Ontario
Eco-Smart School Campaign 2009-2010

“Climate change is agreeably one of the greatest threats facing our future generations, but it is also the greatest opportunity for business and technology to work together to solve environmental, social and economic problems.

And the new green revolution will be lead by this generation of eco-literate students who represent the real agents of change”.

John Fullerton
CEO
Green At Work Inc.
Eco-Conference 2008
Canada

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The **Changing Nature of Environmental Education**

The intention of the following presentations is to provide a resource for Ontario educators that focuses on the opportunities for social and economic development in the battle to reverse global Climate Change.

The specific expectations corresponding to these resources provide opportunities for making practical Environmental Education connections.

Presented by **Green@Work LLC**
Rainy River District School Board, Ontario Canada

“Societal concerns about protecting the environment and dealing with Climate change will have an effect on available jobs and on the demand for various types of labour and skills, as well as on practices in the workplace.”

Produced by
Green @ Work LLC, Florida USA
&
Rainy River District School Board, Ontario Canada
Based in West Palm Beach, Florida
In Publication since 2000
Fortune 1000 clients- Ford, GM, Wal-Mart, Home Depot, Starbucks, Coke, Xerox, GE and Staples
Second Nature Media Partner (Green Campus ACCU)
50+ Major North American Green Conferences
Green North Eco-Conference 2008
Ontario Eco-Smart School Campaign 2008-2009
For two days in March 2008, renowned international sustainability experts gathered at Confederation College in Thunder Bay to celebrate Greening Ontario and to host the region's inaugural "Green North Eco-Conference 2008".

At the close of the Green North Eco-Conference 2008 a number of participating students and educators approached the conference organizers to determine what would be required to deliver a select portion of the conference materials to High School students across Ontario.

The following presentations provide information selected from the 2008 Canadian conference and other materials provided by corporate and academic partners.
Value of **Eco-Literate** Students

- Ontario’s senior High School students represent our province’s next generation of decision/policymakers, business owners and educators.

- Students represent a powerful demographic as their numbers now surpass the baby boomer generation as the leading global consumers.

- The power of thousands of High School students living in our communities, who understand the basic fundamentals of environmental issues and practical approaches for a sustainable future is priceless…….
Ontario Eco-Smart School Resource Presentations 2009-2010

Student Presentation # 1 - 60mins

- Energy and the Ontario Economy
- Developing Ontario's Alternative Energy Sector
- Green Buildings
- Bio-Economy
- Ontario's Future
- Green Business Innovation & Ideas
- Top 25 Green Careers for 2009
- Ontario Eco-Smart School
- Bio-mimicry.. Natures Test Lab

Student Presentation # 2 - 60mins

- Business Case for Sustainability (Hunter Lovins) TIME Magazine’s ‘Hero of the Planet’
- Developing Your School's Green Team - Staff Resource Guide (“The 19 Reasons Sustainable Change Doesn’t Happen In K-12 Education”)
Ok, Let’s get started…
What if you could actually see Green House gases....
Energy and the Ontario Economy

- Forestry - 45% unemployment rate 2008-2009, **Causes:** the price of energy, the Canadian dollar, low commodity prices.

- Manufacturing - 2005-2008, down 37% **Causes:** the price of energy, the Canadian dollar, global outsourcing.

- Transportation – 2008, gas hit a record high of $1.30 liter - drives inflation and impacts virtually every sector of the provincial economy.

- Agriculture - 2006-2008, Record family farm bankruptcies **Causes:** the price of fuel, shipping costs, the Canadian dollar, low commodity prices.

- 2008, Ontario Power Authority warns the public, “We will not be able to produce enough domestic power to meet provincial demand by 2012.”
Developing Ontario's Alternative Energy Sector

- Wind
- Solar
- Bio-Fuels
- Bio-Refineries
- Geo/Hydro Thermal Energy
- Gas Generation Systems
Canadian Alternative Energy Hot Spots

Radiant Solar Energy

Biomass Availability

Average Wind Resource

Earth Heat Flow

Legend:
- Poor Resource
- Excellent Resource
The Clean Energy Standard Offer Program (CESOP)

- The Clean Energy Standard Offer Program (CESOP) will support small clean energy generators.
- The Program is intended to encourage participation by a variety of clean energy technologies, including natural gas-fired Combined Heat & Power (CHP), by-product fuel-fired generation projects, and generation projects fuelled by under-utilized energy (thermal or mechanical) sources.
Wind Generation in Canada
Wind Energy Ontario

- The Ontario Government has received over $5 billion dollars worth of Wind project funding applications from communities across Ontario (2009).

- Example: Sault Ste. Marie - The Prince Wind Farm on the shores of Lake Superior is Canada’s largest wind farm generating 189 megawatts of power.

- By the end of 2008, Ontario will generate up to 1,300 megawatts of wind power, an 80-fold increase over 2003. This will make Ontario… Canada’s leader in wind generation.
Example: Ventus Energy and Wardrope Engineering have proposed a wind farm to be located on 10 square kilometers of land east of Thunder Bay. The project proponents have been studying the wind resource in the area since 2004.

- The wind resource assessment shows that the 100 megawatt Lake Head Wind Farm will produce enough electricity for 30,000 average households.
Wind Energy Ontario

- Ontario has only scratched the surface of its massive wind energy potential, which currently powers the equivalent of 563,000 Canadian homes. Tomorrow we hope to do even more. Countries like Denmark already get over 20% of their electricity from wind. If we did the same in Canada, we would have enough wind energy to power 17 million homes! As long as the wind continues to blow, there is a great future in wind energy.
Bio-Fuels
Ontario’s Tar Sands....
Bio-Fuels

- All gasoline sold in Ontario is required to contain an average of at least 5% ethanol and a biodiesel standard is in development.
- There is no federal fuel tax on ethanol or biodiesel fuel in Ontario.
- The Ontario Ethanol Growth Fund (OEGF), is a 12-year, $520 million (Cdn) program, that provides capital for new or expanding ethanol plants, operating assistance to help manage fluctuating prices and support for independent blenders of ethanol.
- Sustainable Technology Development Canada (STDC) finances and supports the development of clean technologies, including ethanol and biodiesel, with its $550 million (Cdn) fund.
Abitibi-Bowater announced a $84.3 million investment to construct a new biomass energy generator at its Fort Frances pulp and paper mill in Ontario.

Between the new biomass and existing cogeneration facilities, as well as the company's local hydro-electric dams, the Fort Frances facility will be 86 per cent energy self-sufficient.
Innovation and Research Minister John Wilkinson is right in thinking that the best bio-fuel solutions are going to come from Ontario. If there’s one thing we know in this Province, it is our forests.

The benefit to communities in the Forestry business could potentially be worth billions. Bio-fuel development with refineries promises that Ontario could be the next Alberta tar sands.

Later this year Ontarian’s should have a better idea of just how the province’s $25 million commitment to help fund a bio-economy centre for research will move forward.
Bio-Refinery
The forest has potential for more than pulp.....

- In the international arena of research, the concept of the Bio-Refinery has been developed into a vision of processing scarce resources in a resource-efficient and environmentally-friendly way while striving for sustainable development.

- There is fantastic potential to increase the value added output from renewable raw materials used by today's processing (forest) industry.
Bio- Refinery

- It is estimated that for every three tonnes of wood harvested from the province’s forests, there is another one tonne of bio-mass that can easily be recovered and converted into energy or other high-value products.

- Since the provincial harvest is roughly ten million tonnes annually, there are three million tonnes of energy fibre available. That is the equivalent of approximately three million barrels of oil.
Bio-Refinery

- Renewable fuels from biomass are already important energy carriers in many regions and are likely to be a key part of a future sustainable society.

- To overlook this fantastic opportunity to diversify and develop our forest energy industry at a time when the potential of the new bio-economy is just emerging and being recognized by many jurisdictions is to look a gift horse in the mouth.
Solar
Thirty cities and communities across the province are investigating different solar applications to become recognized as "solar" cities. Ontario has the most sunny days per year than anywhere else in Canada.

An American/Canadian joint venture acknowledges that the new partnership has been checking out prospective sites in Ontario with major development plans to generate 50 megawatts of solar energy for the provincial power grid by 2015 (2008).
In 2008, the provincial Energy and Infrastructure Ministry approved a California company's plan to build North America's largest solar farm in Ontario.

OptiSolar Farms Canada Inc. will install more than one million solar panels at four farms outside of Sarnia, Ont., providing the province with 40 megawatts of power by 2010. Ontario Energy Minister Dwight Duncan said that's enough to power 7,000 homes.
Geothermal power plants burn no fossil fuels and release only water vapor, making them emissions free. Hydrothermal uses lake water to cool buildings instead of air conditioners. (Tridel Condominiums Toronto)

Geo/Hydrothermal energy supplies 8,200 megawatts of power worldwide to 60 million people in 21 countries.

Three major partnerships between European and Ontario resource companies were announced to further develop Ontario’s Hydro and Geo-Thermal resources (2009).
Landfill Gas Generation System
Sudbury’s first major renewable energy plant

- The Greater Sudbury Utilities (GSU) project involves a series of perforated pipes set into the ground. A vacuum slowly draws gases released from decomposing material into piping where it is cleaned before being sent to a reciprocating engine. The engine powers a generator which in turn creates electricity for the power grid. Construction of the piping was completed in January 2006.

- Once fully operational the $3.2 million plant will supply 1.6 megawatts of electricity, enough to power 1,200 homes and generate approximately $500,000 per year in revenues for the city of Sudbury.
Current Energy Supply Resources in Ontario (MW) 2009

- Hydroelectric – 7788 MW
- Nuclear power - 11419 MW
- Coal power - 6434 MW
- Gas generation - 5103 MW
- Wind generation - 501 MW
- Biomass generation – 75 MW
Green Business
People, Planet, Profit

It’s Good to Be Green
Increasingly companies are recognizing the benefits of eco-efficiency.
People who live in poverty in the world’s developing countries represent one of the greatest sources of greenhouse gas emissions because of the way they have to live and work.

Multi-national corporations are now producing products that are low cost and provide eco-centric solutions and are profitable as well. This market represents billions of potential consumers.

People, Planet, Profit.
Green Business Changing everything...

- CNEX, a Mexican cement giant realized that poor people buying one bag of cement a week represented 26% of the company’s business.

- GE discovered that they could create a simple solar powered light source for third world markets and do good while making money.

- Microsoft is developing components for solar classrooms that will provide access to virtual teachers for millions of children whose communities have no schools.
Green Business Innovations
Developed by young Eco entrepreneurs
Green Business Innovations
Developed by young Eco entrepreneurs …..

- The wave power system, bioWAVE™, is based on the swaying motion of sea plants in the presence of ocean waves.

- The tidal power conversion system, bioSTREAM™, is based on the highly efficient propulsion of swimming species, such as shark, tuna, and mackerel.
The next time you take a trip to the water cooler, just think, what you’re about to drink isn’t just good for hydration; it makes for a very effective, energy-efficient lens, too. That’s what young researchers in Germany have announced after designing and testing an adaptive liquid lens—comprised of a pair of water droplets—the new lens captures 250 pictures per second.
Green Business Innovations

Developed by young Eco entrepreneurs …..

- $20 million from Google, $350 million first round of financing…

- The NANOSOLAR Power sheet is made utilizing a coating, thin as a layer of paint, that takes light and converts it to electricity…

- Nanosolar Light-weight solar-electric cell foil can be cut to any size…

- Think about the applications for this technology, trucks, trains, ships, planes, clothing, tents, you get the idea….
Green Business Innovations

Developed by young Eco entrepreneurs ….

- In India, the state-run student eco-transportation competition unveiled what they call a "soleckshaw" (short for solar electric rickshaw). The soleckshaw, like traditional cycle-rickshaws can still be pedaled, and is a motorized cycle-rickshaw that runs on a 36-volt solar battery for up to 9.3 miles per hour, and carries a load of up to approximately 440 lbs. The battery has enough juice to keep the rickshaw going for 30 to 42 miles. Increase of new sales for small business who rely on transportation of their goods will grow by a factor of 10...
Green Business Innovations

Developed by young Eco entrepreneurs ….

- The first Sustainable Dance Club opened in Rotterdam, called Club Watt. Club Watt features an LED dance floor that is powered by the kinetic energy the dancers generate.

- Think about the applications of this technology: airports, shopping malls, hospitals, city streets and sidewalks, etc. …
Green Business Innovations
Developed by young Eco entrepreneurs …..

- A new company run by homeless 20 year olds, takes broken or returned MP3 players, phones, PDAs, and IPods, restores them, and sells them for less. With so many of our old electronics being thrown away each year, (which is known as E Waste), these young eco-entrepreneurs are making serious money from converting waste into more affordable products for low income consumers.
Houses are normally fairly stationary objects, and that's not considered a bad thing. But innovation never stands still, and a new prototype house that can walk on six legs has been built. The house is ten feet high, powered by solar panels, and is outfitted with a kitchen, toilet, bed, and wood stove. The house, a collaboration between MIT and the Danish eco-design students took a journey through Cambridge shire in England.
**Green Buildings**

$1 Trillion Dollar Industry 2009-2010

- **Green building** is the practice of increasing the efficiency with which buildings use resources — energy, water, and materials — while reducing building impacts on human health and the environment. It does this through better design, construction, operation, maintenance, and removal — the complete building life cycle.

- Over 5000 new Green Building products were introduced to the building/design marketplace in 2008.

Source USGBC 2008
The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ encourages and accelerates global adoption of sustainable green building and development practices through the creation and implementation of universal performance criteria. Developed by the United States Green Building Council (USGBC).

USGBC represents the fastest growing number of non-profit chapter centers in history.
Eco-Smart Green Schools

- Boards of Education from across Ontario are investing millions of dollars to make their schools more energy efficient and incorporating new eco-education content in the curriculum.
- In Feb 09, the Ontario Ministry of Education is hosting "The Environmental Education Symposium". The symposium will launch the Environmental Education Policy Framework and showcase environmental and education initiatives and resources for Ontario teachers.
In 2001, when governments in North America began ranking schools for availability of eco-courses, only 34 percent of those it surveyed offered any green courses. By 2008, 83 percent did.

The top Business Schools in North America are shopping for eco-minded students who understand that green business holds the power to address the world's most critical environmental, economic and social problems.

2008’s No.1 market value rated post Graduate Degree:

- MBA Sustainable Management

Post secondary students today are much more interested in social and environmental issues—and in the business models required to solve those issues," Liz Maw, Executive Director of Net Impact.
Bio-Mimicry
Solutions from Mother Nature

The more our world functions like the natural world, the more likely we are to endure on this home that is ours, but not ours alone." Every solution that nature provides is a potential business waiting to open...

~ Dr. Janine Benyus
## Top 25 $ Green Careers for 2009-2010

<table>
<thead>
<tr>
<th>Career</th>
<th>Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrologists</td>
<td>$51,080.*</td>
</tr>
<tr>
<td>Environmental Engineer</td>
<td>$50,000.</td>
</tr>
<tr>
<td>Conservation Biologist</td>
<td>$50,000</td>
</tr>
<tr>
<td>Toxicologist</td>
<td>$79,500.</td>
</tr>
<tr>
<td>Pollution Control Technician</td>
<td>$55,000</td>
</tr>
<tr>
<td>Ecologist</td>
<td>$68,950.</td>
</tr>
<tr>
<td>Eco-Business Manager:</td>
<td>$50,000.</td>
</tr>
<tr>
<td>Economist</td>
<td>$72,780</td>
</tr>
<tr>
<td>Forester</td>
<td>$48,230</td>
</tr>
<tr>
<td>Environmental Attorney</td>
<td>$70,000</td>
</tr>
<tr>
<td>Building and Mechanical Trades</td>
<td>$56,000</td>
</tr>
<tr>
<td>Environmental Health and Safety Technician</td>
<td>$35,500</td>
</tr>
<tr>
<td>Landscape Architect</td>
<td>$74,508</td>
</tr>
<tr>
<td>Waste Disposal Manager</td>
<td>$55,000</td>
</tr>
<tr>
<td>Environmental Chemist</td>
<td>$51,080</td>
</tr>
<tr>
<td>Corporate Waste Compliance Coordinator</td>
<td>$49,000.</td>
</tr>
<tr>
<td>Urban and Regional Planner</td>
<td>$55,250</td>
</tr>
<tr>
<td>Building Architect</td>
<td>$70,000</td>
</tr>
<tr>
<td>Geographic Information System (GIS) Analyst</td>
<td>$50,000</td>
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<tr>
<td>Agricultural Inspector</td>
<td>$45,000</td>
</tr>
<tr>
<td>Marketing &amp; Sales</td>
<td>$65,000</td>
</tr>
<tr>
<td>Wastewater Water Operator</td>
<td>$45,000</td>
</tr>
<tr>
<td>Wildlife Biologist</td>
<td>$52,000</td>
</tr>
<tr>
<td>Pollution Control Engineer</td>
<td>$66,000.</td>
</tr>
<tr>
<td>Eco-Inventor Bio-Wave</td>
<td>$25,000,000</td>
</tr>
</tbody>
</table>

source: The Economist
Researchers across Ontario’s north are collaborating with industry partners and colleagues around the world to unlock the commercial potential of biotech.

Global trends are driving Ontario’s economy to maximize its competitive advantage through development and application of innovative and creative technologies related to:

- Energy
- Bio-prospecting
- Mining
- Forestry
- Medical/health
- Functional Food
- Product Manufacturing
Ontario is positioning itself as a leader in forest bio-prospecting—the search for bioactive compounds within plants and other species that could lead to new and economically viable pharmaceuticals and other bio-products.

This boreal region is potentially a rich source of plants with medicinal properties: over 400 species of native plants have been used as traditional herbal medicines by First Nations in Ontario alone.

Future economic potential is projected to be between $2 and $7.4 billion per year. (Industry Canada)
Bio-Prospecting

- Edible forest mushrooms—with an estimated export value ranging between $10 and 42 million per year over the past decade; a single pine mushroom may retail for up to $150 in Japan.

- Native perennials—for example, wild ginseng and fiddleheads; and herbal teas.
Bio-Farming

Blueberry/Rosehips

- Blueberry farming research is part of a broader initiative geared toward diversifying and bringing value-added innovations that result in economic development and lead to growth of a bio-economy based on natural resources in Ontario.

- Communities across the province are also investigating rosehips as another source of bioactive compounds. Rosehips have high levels of antioxidants and there is a strong market for products such as rosehip powder. If successful the future economic potential is projected to be between $8 and $9.4 billion per year.
Conclusion

Presentation 1

“Climate change isn’t just a threat to our survival, it’s a fantastic opportunity for innovation, social and economic development”.

Peter Love
Ontario Power Authority
Green North Eco-Conference
Canada 2008

By 2016 our senior High School students will begin to take on the roles of Ontario’s social, political and economic leaders. Their understanding of sustainability challenges is vital to our province’s economic and social development.

Sustainability: Any “activity“ that meets the needs of the present without compromising the ability of future generations to meet their own needs, is now the new standard for both social and economic development.

Hunter Lovins
Green North Eco-Conference
Canada 2008

When it comes to “Green” business and the career opportunities that exist for eco-literate graduates…It’s a very exciting marketplace.”

Ontario Minister of Economic Development and Trade
Joseph Cordiano
Green North Eco-Conference
Canada 2008
Ontario
Eco-Smart School Campaign 2009 –2010

You are not just burning off calories...

You'll save one pound of CO₂ for every mile you don't drive.

Thank You
Go Out and Make a Difference......
Ontario

Eco-Smart School Campaign 2009 - 2010

Sustainable Business

Presentation 2 – 60min

Copy Right Green@Work LLC 2008
Business Case for **Sustainability**  
*Not Business As Usual……*

- Hunter Lovins  
  *Time Magazine’s “Hero of the planet”*

- Hunter proposes that citizens, communities and companies, working together within the market context, are the most dynamic problem-solving force on the planet.

- Hunter’s video explains why leading corporations are now adopting “sustainable” business practices in order to survive….
To obtain a copy of the 2009-2010 Eco-Smart School presentations for your High School ....

*Please Contact*......

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Green At Work LLC