

CANADA'S LEADERS IN SUSTAINABILITY

2016
Clean50
Outstanding Contributors to Clean Capitalism

THE GLOBE AND MAIL

TUESDAY, NOVEMBER 24, 2015

SECTION C

Celebrating outstanding achievements in sustainability across 16 categories, **Canada's Clean50 Awards** recognize 50 individuals or small teams working in areas from academia to manufacturing who are reducing emissions, saving energy, diverting waste and taking other actions to help build a strong and resilient low-carbon economy.

The Clean16: The top honourees in 13 of the 16 award categories, including Premiers Philippe Couillard and Kathleen Wynne, and Clean50 founder Gavin Pitchford. AMY JIN



Each year, Canada's Clean50 honourees are chosen from over 500 nominees across 16 different sectors by leading sustainability and clean tech search firm Delta Management Group, with advice from industry advisors and based on the nominees' submissions. Delta founder Gavin Pitchford created the award in 2011 to bring together leaders from numerous sectors with a view to encouraging cross-community learning and col-

laboration that could inspire others. The Clean50 Awards also recognize 10 emerging leaders under the age of 35, and 15 innovative sustainability projects that can inform and inspire others. Please visit clean50.com for more information.

INSIDE

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Online? Visit globeandmail.com/adv/clean50 for more information.

In advance of the COP21 Conference in Paris: An open letter to Prime Minister Trudeau, Environment and Climate Change Minister McKenna, and our Premiers.

The evidence is overwhelming that climate change is substantially caused by human activity, and if left unchecked, will have a significant impact on our economy, weather, infrastructure, forests, fisheries and food supply. But we can do something about that.

With your leadership, Canada can act to build a cleaner, more prosperous economy – and keep pace with the world's most advanced countries.

A strong economy and a healthy environment go hand in hand. Sustainable corporations outperform peers on growth, profit, and employee retention. Canadians are making more environmentally responsible choices for their energy, transportation, food and products. As a result, a growing group of business leaders, academics and consumers agree that "green" is good for Canada.

We concur: **There is great opportunity for Canada in such action**, derived from exporting our clean technologies and know-how, making our resource and manufacturing firms sustainability leaders, building clean, advanced infrastructure and by adopting renewable energy targets. All will serve to lessen our impacts upon the planet upon which we all rely for sustenance.

As political leaders from across Canada seek to join the worldwide response to climate change in Paris next week, we, the following members of Canada's Clean50, urge all Canadians to join us in the following message to our leaders as they represent Canada in Paris:

- **Please act now:** Set appropriate national targets for reducing greenhouse gas emissions. Canada can again be a leader.
- **Create a national sustainable development plan.** Put in place strong policies that ensure we meet those targets, including a price on pollution, and incentives that accelerate adoption of cleaner choices.

Further delay will be costly to all of us. If we act now, we can build a greener, stronger future for Canada.

This message is supported by the following individual members of Canada's Clean50, and where shown, their organizations. All signatories contributed to the cost.

Pictured Right: Row 1: Kerry Adler, CEO, Skypower Global; Helmi Ansari, CEO - GROSCHÉ Intl.; Celine Bak, President - Analytica Advisors; Brian Bentz, President and CEO - Powerstream; Philippe Bernier, Triovest Realty Advisors; Andre Boulet, CEO - Inventys; Kent Brown, BluEarth Renewables; Row 2: Lloyd Bryant, HP; Peter Busby, Perkins+Will; Robert Cadieux, Fellow; Chris M Campbell, Marine Renewables Canada; Charles Cartmill, CEO - Solar Global Solutions; Stephen Cheeseman, CEO - Chinook Power Corp.; Richard Corley; Row 3: Prof. Ray Côté; John D. Coyne, Unilever Canada; Pauline D'Amboise, Desjardins Group; Arthur De Jong, James Dean, CEO - dPoint Technologies; Lisa DeMarco; DeMarco Allan; Dr. Ron Dembo; Zerofootprint Software; Row 4: Audrey Depault, Climate Reality Canada; Ron Dizey, MaRS Cleantech; Jonathan Dogterom, MaRS Cleantech; Frank Dottori; Frances Edmonds, HP; Stewart Elgie, U of Ottawa; Tom Ewart; Blair Feltmate, Intact Centre on Climate Adaptation; Row 5: Mike Gerbis, The Delphi Group; John R. Grace, University of BC; Tim Gray, Environmental Defence; Toby Heaps; Brett Henkel, Inventys; Gord Hicks, CEO Americas - Brookfield GIS; Row 6: Franklin Holtforster, MHPM Project Leaders; Charles Hopkins, UNESCO Chair York U; Celesa Horvath, Ventus Development Services; Martin Janowitz; Jane Kearns, MaRS Cleantech; John Keating; Diane Kilcoyne, DEK Consulting; Row 7: Brent Kopperson, Windfall Centre; Joseph Kuhach, CEO, Nsolv; David Labistour, MEC; Lisa Lafave; Pascale Lagacé, Resolute Forest Products; Michael List, GreenSky Capital; Peter Love, Love Energy Consultants; Row 8: Anthony Marcil; Sandy Marshall, BIC; Dustyn Lanz; Ellen McGregor, CEO - Fielding Chemical; Paul Mertes, CEO - CircuitMeter; Joe Miranda, CEO - Canada Fibers; Mike Morrice, Sustainability CoLab; Row 9: Reza Nasser, CEO - Landmark Group; Ralf Nielsen, MHPM Project Leaders; Robert Niven, CEO - CarbonCure Technologies; Mike Pedersen; Neil Pegram; Ian Philp, MaRS Cleantech; Gavin Pitchford, CEO - Delta Management; Row 10: Dr. Catherine Potvin, McGill University; Francisca Quinn, Quinn & Partners; Tom Rand, ArcTern Ventures; Bill Redelmeier, CEO, Southbrook Vineyards; Carolyn Sedgwick; Katherine Skene; Art Sterritt; Row 11: Coro Strandberg, Strandberg Consulting; Bruce Taylor, P. Eng, Enviro-Stewards; Miriam Tuerk, Clear Blue Technologies; Wal Van Lierop, Chrysalix Venture Capital; Dr. Geoffrey Waters; Kate Whalen; Bob Willard; Not pictured: Prof. Majid Bahrami, SFU; Eric Chisholm; Alexis Esseltine Scoon

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For more information, please visit www.clean50.com

CLEAN50

LEADERSHIP

Sustainability professionals help organizations achieve concrete results

Many companies promote themselves as being "green." However, there's a big difference between scratching the surface and talking about sustainability compared to taking real action that both helps support a low-carbon economy and drives financial rewards for the organization, says Gavin Pitchford, chief talent officer at Delta Management Group.



"If you have the right people on the team and are taking action, at the end of the day pursuing sustainability improvements doesn't cost you money, it saves you money."

Gavin Pitchford is chief talent officer at Delta Management Group and founder of the Clean50 Awards program

"The key is having experienced sustainability professionals leading the effort to bake sustainability into the operation: this not only reduces a company's carbon footprint, but also helps it to reduce costs and attract and retain both employees and customers," says Mr. Pitchford, who is also the founder of Canada's Clean50 Awards program.

"The companies that are seeing sustainability as a strategic megatrend have discovered, in the process, all sorts of opportunities for cost savings, cost avoidance and improving what they are delivering to their customers and their employees."

He points to members of the Clean50, which again this year include companies and leaders across a wide range of sectors – from banking, transportation, technology, real estate and retail to government and First Nations.

One of this year's Clean50 honourees is Compugen Finance's Green4Good director Steve Byrne, who has led the effort that has helped to divert more than 580,000 different information technology assets from landfill. Another example is Eric Chisholm, leader of WSP Canada's sustainability team, who has helped the company implement conservation measures at its buildings across Canada that have saved the company \$20-million annually in utility costs.

"If you have the right people on the team and are taking action, at the end of the day pursuing sustainability improvements doesn't cost you money, it saves you money," says Mr. Pitchford.

"Companies that don't have sustainability professionals overlook opportunities and can make bad decisions."

More governments are also getting the message, Mr. Pitchford says, pointing to Ontario and Quebec, whose premiers also made the Clean50 list this year.

Ontario Premier Kathleen Wynne was cited for positioning Ontario "as an environmental leader" through measures such as the recently introduced cap-and-trade system to reduce carbon emissions, while Quebec Premier Philippe Couillard was recognized for his taking "concrete steps" to help mobilize governments ahead of the upcoming United Nations Climate Change Conference in Paris.

"Governments are starting to grasp the urgency," says Mr. Pitchford, who hopes new carbon policies will inspire more corporations to bulk up their sustainability staffing and programs.

"The smart companies have been doing it all along, recognizing that it's more than skin deep and requires a true

change in strategy, led by professionals."

That includes TD Bank Group, which hired Karen Clarke-Whistler as its chief environment officer back in 2008. TD says it has invested more than \$7-billion in the low-carbon economy between 2006 and 2014, across a wide range of initiatives from green building energy reduction initiatives, to loans for small-scale renewables and energy.

Ms. Clarke-Whistler says the bank provides loans for clean energy projects to businesses and organizations of all sizes and across various industries.

"In almost every single sector of the economy, from the very traditional to the emerging sectors of clean tech, there is a focus on how to do more with less," Ms. Clarke-Whistler says. "There are no good and bad sectors in this, and that is what I think is really exciting."

Another sustainability leader is HP Canada Co., which has received widespread recognition for its initiatives and leadership. An example is its Eco Advocates program, which tackles HP's largest carbon footprint area: customer use

of its products. The program prepares HP employees to talk with customers and colleagues about environmental stewardship and solutions.

"Sustainability is a team sport," says Frances Edmonds, director of environmental programs for HP Canada. "You have to educate, because generally people aren't taught this in school."

The company is also behind the WWF Living Planet @ Work Championed by HP: an employee engagement program that offers free guidance to hundreds of businesses on how to deliver environmental sustainability initiatives within their organizations.

Ms. Edmonds says more people are seeking out employers that are environmentally and socially responsible, which in turn helps to increase the results of the sustainability programs.

"It all starts at the recruitment stage," she says. "Hiring employees that are supportive of corporate social responsibility and volunteering is critical, and then telling your story attracts more people who value what you do."

CLEAN50 LEADERS



Canada's Clean50 Honourees gathered for a group picture after a day of working in cross-sectoral teams to develop solutions to fight climate change at the Clean50 Summit in September. AMY JIN

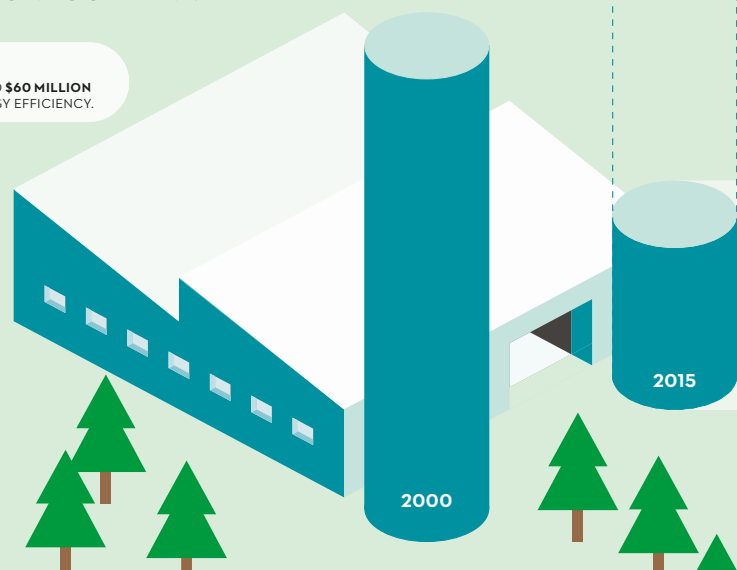
Some of the results recognized in this year's Clean50 Awards acknowledge specific individuals who have led efforts resulting in:

- saving the Experimental Lakes Area in Ontario,
- providing startup expertise to clean-tech companies that now employ 1,456 people and generate annual revenues of more than \$245-million,
- bringing together 64 academics from across Canada to create a blueprint for Canada's sustainability,
- discovering a new way to mine the oil sands using no water and producing 80 per cent less greenhouse gases,
- providing clean renewable energy to 45,000 homes,
- conserving 410 gigawatts of electricity,
- diverting 580,000 computer and other IT assets from landfills,
- installing over 400 EV (electric vehicle) charging stations on the Trans-Canada Highway,
- announcing and imposing a price on carbon pollution, and
- creating four promising clean-tech companies.

RESOLUTE ON ENERGY AND CLIMATE

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SOUND INVESTMENTS
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OUR ORIGINAL GOAL: 65%

70%

REDUCTION IN ABSOLUTE GHG EMISSIONS BELOW 2000 LEVELS BY 2015.

107%
OF OUR GOAL COMPLETED*

- INDUSTRY-LEADING
- EQUIVALENT OF TAKING 1.74 MILLION CARS OFF THE ROAD



*31% OF THIS WAS ACHIEVED BY REDUCING PRODUCTION TONNAGE, WHILE 69% WAS ACHIEVED BY REDUCING GHG INTENSITY OF EXISTING OPERATIONS.

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CLEAN50 RECOGNIZES LEADERS WHO HAVE MADE THE GREATEST CONTRIBUTIONS TO SUSTAINABLE DEVELOPMENT OR CLEAN CAPITALISM IN CANADA.

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AS OF APRIL 2014, ALL OF RESOLUTE'S OPERATIONS ARE **100% COAL-FREE***

* EXCLUDING COAL USED IN BOILERS NOT OWNED BY RESOLUTE, I.E., ELECTRICITY PROVIDERS

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ELECTRICAL POWER

WE MAKE ELECTRICITY AT OUR HYDROELECTRIC DAMS AND COGENERATION FACILITIES.



ALTERNATIVE SOURCES*

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72%

TOTAL ENERGY NEEDS FROM RENEWABLE SOURCES



77%

FUEL ENERGY USAGE FROM BIOMASS

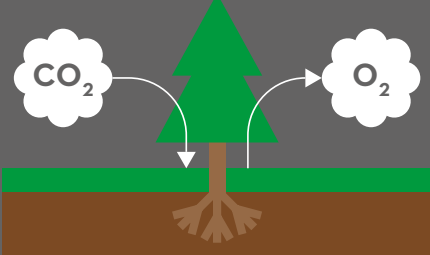


20%

ELECTRICITY WE PRODUCE OURSELVES

DID YOU KNOW?

SUSTAINABLY-SOURCED FOREST PRODUCTS ACT AS AN ADDITIONAL GLOBAL CARBON RESERVOIR FOR MITIGATING CLIMATE CHANGE. THIS IS ESPECIALLY TRUE WHEN FOREST PRODUCTS ARE USED INSTEAD OF MORE CARBON-COSTLY MATERIALS LIKE STEEL AND CEMENT.



WHAT'S NEXT?

- INVESTING IN TECHNOLOGIES THAT ALLOW US TO REDUCE OUR SCOPE 2 GHG EMISSIONS
- INVESTING IN MORE CLEAN ENERGY PROJECTS
- FURTHER ENHANCING EFFICIENCY AT OUR OPERATIONS
- TRACKING SCOPE 3 GHG EMISSIONS

Visit globeandmail.com/adv/clean50

PARTNERSHIPS

Growing momentum for low-carbon economy brings opportunity for sustainable solutions

While there are reasons to be pessimistic about the impact of climate change on the environment, Karen Clarke-Whistler prefers to remain upbeat.

The chief environment officer at TD Bank Group says a lot of good and important work is being done across industries and by some governments around the world to help reduce harmful greenhouse gas emissions, save energy and shrink society's overall environmental footprint.

"Obviously it could be moving more quickly, but I think we've moved from years of what I call 'analysis paralysis' to the point where there is widespread recognition of the problem and a focus on solutions," says Ms. Clarke-Whistler.

She points to new carbon pricing policies in places like Ontario and the momentum among government and industry in Canada and around the world heading into the upcoming United Nations Climate Change Conference in Paris, where global leaders are set to tackle tough environmental challenges. According to a recent report from the United Nations Climate Change Secretariat, the world is on track to make a "significant dent" in cutting greenhouse gas emissions without sacrificing economic growth.

"I feel we've passed a very important tipping point at this stage, and having a strong regulatory base is only going to help," says Ms. Clarke-Whistler. "It's very interesting to me the momentum that has been building even without that."

Ms. Clarke-Whistler has a unique perspective from a bank that offers financing to a wide range of businesses, including those involved in clean technology. TD is often sought out as a trusted environmental partner by many of its leading energy clients and by governments on issues relating to carbon reduction.

In 2010, TD became the first North American based carbon-neutral bank. Within the bank's retail branch network, the green building program supports solar generation at more than 115 locations. Between 2006 and 2014 TD



Through an ongoing partnership with the Nature Conservancy of Canada, the TD Forests program has protected over 15,000 hectares of Canada's forest ecosystems, including a 158-acre (64-hectare) property along the Salmonier River in Newfoundland. MIKE DEMBECK



"Creating an inclusive approach that doesn't call out 'good and bad guys' is vitally important, especially to established industry sectors."

Karen Clarke-Whistler
is chief environment officer at TD Bank Group

provided nearly \$7-billion in financing to the low-carbon economy. TD also has a large portfolio of renewables financing and in 2014 became the first commercial bank in Canada to issue a green bond, which supports low carbon projects related to energy, buildings and infrastructure.

TD has published a number of high-profile thought leadership reports on the environment and the economy, and most recently is considering natural capital and how including it in the decision-making process can lead to better outcomes both financially and for society at large. TD says its own carbon neutral commitment leads to a reduction in carbon emissions and air pollution that has a natural capital value of \$18-million annually.

"I think all of us have a role to play in helping to reduce energy and

emissions, not just corporations and government; a lot of it also comes down to the consumer level," says Ms. Clarke-Whistler.

Companies and governments can contribute by helping consumers better understand the environmental impact of the goods and services they buy. Ms. Clarke-Whistler says banks can also step up their efforts on financing emerging clean technologies.

She is calling for "an inclusive approach" to help develop the economic transformation towards a low-carbon economy. That includes both natural resource-based and traditional "bricks and mortar" industries.

"Creating an inclusive approach that doesn't call out 'good and bad guys' is vitally important, especially to established industry sectors," she says. She cites the example of Ontario,

which benefits greatly from linkages to the oil and gas and the auto manufacturing industries, both of which have taken strong action linked to greenhouse gas emissions.

"The transition to a low-carbon economy has potential benefits for numerous sectors," adds Ms. Clarke-Whistler.

She says the key is to grow and support clean-tech companies through education and training programs, which in turn will help to ensure entrepreneurs have the financial literacy and business skills to successfully create and grow businesses and secure financing.

"In Canada, what we need to do more of is provide recognition of what we are doing to help move towards a low-carbon economy," she says. "We can do it if we all work together."

PANEL

As a Clean50 leader, how are you contributing to a low-carbon economy?



SCOTT VAUGHAN
President-CEO
International Institute for Sustainable Development



JUDITH SAYERS
Strategic Advisor
Sayers Strategic Advice



JIM VANDERWAL
Senior Manager
Climate Change & Air Quality Program, Fraser Basin Council



TIM GRAY
Executive Director
Environmental Defence



CATHERINE POTVIN
Leader, Sustainable Canada Dialogues,
Canada Research Chair on Climate Change Mitigation and Tropical Forests, Professor, Department of Biology, McGill University

In 2014, the International Institute for Sustainable Development (IISD) assumed management of the Experimental Lakes Area (IISD-ELA). IISD-ELA is the only whole-ecosystem research facility in the world. Each day, its scientists play an indispensable role in bridging science with urgent freshwater policy needs within Canada and globally.

Bridging evidence with policy is the basis of IISD's work in some 70 countries. IISD's economists help reveal the consequences of the \$550-billion spent yearly on fossil fuel subsidies, and push for their elimination. Our climate mitigation work supports policy coherence among distinct carbon pollution reduction approaches within Canada, while identifying how Canadian efforts can leverage opportunities with U.S. and Mexican partners.

IISD's legal, economic and financial experts advance reforms in trade, investment and financial systems to deliver fair benefits and accelerate environmental protection. One example is our work with China to advance green finance through green bonds.

IISD has made international negotiations more transparent. Each day, IISD Reporting Services teams provide authoritative coverage of global negotiations so critical to our future. Later this month, 50 IISD experts will cover the historic Paris Climate Summit, as well as host a number of senior meetings and public events.

To learn more about what we do, visit www.iisd.org.

There is no issue more critical to me than living in a low-carbon economy in order to reduce the negative impacts of greenhouse gases (GHG) on Mother Earth. These impacts are quickly changing the quality of our way of life. We must take measures to protect the ecosystems that allow us to exercise our rights as First Nations people.

As a Clean50 leader, I am advocating for more opportunities in B.C. for First Nations to develop clean energy projects. I am working to help build capacity in First Nations communities to develop their own clean energy projects. I also help bring awareness to issues that arise due to climate change.

Education of the public is key to a low-carbon economy and I use every opportunity I have through public speaking and social media to relay pertinent information. My own lifestyle is one that reduces my own carbon footprint. For the future, I see an increasing need for me to advocate for clean energy and help find mechanisms to reduce GHG. I will always be part of the movement to ensure a low-carbon economy as the future of the next seven generations weighs on us heavily.

The Fraser Basin Council (FBC) is helping advance electric transportation – one important way for B.C. to meet its greenhouse gas reduction targets and transition to a low-carbon economy.

As with any new technology, electric vehicles will require the efforts of many champions to join the mainstream. FBC is part of a multi-partner collaboration of provincial and local governments, utilities, researchers, businesses and electric vehicle owners – all working together to support the electric vehicle (EV) market.

One key to success is better public awareness. It's why we launched an outreach campaign called Emotive, the Electric Vehicle Experience. The campaign introduces the public to electric cars in a fun and engaging way, and shares the real-life stories of EV owners. Another key to success is charging infrastructure. Since 2012 we've worked with our partners to manage the roll-out of over 500 public electric vehicle charging stations throughout B.C. Now drivers can charge up on the road and go electric in confidence.

We are also supporting B.C. companies and local governments through a peer-to-peer network called West Coast Electric Fleets. We help fleet managers evaluate the integration of electric vehicles into existing fleets and build a business case for the change.

As a Clean50 Leader and the executive director of Environmental Defence, one of my areas of focus is convening over 80 organizations in the Clean Economy Alliance. We are working collaboratively to propose smart, robust climate action for Ontario and beyond. The Alliance supports putting a meaningful price on carbon, a transition away from fossil fuels and the creation of a clean economy.

We developed recommendations for Ontario's cap-and-trade program and have offered concrete examples of where the Province can take action in the areas of buildings, transportation and energy. At Environmental Defence, we are also working successfully to halt the creation of fossil fuel infrastructure, such as pipelines, that would prevent Canada from achieving its carbon emission reductions.

As a leading environmental charity, we are also extending our expertise to support climate action in Alberta at the federal level. We have great hopes for new national action at COP21 in Paris in December and are working hard to ensure that Canada returns to the world stage as a climate leader.

With Sustainable Canada Dialogues, I mobilized 60+ Canadian scholars from every province, representing climate change expertise in areas from engineering to sociology, to produce a consensus on science-based, viable solutions for greenhouse gas reduction. In Acting on Climate Change: Solutions from Canadian Scholars we identified 10 policies that could kick-start Canada's transition toward a low-carbon economy and sustainable society. We highlighted the opportunities, for jobs and the economy, stemming from actively pursuing low-carbon electricity, evolving smart urban design, creating participatory and open governance institutions and rising to the challenge of something tantamount to a total transportation revolution. Convinced that putting options on the table was long overdue in Canada, I shared our solutions widely and invited feedback. Rising to the challenge, 28 contributors came forward. A second report, Acting on Climate Change: Extending the Dialogue Among Canadians, presents this input from First Nations, business, NGOs, labour and youth from across Canada. With these two reports, I hope we have sown the seed for our new governments to grow an inclusive, countrywide consultation on how Canada can begin this urgent transition. Contributors join me in offering full support to governments at all levels to act now on climate change.

CLEAN50

RESOURCE MANAGEMENT

Strong leadership guides forest products giant on evergreen course

At Resolute Forest Products, sustainability is not only represented in the company's vision and values, but also reflected in the way it does business.

Over the past five years, the Montreal-based company, which owns or operates about 40 pulp and paper mills and wood products facilities in North America and South Korea, has had a mission to become one of the world's top performers, not just in its own sector but also across industries.

Under the leadership of chief executive Richard Garneau (a 2015 Clean50 award winner), Resolute has significantly improved performance in such areas as health and safety, mill environmental performance, energy use and sustainable forest management. Resolute has also developed strong partnerships with local First Nations.

"We have undergone a cultural change here at Resolute that only happens when you have real leadership from the very top of the organization," says Seth Kursman, vice president, corporate communications, sustainability and government affairs at Resolute. "Five years ago, we were a middle of the road performer within our industry. Today, however, we're among a handful of companies globally that have set out to be a world leader and achieved outstanding results. Sustainability is reflected in how we operate every day."

Employees Pascale Lagacé, Alice Minville, Mylene Labrie and Jim Balik were honoured by the Clean50 in the manufacturing and transportation category this year for helping to drive sustainability initiatives at Resolute.

These include new policies to better track all environmental incidents, which led to a 19 per cent decrease in incidents in 2014, and is on track in 2015 for continued improvement.

Resolute has also made investments to eliminate all on-site use of coal, replacing this higher emission fuel with

"We have undergone a cultural change here at Resolute that only happens when you have real leadership from the very top of the organization."

Seth Kursman is vice president, corporate communications, sustainability and government affairs at Resolute Forest Products



One hundred per cent of Resolute's managed woodlands have been certified to at least one of three internationally recognized sustainable forest management standards. SUPPLIED

natural gas and biomass, and has also reduced its use of heavy oil. As a result, nearly three-quarters of its energy now comes from renewable sources. At the same time, greenhouse gas emissions

have dropped seven per cent since 2013, and 70 per cent since 2000.

Kursman says the measures not only benefit the environment and the company's bottom line, but also better

position Resolute as an environmental leader and a competitive employer, helping to attract and retain top talent.

Resolute has also maintained close ties with 39 First Nations and Aboriginal communities in Quebec and Ontario. Earlier this year, the company announced a groundbreaking Memorandum of Agreement with six First Nations in Ontario that resulted in \$100-million in new Aboriginal business. An agreement with the Gull Bay First Nation to identify and pursue new economic opportunities was signed shortly after, in addition to a collaboration agreement based on employment and training with the Council of the Innu of Pessamit in Quebec.

"It's a really good fit for what we think our role is in forestry," says Chief Sara Mainville of the Couchiching First Nation near Fort Frances, Ontario. "We are thinking about future generations in developing these forests, in doing no harm and leaving more for the next generation."

Ms. Mainville says First Nations are eager to work with companies like Resolute that respect their vision and values for the long term and treat them as partners.

"Forestry is an industry that supports our communities," Ms. Mainville says. "First Nations voices are a little stronger by partnering with industry."

LASTING COLLABORATIONS WITH ONTARIO FIRST NATIONS AND ABORIGINAL COMMUNITIES

Multi-year contracts of more than \$100-million have been awarded to six First Nations through Resolute's Northwestern Ontario investments in the Atikokan, Ignace and Thunder Bay (Ontario) sawmills. A Memorandum of Agreement, renewed earlier this year, has yielded contracts for construction work at Resolute's area sawmills; the transportation of wood chips, biomass and lumber from the sawmills; yard services to manage the loading and unloading of logs, lumber and byproducts; and log harvesting and delivery. These contracts are in addition to existing agreements, worth approximately \$50-million a year, that pertain to the company's other operations in the region and a recently signed agreement with the Gull Bay First Nation to identify and pursue new economic opportunities.



From left to right: Chief Will Windigo, Nigigoonsiminikaaning First Nation; Chief Judy White Cloud, Lac des Mille Lacs First Nation; Richard Garneau, President and Chief Executive Officer of Resolute Forest Products; Chief Earl Klyne, Seine River First Nation; Chief Sara Mainville, Couchiching First Nation; Chief Janice Henderson, Mitaanjigaming First Nation; and Chief Norman Jordan, Lac La Croix First Nation. SUPPLIED

TOGETHER, WE'RE MAKING A DIFFERENCE.

HOW CAN WE DO EVEN MORE?

Canadians right across the nation are helping keep their old electronics out of landfills by responsibly recycling them through EPRA. In fact, by working together, we divert over 15 million devices from landfill each year through our eight regulated e-recycling programs and over 2,100 drop-off locations. Plus, the recovered materials go back into the manufacturing supply chain so that fewer natural resources are required.

Let's do even more!

Continue your commitment to the environment for today and tomorrow. Bring your end-of-life electronics to an EPRA approved drop-off location for safe and secure recycling and help make a difference for nature's sake.



WINNER OF THE 2015 CANADIAN STEWARDSHIP AWARD



To learn more about how you can safely recycle your electronics and to find a drop-off location near you visit www.epra.ca

Visit globeandmail.com/adv/clean50

HEAT RECOVERY

An unlimited source of renewable energy for heating and cooling buildings

Who says you can't make a silk purse out of a sow's ear? Metro Vancouver entrepreneur Lynn Mueller is proving it can be done by building a profitable business on that most basic of biological products: human waste. His technology of extracting the heat generated by sewage is saving clients around the world big dollars every year.

"Sewage is everywhere and it's extremely efficient and reliable," says Mr. Mueller. "The U.S. Department of Energy did a study in 2009 that determined that 350 billion kilowatt hours of energy go down the drain every year just from household uses."

Mr. Mueller, who began his career as a refrigeration journeyman, was fascinated by the possibilities of capturing that heat and repurposing it. He co-founded the Port Coquitlam, B.C.-based International Wastewater Systems with veteran mechanical contractor Daryle Anderson.

Their first residential project was installed six years ago in a 60-townhouse development in North Vancouver. They have since installed the SHARC (short

for sewer heat recovery system) in several Vancouver-area condo projects, a theatre in Richmond and a sewage treatment plant in Sechelt, B.C. Projects

are currently underway in the U.S., Europe and Australia.

SHARC consists of a filter that segregates solids from sewage, a pump

that pushes the filtered water through a heat exchanger, and heat pumps that extract the heat from the exchanger. That heat is used to heat the building,

hot water or both, with the assistance of a computer control unit.

In summer, the process can be reversed with the heat pumps pulling heat from the building and transferring it back into the sewer water. The solids filtered from the wastewater are returned to the wastewater stream that flows into the treatment plant to be cleaned.

Capital costs for SHARC range from about \$250,000 for a condo project to millions of dollars for industrial projects. At the recently completed Sechelt sewage treatment plant, recovering the heat from sewage generated by 8,500 Sechelt residents produces about \$5 of energy for every \$1 in operating costs. That energy is used to heat and cool the 1,790-square-metre plant.

"We have stumbled onto a real monster here," says Mr. Mueller, adding that his company, a 2016 Clean50 award winner, has recently been publicly listed on the Canadian Securities Exchange. "We've gone from a concept to distribution on three continents – North America, Europe and Australia."



Technology developed by International Wastewater Systems recovers the heat generated by sewage to meet the heating and cooling requirements of residential, commercial and institutional buildings, including Sechelt's sewage treatment plant on B.C.'s Sunshine Coast. SUPPLIED

INNOVATION

Edmonton facility converts waste to biofuels

At the Advanced Energy Research Facility (AERF), university, government and industry researchers are working to find more efficient ways to convert waste into clean sources of energy and green bioproducts.

"AERF is a state-of-the-art plug-and-play facility," says Dr. Eddy Isaacs, CEO of Alberta Innovates – Energy and Environment Solutions (AI-EES). "This means technology developers can come and test their processes in this facility in real time and with actual feedstocks."

The \$11-million facility was envisioned by and jointly funded through a partnership between AI-EES and the City

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Dr. Eddy Isaacs is CEO of Alberta Innovates – Energy and Environment Solutions

of Edmonton, who wanted to attract researchers working on novel technologies that could benefit Alberta and help companies accelerate the commercial deployment of their technologies and processes.

"It was our hope that AERF would foster collaborative research projects among industry, universities and national and international R&D organizations," says Christian Felske, general supervisor of engineering innovation at the City of Edmonton. "To date, AERF has been home to eight successful research projects."

Companies are working to develop

cost-effective technologies for converting forest biomass and waste from agriculture, construction or municipalities into clean biofuels and bioproducts. Being able to test products and processes at AERF reduces technology development costs, risks and time.

For example, Enerkem – led by 2012 Clean6 honouree Vincent Chornet – is seeking ways to enhance biofuel production from waste biomass at AERF, and will then implement these technologies and products at its commercial biofuels facility at the same location. A collaboration between the City of Edmonton and the American Chemistry

Council is evaluating how increased plastics in the feedstock affect the yield of biofuels and other value-added products.

Companies can lease space from AERF and make full use of the facility's waste feedstock preparation system (shredding, air classification, ferrous and non-ferrous metals separation) and a bench-scale gas-to-liquids catalytic research laboratory.

The facility has also become a valuable training ground for the clean energy sector, giving students the opportunity to work alongside highly qualified personnel and gain hands-on research experience in this in-demand and growing area.

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URBAN MINING

Recycling diverts waste from landfill, reuses resources

Canada's recycling industry handles a veritable smorgasbord of waste – everything from plastic pop bottles and newsprint to cell phones and old computer printers.

Regardless of the diversity of junk recyclers collect, they share one common goal: keep it out of the landfill.

To reduce that flow to the garbage dump, recyclers as diverse as the Electronic Products Recycling Association (EPRA) and Canada Fibers are increasingly turning to "urban mining," the harvesting of metals and other materials that are steered away from landfills and returned back to the "remanufacturing stream."

"Since the inception of the program in 2011, we have diverted over 96 million devices that previously would have gone to the landfill," says Cliff Hacking, EPRA's president and CEO. "That feels like success."

In the Association's case, urban mining starts with getting more people to recycle their old electronic gadgets and other devices that contain precious metals such as gold, silver, platinum, and iridium among others, he says.



"Since the inception of the program in 2011, we have diverted over 96 million devices that previously would have gone to the landfill. That feels like success."

Cliff Hacking is president and CEO of the Electronic Products Recycling Association

It serves to divert products and substances harmful to the environment from the landfill, including lead and mercury.

Of particular concern are cathode ray tubes, the most bulky and heavy component of old-style TVs and computer display terminals, where lead was used to fortify the glass fronts. That equipment is now streamed to special verified processors such as Teck Corp., which operates smelters, to extract the lead, says Mr. Hacking.

Urban mining also presents other benefits, such as dramatically reducing energy consumption and greenhouse gas emissions in the process. "It is 10 times more efficient to harvest materials from your old computer or your old printer than it is to have to go and dig the metals fresh from the ground."

The Association, which represents electronics manufacturers and retailers, has been working to create a national end-of-life electronics program, relying in part on environmental handling fees levied at point-of-sale to pay the costs. In four short years, it has developed e-waste programs in eight provinces,

including 2,100 consumer collection sites. It estimates that 100,000 metric tonnes annually are kept out of landfills, diverting over 15 million devices.

Urban mining is equally important to Canada Fibers, which started in 1990 as a Toronto-based broker of recycled papers and expanded into processing the province's blue box materials collection system, which includes plastics. It has recently expanded into manufacturing products and materials for home and industry through an affiliate, Urban Resource Group Inc., says Mark Badger, that company's senior executive.

"It's a unique move," says Mr. Badger. "Typically in the waste business, folks aren't engaged in downstream industrial and consumer products. We like to think by doing this, we keep recovered materials at home in Canada and put them to another productive life here and keep jobs in Canada."

In one program, pallets used to transport products to garden centres are ground up into garden mulch, which the retailer sells back to consumers, in what is called a "closed loop"

strategy, he says. In another, a major form of waste – beverage bottles – is cleaned and ground up to yield polyethylene terephthalate flakes that are used in remanufacturing processes. That has also created about 35 jobs at Urban Polymers, an affiliate created last spring.

Europeans lead the world in diverting wastes from landfills, says Mr. Badger, singling out Belgium for sending a mere five per cent of all raw plastics waste to garbage dumps, while in Canada, 80 per cent of that waste still ends up in landfills.

"In Europe, they have figured it out," he says. "The amount of mechanical plastic recycling in Europe is three to four times greater than what is mechanically processed in Canada."

"When you send something to a landfill, you don't create a lot of employment," he said. "When you transform something and give it a new life, you create a lot of employment."

Mr. Badger says he strongly advocates that Canadian legislators look to Europe to see what has worked there. "The results speak for themselves."



Companies like the Electronic Products Recycling Association and Canada Fibers are involved in "urban mining" – harvesting materials from used electronics or paper and plastics and recycling them back into the manufacturing stream. SUPPLIED



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EMISSIONS REDUCTIONS

Resource-intensive tissue manufacturer achieves environmental gains through innovation and drive

Wood residue that would otherwise end up in a landfill site has become a significant energy source at Kruger Products' paper mill in New Westminster, British Columbia. Replacing carbon-dioxide emitting natural gas, this waste material is converted into a clean-burning synthesis gas, which becomes the steam powering the mill.

The environmental benefits of this biomass gasification system – a first of its kind in the Canadian pulp and paper industry – have exceeded the company's expectations.

"Our goal was to reduce CO₂ emissions by 50 per cent a year and we have actually achieved a 58 per cent reduction, so it's very significant," says Steven Sage, the company's vice president, sustainability and innovation and 2016 Clean50 award winner. The annual decline in emissions is equivalent to the impact of planting three million trees or removing 5,500 cars from the roadways, he says.

The system at the New Westminster mill was the first major project under Kruger Products' five-year sustainable development plan, Sustainability 2015.



Kruger's pulp mill in New Westminster, B.C., introduced the first biomass gasification system in Canada, leading to a nearly 60 per cent reduction in CO₂ emissions. SUPPLIED

The plan called for actions to reduce the firm's environmental footprint related to emissions, use of energy and water, logistics, packaging and more. Across the board, Kruger Products has reduced its energy consumption in Canada by more than eight per cent and its

greenhouse gas emissions (GHG) by more than 22 per cent.

Kruger Products believes it has a responsibility to show industry leadership in fighting climate change and achieving other environmental gains. The company is the leading manu-

facturer of tissue products in Canada for both home and business use. On the consumer side, it produces such market-leading brands as Cashmere, Sponge Towels and Scotties.

"In making these products, we are a natural resources-based company;

we need forests, energy and water to make paper. We are very aware of those components and our responsibility to manage them as responsibly as possible," Mr. Sage says.

"We also recognize that sustainability is good business sense. Reducing our energy consumption not only supports our climate change mission but cuts costs and allows us to meet stakeholder expectations. Many of our key customers are holding us accountable for environmental stewardship."

Other flagship projects that have reduced energy use and GHG emissions are heat-recovery systems in two plants near Montreal. The systems capture hot, humid air from the plants' machinery and reuse it to heat processing water and the facilities themselves in winter.

The company is now developing its new plan, Sustainability 2020. "We will set more ambitious goals for energy, water and emissions reductions, as well as social responsibility objectives," says Mr. Sage. "We are excited about continuing on this journey of sustainability leadership."

OPPORTUNITIES

Company's success in measuring energy use at circuit level fuels plans for expanding into new markets

Organizations wanting to improve their bottom line would do well to take a close look at their electrical bills. The U.S. Department of Energy estimates that 30 per cent of the US\$250-billion spent on energy in the country is needlessly wasted.

The problem is figuring out where that energy is being lost. And that's where CircuitMeter has an innovative solution. The Toronto-based company has developed an inexpensive metering technology that can provide instant electricity use data at the circuit level, says CEO Paul Mertes.

Over the past two years, CircuitMeter has installed its technology in commercial, institutional and industrial buildings. "We've established the functionality of the technology, the economics of the installation and gathered examples of the energy and cost savings enabled through the system data and analytics," says Mr. Mertes.

The technology has helped companies quickly identify energy-draining



CircuitMeter's leadership team – Michael Ordanis, chief technology officer; Dan Seto, chief operating officer; and Paul Mertes, chief executive officer – has developed technology to record electricity use data at the circuit level, which enables companies to identify energy inefficiencies and ultimately benefit from significant cost savings. SUPPLIED

inefficiencies that include exhaust fans operating 24/7 when they should have been powered down overnight, parking lot ramp heating systems operating in July and conveyor motors operating with a power factor of less than 0.3.

CircuitMeter is now embarking on its next stage of growth, raising capital to finance marketing and sales, hire additional employees and expand its operations within Canada and abroad.

CircuitMeter's expansion plans reflect the opportunities for growth in the clean-tech sphere. As part of Canada's fastest-growing sector, clean-tech companies are adding jobs and revenues at a greater pace than those in the traditional sectors of our resource-rich country.

However, Canada is a small market, and creating a thriving business requires looking beyond our borders. "The Canadian market is too small on its own, and our clean-tech companies need to pursue international markets," says Tony Van Bommel, the senior

"Early-stage companies like us need enthusiastic industry partners to adopt new technologies, and a more aggressive stance by public sector bodies would also help."

Paul Mertes
is CEO at CircuitMeter

managing partner of BDC Capital's \$152-million Industrial, Clean and Energy Technology Venture Fund.

Both Mr. Mertes and Mr. Van Bommel agree that the first step to international success is for clean-tech companies to prove their technologies close to home.

"Early-stage companies like us need enthusiastic industry partners to adopt new technologies, and a more aggressive stance by public sector bodies would also help," says Mr. Mertes. "Improved productivity, a lower cost structure and advanced energy and environmental performance will enhance any organization."

Adds Mr. Van Bommel: "For Canada to be a leader in this field, we need Canadians to support these technologies. We tend to be late adopters, but it's time for us to become early adopters of clean tech. It will benefit us as Canadians and it will benefit our companies, enabling them to grow both here at home and around the world."

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OPINION

Lighting the path to climate change action

By Clean50 and Clean16
Honourees Mike Gerbis, CEO, GLOBE Series, and Chris Henderson, Chair, GLOBE Series



Paris is referred to as the City of Light, in part because it was one of the first European cities to adopt gas street lighting. In December, Paris will host COP21, a global climate change meeting, and our hope is that this critical meeting will lay a clear and bright path to a more sustainable energy and environmental future.

It is possible – but only if COP21 talk is translated into action. Along with governmental leadership, capital investment and technology innovation on the part of business and cities is the only way to move towards meaningful climate change.

We need to dramatically scale-up clean tech, clean energy and sustainable infrastructure innovation in industries such as the electricity and oil and gas sectors, transit, inter-model shipping, manufacturing, agriculture and natural resources to effectively reduce global and Canadian greenhouse gas emissions. That is the global business imperative.

Of course, it is much easier said than done. It requires a completely new

mindset to catalyze our transition to a sustainable energy future. Without a doubt, public policy leadership is imperative. Canada's new prime minister, Justin Trudeau, deserves credit for inviting provincial leaders to join Canada's delegation to the Paris Climate Change conference. All governments need to rapidly move to establish a pan-Canadian climate change framework connected to a Canadian energy strategy. The approach needs to foster co-operation with the United States and other global partners on energy and climate issues.

Climate-proactive public policy has the potential to catalyze Canadian low-carbon technology and services solutions that can be exported to global markets. Early entrants into such new economy, enterprise and employment-friendly trade opportunities will have a competitive advantage.

The Pacific-Indian oceans nexus will be the hub of sustainable energy infrastructure growth, underpinned by the economies of the U.S., China and India.

The carbon marketplace is just emerging. As industry sectors and cities consider capital investment in sustainable solutions, buyers need to be connected with sellers. This requires new modes of market relationships and a more collaborative commercial approach to matching low-carbon demand with value-additive solutions.

More than 80 per cent of Canadians, and a growing number of people around the world, live in cities. The greenhouse gas emissions footprint of homes, institutions and businesses is moulded by urban design, energy sources, transport infrastructure and nature. Compellingly, now is the time for cities worldwide to embrace a 100

per cent renewable energy future – a powerful people-centered, climate-friendly and economically prosperous goal.

Not to be underestimated is the pivotal decision-making role of large corporations. These global enterprises will be at the forefront of carbon innovation as they fuse business strategy with corporate social responsibility in a climate change future reality. As corporations undergo a transition to a cleaner energy, they will certainly have to engage with communities, NGOs and indigenous peoples.

Innovation for a low-carbon future is the product of a business-government-society collaboration and creativity. Society is ready. Let's make sure our political and business actions, following the time spent in the City of Light, both illuminate and mobilize business innovation for the planet.



Cities offer significant opportunities to reduce greenhouse gas emissions through smart investments in transport infrastructure and green technologies. ISTOCKPHOTO.COM

The University of Ottawa congratulates Stewart Elgie, professor of law and founder of Sustainable Prosperity, on his Clean 50 award

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OPINION

Five ways to build a low-carbon, high-octane Canadian economy



By Stewart Elgie, Professor of Law and Economics at the University of Ottawa, and Chair of Sustainable Prosperity

Justin Trudeau will join world leaders at next week's Paris Climate Summit to chart a course to a low-carbon future. The most advanced nations aren't waiting. They are hard at work building cleaner, more innovative economies to compete in a changing global marketplace – one that will reward countries and companies that find new ways to generate wealth and jobs with less impact on the planet.

Canada is well positioned to thrive in this changing global economy. Our burgeoning clean-technology sector can tap into a rapidly growing market expected to exceed \$2-trillion by 2020. At the same time, demand continues to grow for energy and natural re-

sources that are a big part of Canada's economy. These sectors face rising pressures for cleaner production, as our oil industry is learning, and firms that succeed will gain market advantage.

To ensure Canada's place in this new order, we need to boost both our environmental and economic performance. Experts call this "decoupling" economic growth from environmental harm. It isn't easy, but it is possible. In fact, we have already done it in a number of places. Ontario, for example, reduced greenhouse gases by 19 per cent since 2005 while growing its GDP, mainly by shifting from coal to cleaner power. Since 2000, Canada's forest sector has improved its environmental performance and cut its emissions in half, building market access with a new green brand. With the right mix of smart public policies and private initiative, growth can be green.

There are five key strategies for Canada to build a cleaner, stronger economy that positions us to prosper in a changing world.

- 1. Price pollution and waste.** Ensuring prices reflect the real cost of harm to air, water and land will create real incentives for greener choices by industry, consumers and investors alike. B.C.'s carbon tax, for example, helped cut fuel use by 16 per cent from 2008-2013 while its GDP outpaced the rest of Canada.
- 2. Accelerate clean innovation.** Finding new, affordable ways to solve environmental problems is the key to success in a greening global economy. We've seen prices for solar panels and electric car batteries plunge by over 60 per cent in the past six years through smart policies and entrepreneurship. Imag-

ine unleashing that same kind of eco-ingenuity across the Canadian economy.

3. Invest in advanced infrastructure. The smart economy of tomorrow will run on next-generation energy, transportation, water and waste systems. With a big investment in clean infrastructure now, as Justin Trudeau has promised, we can reduce our environmental footprint for decades to come, and build capacity to help Canadian firms compete for the \$90-trillion the world will spend on better infrastructure by 2030.

4. Boost energy and resource efficiency. Doing more with less is essential to a high-performance, low-impact economy. Existing technologies – for more efficient buildings, vehicles and industries – can cut energy use by over 25 per cent and save money. And Canadian producers can help provide the resource efficiency breakthroughs needed to meet the world's growing demand for food, water, energy and materials – a \$1-trillion per year opportunity.

5. Conserve and value nature. Canada's natural systems provide us with clean air, fresh water and other priceless services that are the foundation of our economy, health and way of life. By creating world-class stewardship and protected areas regimes we can conserve our precious natural capital for future generations.

Canada has a proud history of taking far-sighted policy actions to prepare for global economic changes, from free trade to the global financial crisis. That same kind of leadership is needed now to spur environmental solutions and secure Canadian competitiveness and jobs in a low-carbon world.

BY THE NUMBERS

Since 2012, Clean50 members have:

STARTED **4** clean-tech companies

CONSERVED **410 Gwh** of electricity

PROVIDED clean electricity to **45,000** homes

Source: Clean50



Over the past six years, solar energy panels have dropped in cost by more than 60 per cent, making them a more affordable option for individuals and organizations wanting a greener alternative. ISTOCKPHOTO.COM

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