Winter 2010 edition

Knowledge Insider

Where business meets opportunity | **Finding value in green**

Farm Credit Canada
Advancing the business of agriculture

Canada

"We can't solve problems by using the same kind of thinking we used when we created them."

– Albert Einstein

"I think the whole world is eventually going to move into a green economy."[1]

– Joseph Stiglitz, *Nobel Prize laureate and former chief economist of The World Bank,* April 20, 2009

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Business insight from FCC

Make better decisions with better information. Use Knowledge Insider to help track global shifts and industry trends. For more knowledge that you can use to plan for success in your business, visit www.fcc.ca/learning.

Farm Credit Canada (FCC) is proud to present Knowledge Insider, a semi-annual publication offering thought-provoking information to producers and other agriculture entrepreneurs. Trends described in this document are supported with facts and figures and examined in the context of what's on the horizon for Canadian agriculture.

Please direct questions and comments to FCC's Customer Service Centre at 1-888-332-3301 or email csc@fcc-fac.ca.

Knowledge Insider is produced by Strategic Intelligence at FCC.

Our special thanks for contributions from all of our FCC partners and industry experts who generously contributed their time, talent and knowledge to the creation of this document.

This report presents forward-looking statements and is intended for educational and general reference purposes only. The authors have attempted to provide useful information and analysis. However, FCC does not guarantee accuracy or necessarily share the views of the authors. Links to other websites are offered as reference to the readers of this report, based on the information provided. The report is not intended to be used as a substitute for professional advice.

Cette publication est également offerte en français.

Understanding the green economy

The green economy is an important topic worldwide. What does this mean for your business? How will it affect your practices and your bottom line? This edition of Knowledge Insider explores opportunities for Canadian producers and agribusinesses of all sizes to find value while minimizing environmental impacts.

Businesses around the world are adopting greener business models. Today's news headlines feature topics like carbon capture, biofuel production and water shortages. Globally, governments and industries are developing regulations to deal with the shift to a greener economy. In the meantime, Canadian agribusinesses are developing innovative solutions to minimize environmental impacts. Some are ahead of the game.

According to the Harvard Business Review, becoming eco-friendly will soon be a required cost of doing business.[2] By thinking beyond today to better understand the big picture, you can develop viable solutions for your business.

In this edition of Knowledge Insider, you'll read stories about Canadian agribusinesses that have decreased their environmental impacts and become more sustainable and profitable. How can a triple-bottom-line approach that considers people, profit and the planet build a sustainable future for your business?

In this issue:

- The global economy is greening. Changing regulations and consumer demands call for innovative solutions.
- Corporations large and small are considering the environment when they do business. A triple bottom line business model integrates environmental costs with the costs of doing business.
- Going green does not necessarily mean making a profit. As with any business decision, understanding and analyzing your options are critical to the success of your business.
- There are opportunities for quick wins, like conserving water or reusing waste products. There are also opportunities for long-term strategic approaches to becoming a greener business.
- By rethinking inputs, operations and outputs, you may uncover opportunities to reduce or conserve resources, reuse or recycle waste, or develop new processes or technologies that increase efficiency, save money, better meet consumer needs and decrease environmental impacts.

Is green the colour of money?

Many consumers care about sustainability. New markets are being formed to manage emissions. Innovators are finding value in waste products and finding markets for them. It is important to meet consumer expectations as efficiently as possible.

Whether you are motivated by concern for the environment, a need to comply with regulations, or both, green initiatives can help build your business and improve your bottom line. Since being green doesn't always equal profit, understanding how and when to make changes that best fit your business is critical to your success.

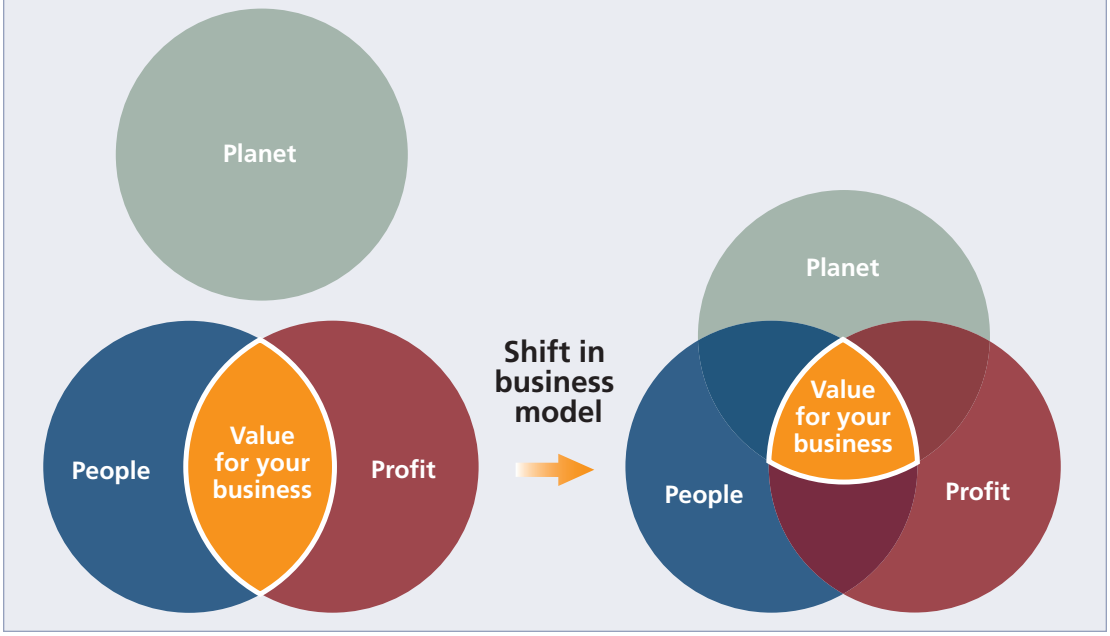
You may brand products differently or work within sustainable value chains. You may reduce inputs or develop a corporate social responsibility strategy. Look for quick wins that could create opportunities for the long term.

Working with professionals, you can conduct environmental audits, calculate return on investment or determine the payback period for infrastructure costs. You may already be meeting or exceeding regulations or standards. This could uncover opportunities to brand your products differently or work within environmentally oriented value chains. Like other business decisions, going green involves opportunity and risk. What more do you need to think about in order to make informed, strategic decisions for your business?

Getting greener

The world of business is getting greener. Growing Forward, Canada's new agricultural policy framework, incorporates programs and measures that continue to build environmental sustainability in Canada's agriculture industry. Long-term trends show growth in green technology, green investment, alternative energy research and green design. Multinational corporations are adopting

Figure 1: People, planet, profit



Green economics integrates environmental considerations and people's needs into business models. Many successful agribusinesses are balancing both with their need to be profitable and sustainable.

comprehensive green strategies that go beyond traditional corporate social responsibility models. Around the world, models are being developed to measure environmental impacts.

Green accounting factors environmental costs into the bottom line of doing business and, in doing so, redefines economic value. For example, the impact of emissions used to be primarily a quality of life issue. Now, with the costs attached to emissions, rising waste disposal fees and volatile energy prices, environmental costs are also an integral part of doing business in many countries. Accounting for natural capital like the value of ecosystems and the biosphere will require new ways of measuring value.

Business tomorrow will be greener than it is today. There will be new environmental regulations, new products and services, and new ways of doing business. Innovators are already making changes for short-term savings and long-term viability. What else could you be doing now to get ready?

Green economics are changing the business of agriculture

For agribusiness leaders, green thinking is not new. Many producers, manufacturers, governments and industry stakeholders already include environmental factors in their strategic decision-making. According to the United Nations Food and Agriculture Organization, opportunities abound to enhance irrigation technology, develop fertilizers that generate less carbon, breed crops that use nitrogen more efficiently and adapt infrastructure to meet the needs of future generations and the planet.[3]

Like many industries, agriculture contributes to climate change impacts. About one-third of global emissions are from agriculture and land-use change related to agriculture, like deforestation.[4] Agriculture is also a big part of the solution. There are growing markets for Canadian agriculture products, like biomass and oilseeds, and innovative new products like bioplastics.

Figure 2: How will the green economy affect your business?

Today, many agribusinesses consider sustainability in how they produce, transport, package and brand their products. From pesticide reduction and traceability to soil conservation and waste management, the agriculture industry has many examples of environmentally friendly principles and practices. As the demand for sustainable agricultural products and value chains grows, the industry will feel further pressure to maximize productivity and minimize environmental impacts. What can you do today in anticipation of changes coming tomorrow? What will the green economy mean to your customers, your industry and your business?

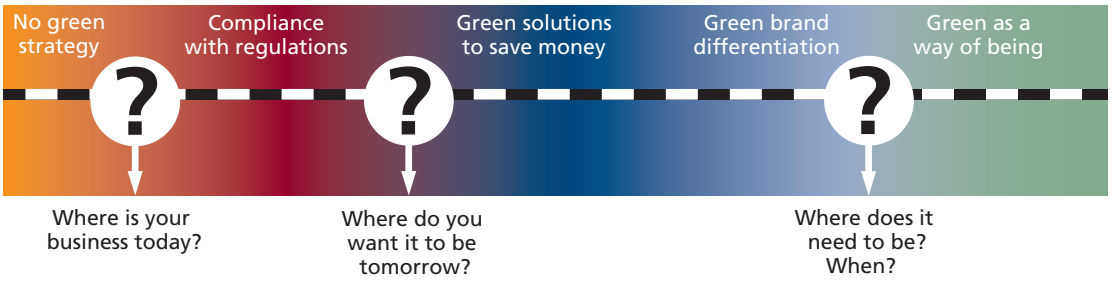
Did you know?

Natural Resources Canada is raising awareness about climate change adaptation across the country. Its website includes an interactive tool that describes climate change impacts and adaptation by province.

www.adaptation.nrcan.gc.ca/index_e.php

Your agribusiness in the green economy

Your business is unique. You know your products, suppliers and customers. Do you know what green initiatives could mean for your business today? Sustainable practices used to mean higher prices to consumers to cover production costs. Today, they can mean increased profits, improved productivity and satisfied customers.



The September 2009 issue of the Harvard Business Review featured a five-stage process for companies that want to become sustainable. This staged approach provides steps and strategies for creating a vision for companies that envision green as a way of being or end state.[5]

There isn't a single answer for all agribusinesses. Only you can decide how quickly and to what degree your business will incorporate environmental initiatives. How green is your vision for your agribusiness?

Making it work – Arthur's Fresh

According to Scott Bell, COO of Arthur's Fresh in Etobicoke, Ontario, winning the Packaging Association of Canada's Sustainable Leadership Award and Walmart's Sustainable Packaging Award in 2009 came from a long-prasticed commitment to sustainability. Arthur's Fresh, which supplies fruit smoothies and super juices across North America, is built on the values of healthy eating and sustainability. Its standards include buying Canadian, encouraging sustainable agriculture, endorsing renewable energy, minimizing waste and maximizing recyclability. "We want to lead by example on sustainability because the food we eat contributes the most to our eco-footprint," Bell says. Maintaining these standards while keeping costs down isn't always easy. When the company found that shipping berries from British Columbia by diesel trucks emitted more greenhouse gases than bringing them from Poland by sea, it searched for a greener solution that maintained profit margins and met its standards. Arthur's B.C. supplier suggested shipping by rail, taking ownership in Toronto instead of Vancouver. Not only did this solution reduce emissions by 21 per cent, it reduced inventory holding time and cut transportation costs for both companies by 15 per cent.

www.arthursjuice.com

Photo courtesy of Arthur's Fresh

Finding value in green

To determine the value of green initiatives for your business, start by rethinking your inputs, outputs and operations. Are there ways your business can become more productive, increase efficiency, save money or exceed environmental regulations?

Figure 3: Inputs, operations, outputs

INPUTS	OPERATIONS	OUTPUTS
❒ Water	❒ Design	❒ Products
❒ Energy	❒ Marketing	❒ Services
❒ Feedstock or ingredients	❒ Transportation	❒ Packaging
	❒ Technology	❒ Emissions
		❒ Waste products
What else?	**What else?**	**What else?**
_____	_____	_____
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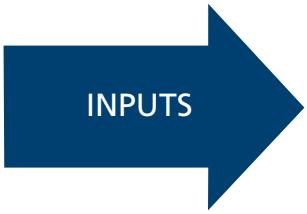
Rethinking inputs



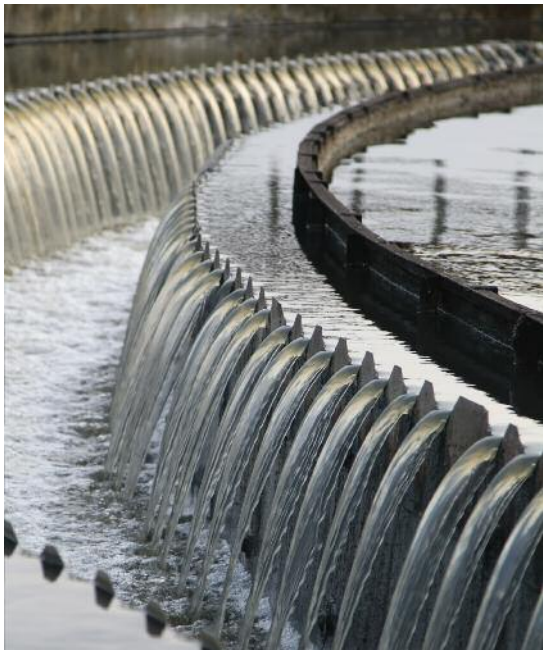
What are the inputs of your business? They may include water, food ingredients, seeds, biomass, energy, feedstock or fertilizer. Let's examine a few common business inputs to help you rethink the ones you use.

Finding value in water

Water is a key input for most agribusinesses. Although it is less evident in Canada than other countries, water resource availability is changing drastically around the world. Glaciers are melting. Water stocks are decreasing in some areas, and flooding is occurring in others. Southern Alberta and parts of Quebec face significant water challenges as they look to irrigate farmlands and generate hydroelectric power in the face of dwindling water stocks. Areas of Brazil and Africa are suffering brownouts from not having enough water to drive hydroelectric turbines. What can we learn from experiences overseas that will help Canada preserve its water resources?

Legendary oil investor T. Boone Pickens recently invested in groundwater rights in Texas, because he speculates that water is the new oil. As investors and industries speculate about the future of water, what opportunities and risks do you foresee for your operation? How can you extract value from your water resources?

Some countries are looking at innovative ways to reuse water or recycle waste water. Australia and Singapore have both instituted massive-scale waste water recycling and reuse projects in response to pressures on water supplies from climate change. Researchers are exploring opportunities for using ocean water in areas where traditional agricultural



lands are becoming unusable due to water shortages.

Canada's water supply

According to Robert Sandford, chair of the United Nations Water for Life Decade, Canada has adequate water compared to the rest of the world, but the supply can be exhausted. Canada has about 2,850 cubic kilometres of renewable fresh water, which is roughly 6.5 per cent of the world's supply. The rest of Canada's water is fossil water that is stored either in lakes, ice or snow. In Sandford's words, "Once we spend this water, it's gone."[6] The Conference Board of Canada is not forecasting water shortages, but does predict variable, seasonal water flows in Canada. It advises companies, including agribusinesses, to consider water variability in their risk analysis, conduct scenario planning, and adjust their design, construction standards and insurance requirements.[7]

Water availability

Concerns are being raised worldwide about water availability and cost. Water markets already exist in some regions, such as parts of Australia and Punjab, Pakistan, where water for agriculture is tradable. These farmers participate in water markets and can trade their water allocation with neighbours.

Water management programs already exist in Canada. In 2000, the South East Kelowna Irrigation District in British Columbia established a pricing program for water that has significantly decreased the demand for water per hectare. The South Nation Conservation team in Ontario piloted a water trading system to meet new municipal regulations to decrease high phosphorous levels. While the South East Kelowna program charges users for water, the South Nation program paid farmers for implementing best management practices to lower phosphorous levels. In both cases, environmental considerations became part of the bottom line of conducting business. What is the value of water to your operation? What would it mean to your bottom line if water cost you more?

What about energy?

Energy is another key input for most agribusinesses. FCC's winter 2009 edition of Knowledge Insider examined how volatile energy markets could affect Canadian agriculture and agribusiness. Agriculture already plays a key role in energy, contributing biomass, cereals and oilseeds for energy production and transforming agricultural waste into energy through anaerobic digestion.

Some businesses are creating alternative energy sources. Onion juice, previously a waste product,

Figure 4: 2006 irrigated farms in Canada (by no. of farms)

1 B.C.	
farms	19,844
# irrigated	6,938
% irrigated	34.96

2 Alta.	
farms	49,431
# irrigated	3,817
% irrigated	7.72

3 Sask.	
farms	44,329
# irrigated	923
% irrigated	2.28

4 Man.	
farms	19,054
# irrigated	241
% irrigated	1.26

5 Ont.	
farms	57,211
# irrigated	2,983
% irrigated	5.21

6 Que.	
farms	30,765
# irrigated	1,305
% irrigated	4.25

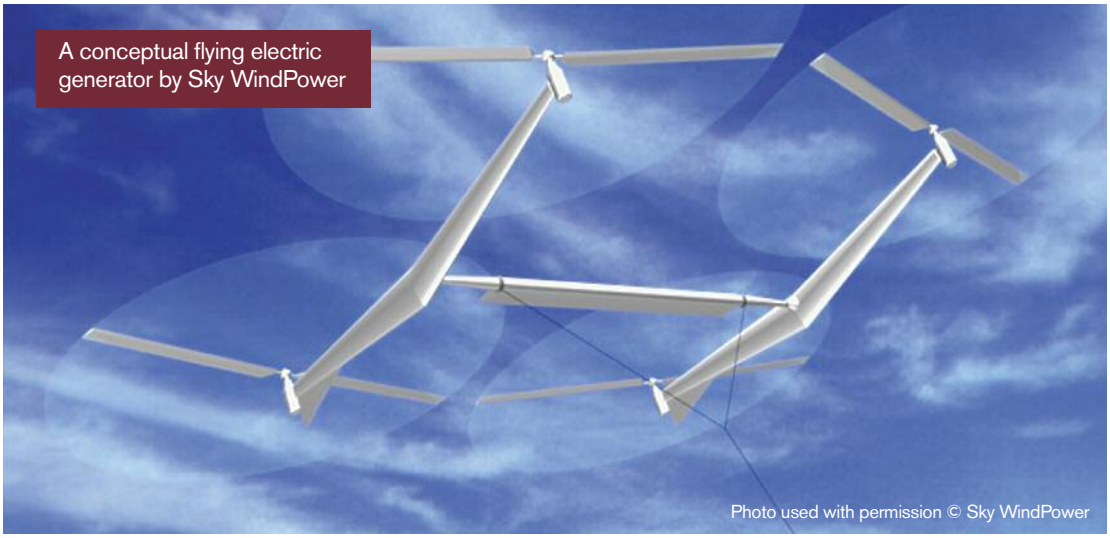
7 N.L.	
farms	558
# irrigated	33
% irrigated	5.91

8 P.E.I.	
farms	1,700
# irrigated	55
% irrigated	3.23

9 N.B.	
farms	2,776
# irrigated	117
% irrigated	4.21

10 N.S.	
farms	3,795
# irrigated	255
% irrigated	6.72

Source: Statistics Canada



A conceptual flying electric generator by Sky WindPower

now generates electrical power. High-altitude kites flown by robots are being studied to generate electrical energy. Turbine-bearing balloons are harnessing steady wind power as high as 4,752 metres in the air.[8] Research funds are supporting further uses for biomass, with algae research gaining much interest from investors and the media.[9]

Did you know?

Feedstock can refer to biomass for use in manufacturing or energy generation processes. It can include waste from various crops, co-products from bioenergy production and waste products from food processing.[10]

Making it work – Anderson Group

Markets are growing for biomass as an energy feedstock. CEO Dany Poisson and CFO Patrice Desrochers of Quebec-based Anderson Group have developed a new technology to reduce harvesting costs of forestry biomass. Their baler gathers biomass from short-rotation woody crops and natural brushes, then mulches, compacts and packages it for gasifiers and biomass burners in a single step. "It's exciting to be working with young engineers on biomass energy and to be part of the advancing green economy," Poisson says. "I encourage others to find a way to be part of the green economy, because it's one of the most rewarding places to be."

www.grpanderson.com

Photo courtesy of Anderson Group co.

Varieties of algae are being used as feedstock for energy production

Finding value in feedstock or ingredients

Many agricultural products can be used as feedstock to produce energy. Some agribusinesses generate energy on site by converting waste products. Some save money on energy costs by using heat exchange technology or conducting energy audits to find inefficiencies and excess heat waste. What steps have you taken since oil hit US $147 a barrel in 2008? Can you hedge your risks by meeting some of your own power needs or using renewable energy sources?

Think about the primary feedstock or ingredients for your agribusiness. Are they seeds that become plants? Are they food ingredients that become packaged goods? Is it biomass to create energy? Whatever your primary inputs, thinking innovatively about greener inputs can help you save money or create new products.

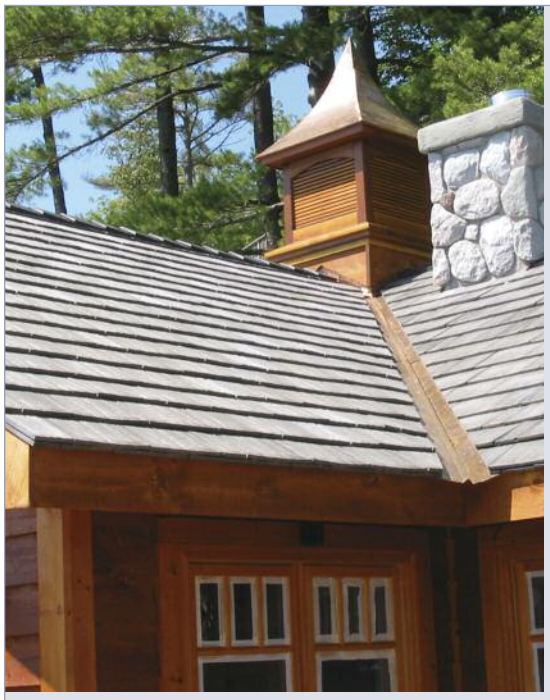
You can uncover hidden opportunities by stepping back and rethinking your business inputs. Perhaps you can substitute products, reduce inputs or reuse inputs, like water, by changing your methods or processes. Looking at your inputs through a green lens can uncover hidden value and short or long-term benefits for your business.

Rethinking and revamping your operational systems and processes in ways that benefit the planet could provide cost savings, boost productivity and reduce environmental impact. Could your operation use a green tune-up?

Did you know?

Biomass is any organic material that is available on a renewable or recurring basis. It comes from sources like agriculture and forestry residues, or less common ones such as algae and jatrophra – a genus that includes a variety of drought and pest-resistant plants, shrubs and trees.

Flax straw used for biomass process



Making it work – Enviroshake Inc.

Roofing shakes aren't a typical agricultural product. That didn't stop Jim Nash of Enviroshake Inc. in Chatham, Ontario. He liked the look of cedar shakes on houses, but wasn't impressed with their long-term durability and warranty, when there was one. Determined to create a better product, he began experimenting and developed the Enviroshake. Enviroshakes are made from 95 per cent recycled materials from the plastic, auto and agriculture industries. They look like cedar shakes and have a 50-year warranty. Nash says opportunities abound for new innovations in the green economy. "There's a market out there for agricultural plastics and fibres that needs to be developed, but this will only continue to grow as more bioproducts come into production. Learn where the materials are being applied and create partnerships with end-users."

www.enviroshake.com

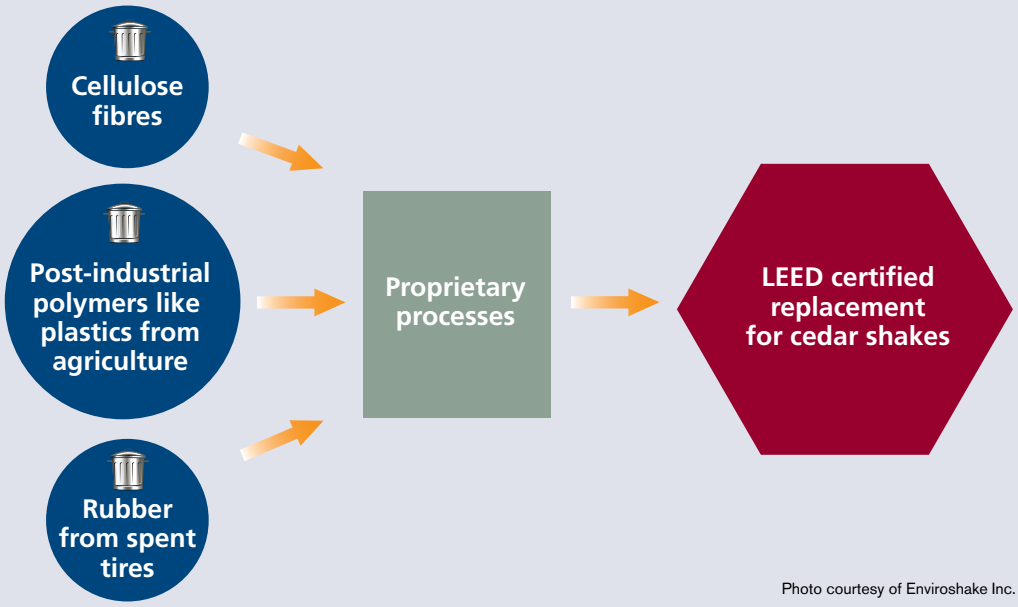


Photo courtesy of Enviroshake Inc.

Did you know?

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System promotes a whole-building approach by recognizing performance in five key areas of human and environmental health: sustainable site development, water efficiency, energy efficiency, materials selection and indoor environmental quality. For more information on LEED certification in Canada, go to www.cagbc.org.

Did you know?

Res/Op Technologies in Winnipeg, Manitoba, developed trademarked technology, called the Orverter, to dispose of organic waste. The combustion technology operates solely on the energy produced from the organic materials being destroyed. This makes it essentially self-fuelled once heated and eliminates fossil fuel costs. The burner operates at a consistent 950 C, turning organic waste into an odourless vapour and sterile ash while producing energy.

Photo courtesy of Res/Op Technologies Inc.

Rethinking operations

OPERATIONS

Finding value through design

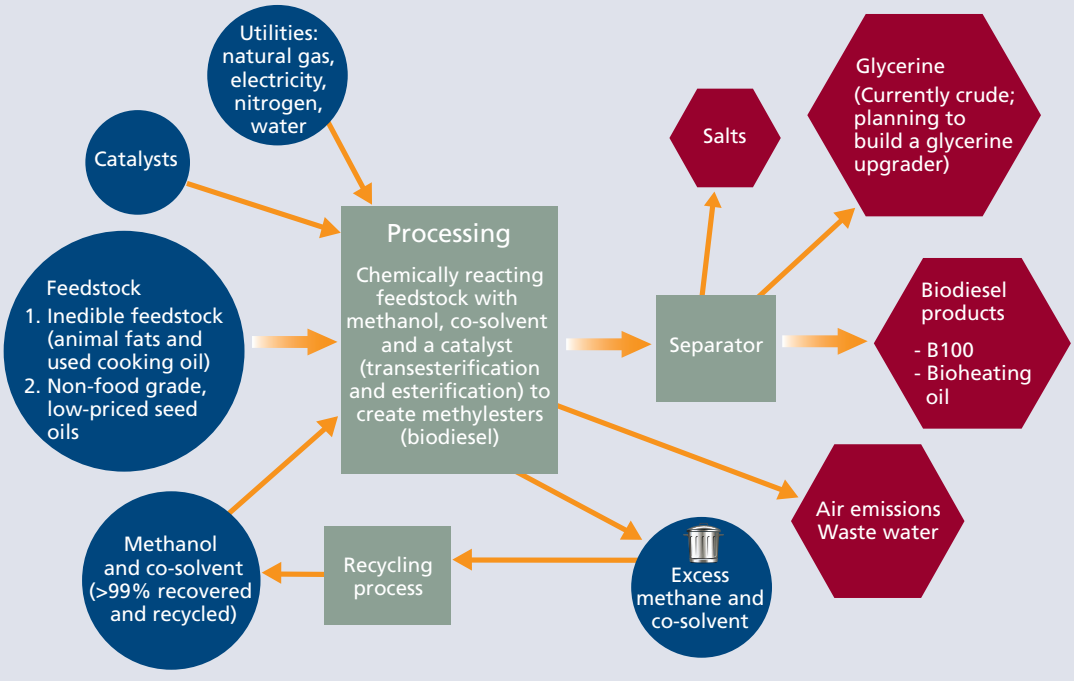
Green design principles offer exciting possibilities for agriculture. New processes could be developed to mimic nature. Waste products could be turned into valuable byproducts.

Anaerobic digestion is an example of technology that reuses water, generates electricity from waste and creates usable byproducts. Other designs promote reuse of materials to prevent them from entering the waste stream. Rethinking the design of your operations, either on your own or with professionals, could uncover opportunities to minimize environmental impact and become more efficient.

Making it work – Biox Corporation

Biox Corporation is turning waste into profit. At 67 million litres per year of production capacity, Biox's Hamilton, Ontario, plant is Canada's largest commercial-scale biodiesel operation. Biox's proprietary and patented process converts low-value feedstock, such as animal fats and used cooking oils, into biodiesel – a renewable, non-toxic, lower-emission replacement for petroleum diesel. Biox uses environmentally sound processes in its operation.

www.bioxcorp.com



Did you know?

Biomimicry is a discipline that studies and emulates natural forms, processes and ecosystems to create sustainable and healthier solutions and technologies for humans. From the creation of Velcro by observing plants to learning how to sequester carbon by studying human lungs, biomimicry offers solutions for the future.

www.biomimicry.net;
www.biomimicryinstitute.org

Cradle to cradle

Cradle-to-cradle thinking analyzes natural systems to design products, facilities and equipment that can be recycled into new products of equal quality. It replaces the cradle to grave thinking that is based on creating products that will end up as waste.

Xerox has developed a copier that can be dismantled into component parts and recycled into new equipment when it's no longer being used. The BMW Z1 Roadster has plastic side panels that come apart like the halves of a walnut shell for easy recycling.[11] The straw from Canadian oilseed flax has been used to replace fibreglass in polypropylene-moulded auto parts.[12] Could a car's side panels be made from bioplastic? Could a photocopier be made from biomaterials? What role can agriculture play in smart, sustainable design? Imagine a future where you have eliminated waste and all of your outputs can be recycled or reused.

Design for the environment

Design for the environment refers to using smart design principles to minimize the environmental impact of products throughout their life cycle. It involves three major design elements:

environmental manufacturing, environmental packaging, and disposal and recyclability. Rethinking your own systems and processes can identify gaps where green design can save money, reduce toxic materials, prevent energy loss and reuse materials. Life cycle assessment, which assesses the overall impact of products or services throughout their entire life cycle, is an input to design for the environment. Agribusinesses interested in learning more about product life cycle analysis can contact organizations like the Guelph Food Technology Centre in Ontario.

Finding value through marketing

Whether you are already taking steps to minimize your environmental impact or are considering new green initiatives, you may have an opportunity to have your brand reflect your green priorities and practices.

Marketing your products or branding your business as green requires careful consideration. Consumer confidence in green product claims is waning. According to Mel Phadtare, Director of Integrated Sustainability for Junxion Strategy, the total number of green products has increased by 79 per cent in the last two years, with the rate of green advertising tripling in the last three years. Of those products identified as green, Phadtare says, only two per cent are accurate or genuine in their claims.[13] Consumers are increasingly distrustful of green claims and concerns about greenwashing are growing.

Greenwashing occurs when a business spends more time and money on green claims than on green business practices. Consumers visiting www.greenwashingindex.org can post advertisements or rate them on how authentic or verifiable they are. The site has three goals: to increase consumers' ability to evaluate environmental marketing claims, to hold businesses accountable for their claims and to encourage legitimate sustainable business practices.

As you examine opportunities for green branding, consider the role of authenticity and verifiable claims. There are benefits to green marketing, including meeting consumer needs and building a strong reputation and brand for your company. What can you do to stand out and earn consumer confidence in an era of growing distrust? Could you turn current practices or innovations into a profitable branding strategy?

Did you know?

In 2008, Save-On-Foods maximized how trailers were loaded and eliminated over 1,000 trips. In 2009, Coca-Cola Enterprises ordered 150 diesel-electric hybrid tractors and 35 Kenworth hybrid straight trucks.[14]

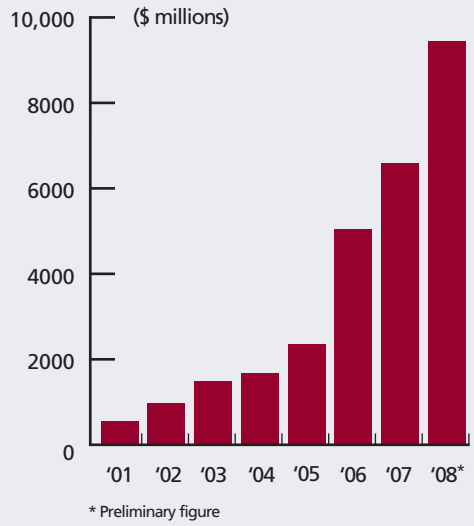
Finding value in transportation

Your system for transporting goods may have been affected by volatile fuel costs and concerns over emissions. Some agribusinesses are already responding by adding hybrid trucks to their fleets or choosing lighter packaging. Some are sourcing goods closer to home. Others are finding new markets for their goods. Many are increasing costs to end users. Green thinking can help you remain competitive in the face of rising transportation costs. Can you be part of a local value chain or a sustainable value chain? What can you do to learn what other businesses in your supply chains need?

Did you know?

The Conference Board of Canada's downloadable publication *Turning Green Into Gold: Green Marketing for Profit* provides ideas for capitalizing on the growing interest in eco-friendly products and services.

Figure 5: Green-tech venture capital investment in North America, Europe, Israel, China and India



Source: Cleantech Group

Finding value through technology

Global businesses face pressures from rising energy costs, growing populations and climate change. Science and technology are providing solutions. Figure 5 shows a significant increase in investment in green technology through venture capital funding in North America, Europe, Israel, China and India. As researchers around the world investigate new technologies for decreasing environmental impact, consider how your agribusiness can become involved in this surge of innovative thinking. Perhaps you could pilot an initiative or partner to create a new technology that increases your operational efficiency.

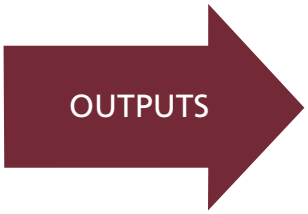
Many innovations have already been developed. Buildings with passive design use the heat from the sun, cooling from the wind and geothermal heat from the earth to be energy neutral. Algae are fed carbon dioxide to sequester harmful gas emissions and grow an energy-rich feedstock. Self-sustaining facilities use sun, wind and waste for energy and recycle waste water. Students at San Jose State University built a solar-powered icemaker using $100 worth of plumbing pipes and a sheet of reflective steel. The device used no electricity or moving parts to produce a large bag of ice from a few hours of sunshine.[15]

Re-examining your operational model can uncover opportunities for ecologically beneficial solutions. In an era where science and technology are forging new frontiers and changing the foundations of design, new knowledge can help uncover profitable solutions for your operation.

Did you know?

Green chemistry, also known as sustainable chemistry, refers to processes that replace substances that harm the environment during manufacturing with ones that produce less harmful waste and byproducts. California is leading the way in green chemistry in North America. Some agricultural applications include pesticides, pharmaceuticals, plastics and water purification.

Rethinking outputs



Whether you produce food, feed, fibre, bioplastic or other agricultural goods, your products are likely the key outputs of your business. Like other businesses, you likely also produce waste in the form of emissions, excess heat, waste water, liquid or solid waste, or byproducts. By searching for alternative uses for these outputs, you may discover new revenue sources and find value in what has traditionally been considered waste.

Finding value in greener products

Your products may offer opportunities to become more environmentally friendly. Perhaps green chemistry can help you produce food products with fewer additives or chemicals. You may be able to create products using fibres that use fewer inputs, like water, and minimize impact.

Agriculture is no longer confined primarily to food, feed and fibre. Advances in biotechnology are spurring the development of three types of plant-made pharmaceuticals: antibodies, vaccines and other therapeutic and analytical proteins.[16] The bioeconomy is creating innovations in biomaterials, biochemicals and bioenergy. Products like bioplastics, biofoams and rubbers for industrial applications and biochemicals represent new opportunities for Canadian agriculture.

Can you find alternative uses for your existing products? Will products you grow, or byproducts of your operation, gain new value as inputs for bioplastics or other growing industries? Are you aware of innovations that may complement your main lines of business?

Did you know?

In 2009, more than $9.6 million was invested by Agriculture and Agri-Food Canada in the Natural Fibres for the Green Economy Network to develop value-added markets for flax and hemp fibres as well as technologies to convert fibre and residue into new industrial products and chemicals.[17]

Adding value through services

Global agribusinesses are finding opportunities to offer services, not just products, to meet emerging needs in the green economy. Some European countries pay producers to provide ecological services like carbon sequestration. In 2003, payments for ecological services accounted for 14 per cent of farm income in Switzerland and four per cent of farm income in France.[18] Payment for services is one of various options. Are there services you can develop to minimize environmental impact and become more diversified? Perhaps you can develop water treatment capacity or generate carbon offsets to sell on new markets. The future for new agricultural products and services is rich with opportunity for innovation.

Finding value in packaging

Agribusinesses are also developing or using environmentally friendly packaging, particularly plastics. Traditional plastic is made from petroleum, a non-renewable fossil fuel. Bioplastics are derived from renewable biomass sources, such as vegetable oil, corn starch or pea starch. The market for bioplastics continues to grow and is expected to expand from an international capacity of 150,000 tonnes in 2006 to two million tonnes in 2011.[19] What will this expansion mean for those of you who grow biomass sources like peas and corn? Will markets be affected like they were for corn with the rise of ethanol production?

Did you know?

Since April 2007, the Mountain View Regional Waste Management Commission in Alberta has paid farmers $100 per 100 kilograms of silage bags, plastic twine, net wrap, bottles and other plastic farm products.

Did you know?

Less than two per cent of the total waste stream globally is actually recycled – primarily paper, glass, plastic, aluminum and steel.[20]

Packaging is a high-cost expense for many businesses. Consumers have come to expect packaging that is esthetically pleasing, durable, clean, clearly labelled and safe. Changes to your packaging may require an initial investment in time, money and infrastructure, but can increase your profitability by changing or reducing materials or decreasing shipping weight. In considering greener packaging options, it is important to factor in infrastructure costs, consumer preferences, shipping considerations and other variables that may affect your projected return on investment.

You may find ways to save money by using less packaging or lighter packaging, or by recycling or reusing packing materials. Would biodegradable packaging meet the demands of your current target market? Could you increase your market share by attracting environmentally conscious consumers who choose greener packaging?

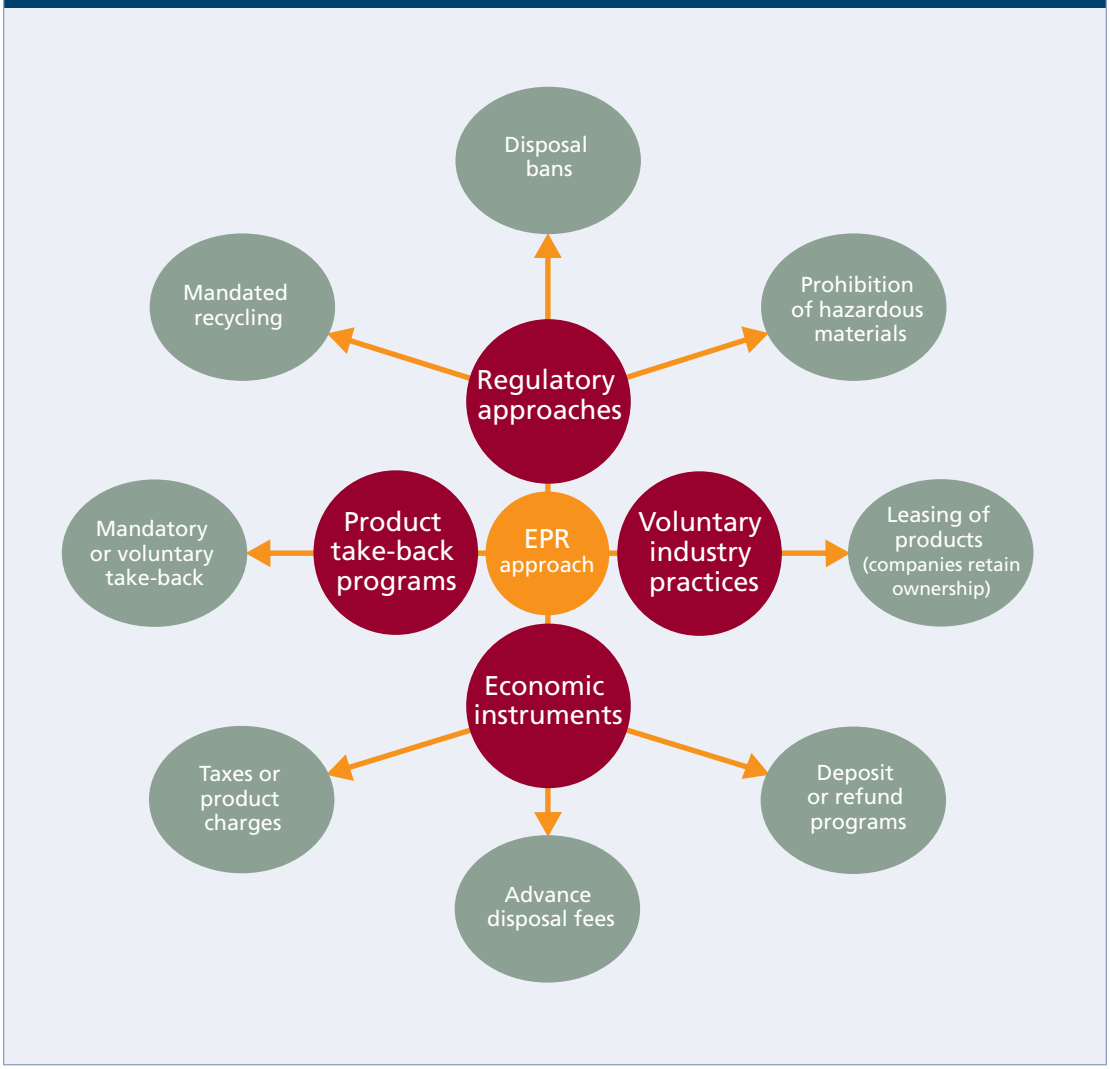
Extended producer responsibility

In most countries, producers are responsible for disposing waste from the production or manufacturing process, while consumers are responsible for disposing products and their packaging. Extended producer responsibility (EPR) is a product stewardship environmental

Did you know?

The Guelph Food Technology Centre in Ontario offers learning programs on sustainable packaging design. Participants learn about definitions of sustainable packaging, life cycle analysis and functionality of sustainable packaging, and conduct case studies to find the best fit for their needs.

Figure 6: Opportunities for extended producer responsibility



Source: adapted from Environment Canada

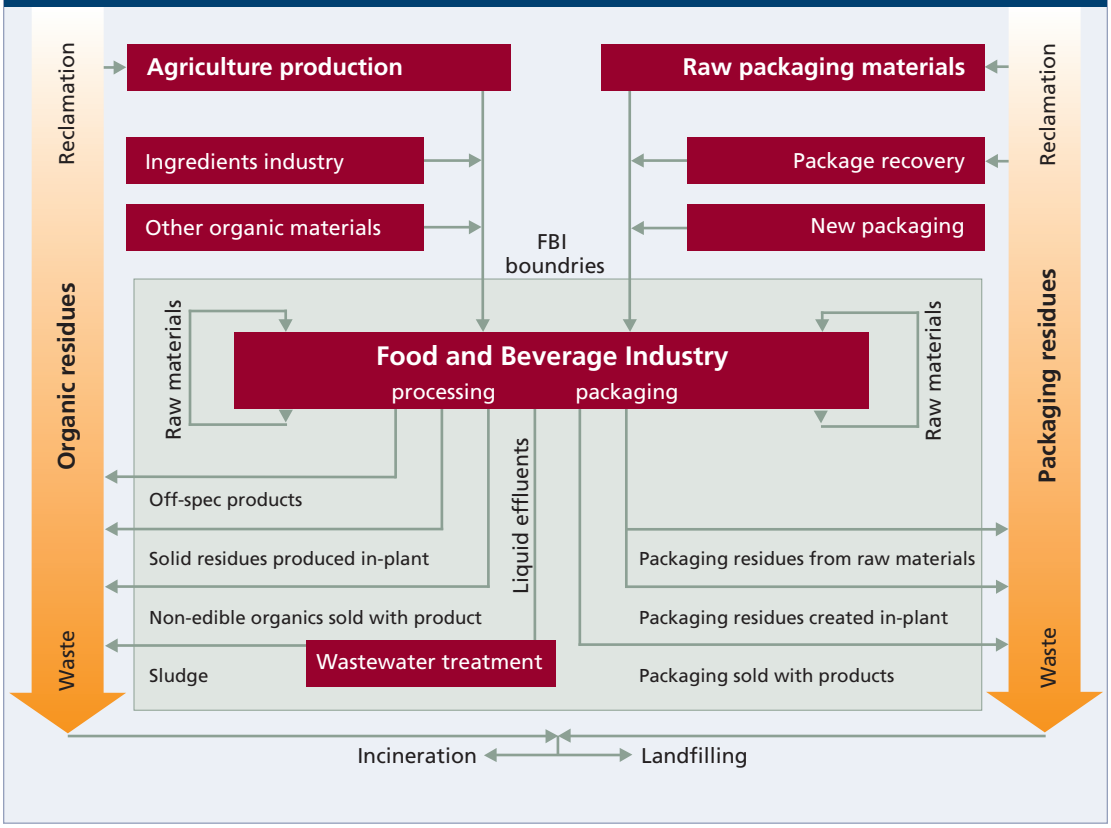
policy that originated in Germany and is being used around the world to change how we deal with packaging and other waste. EPR makes producers responsible for products into the post-consumer stage.

In June 2007, the Canadian Council of Ministers of the Environment (CCME) endorsed Canada-wide principles for EPR. The CCME's EPR Task Group considers packaging a first priority.[21] In Canada, two eco-efficiency indicators are being developed:

Did you know?

Save-On-Foods in western Canada offers recycling centres next door to some of its grocery outlets. This EPR initiative encourages consumers to return containers and packaging through product rebate incentives. The recycling centres are also convenient for consumers and an efficient collection process for the retailer.

Figure 7: Flow of organic and food packaging residual materials in the food and beverage industry



Source: Agriculture and Agri-Food Canada

organic residue intensity and required packaging intensity. As shown in figure 7, these measures will set future standards for how Canadian agribusinesses work within the principles of EPR.[22] What can you find out today to prepare for changes in packaging standards tomorrow?

Clear labelling

Many consumers value transparency and authenticity. Your packaging can provide them with clear, accurate information about your environmental efforts. However, many consumers are skeptical of green product claims. Lack of diligence or misrepresenting products as environmentally friendly without sufficient evidence could put your business at risk of greenwashing. What can you do to help consumers make sense of green claims on your products? Are your claims verifiable or measurable?

Did you know?

The International Organization for Standards provides information on environmental labelling through its ISO 14000 standards. For more information, go to www.iso.org.

Did you know?

In summer 2009, Walmart unveiled an environmental labelling program for the products it carries. Suppliers will now have to calculate and disclose the full environmental costs of making their products so that Walmart can feed this information into its rating system for price tags.

Finding value in emissions

Global concern over emissions is growing. Agribusinesses contribute to emissions, including carbon dioxide from burning fossil fuels, nitrous oxide from fertilizer application and methane emissions from livestock. Agriculture also offers many opportunities to store carbon dioxide and develop solutions to turn emission-heavy waste into valuable outputs like energy and fertilizer.

Some solutions have already been found, like modifying feed rations to create less methane in cattle. What emissions does your operation produce? What steps are you taking today to prepare for tightened regulations tomorrow?

Carbon markets

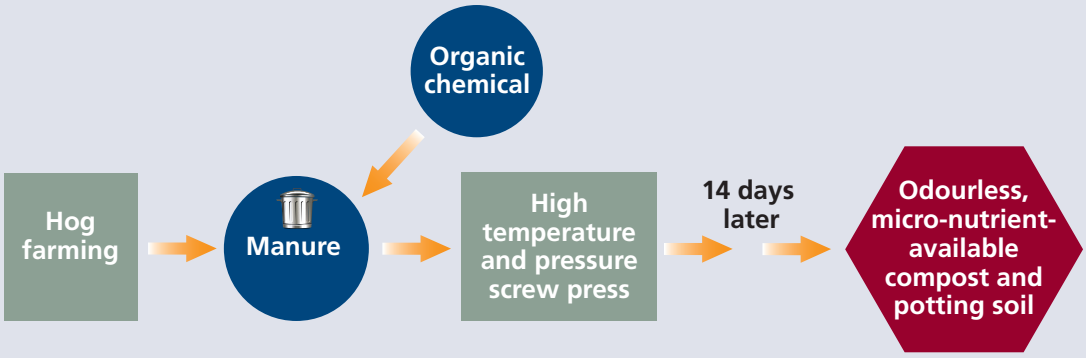
Emissions markets are becoming increasingly common around the world. The European Climate Exchange has been operating a carbon market since 2005. Alberta has implemented its own carbon offset market for provincial residents and companies. Some companies have become aggregators, pooling and contracting carbon offsets from farmers and selling the carbon offsets to large emitters in Alberta.

North American businesses can purchase and sell carbon offsets through the Chicago Climate Exchange on a voluntary basis. Publicly traded

(Continued on page 30)

Making it work – BHF Waste Management

Manitoba's BHF Waste Management is helping hog farmers manage their waste disposal issues as regulations continue to tighten. Farmers add a compound to the liquid manure before transporting it to BHF to remove odours and speed decomposition. The manure is then mixed with wood waste or straw and processed through a thermal screw press at temperatures in excess of 100 C and at 50 barometric pressure. This product is mixed with peat moss into a high-end organic potting soil. The whole process – from the farm to retail-ready products – takes less than two weeks. "The results we've been getting from independent trials have been beyond our expectations," says CEO Dean Stanzel. "The yields have been fantastic and that has been our greatest surprise."



Emissions from ammonium nitrate production in a fertilizer plant

Figure 8: 2004 and 2006 waste disposal by province (tonnes)

1 B.C.	2004	2006
R	919k	956k
NR	1.8m	1.9m

2 Alta.	2004	2006
R	943k	973k
NR	2.1m	2.8m

3 Sask.	2004	2006
R	279k	296k
NR	515k	537k

4 Man.	2004	2006
R	450k	455k
NR	477k	568k

5 Ont.	2004	2006
R	3.4m	3.7m
NR	6.3m	6.7m

6 Que.	2004	2006
R	2.2m	2.1m
NR	4.2m	4.6m

7 N.L.	2004	2006
R	228k	227k
NR	172k	180k

8 N.B.	2004	2006
R	208k	216k
NR	234k	233k

9 N.S.	2004	2006
R	179k	169k
NR	221k	232k

R - residential
NR - non-residential

k - thousands
m - millions

Source: Statistics Canada (P.E.I. information not provided)

Some agribusinesses are finding value in residential and non-residential waste by turning it into energy. What opportunities do you see in your province or region?

Making it work – Transform Compost Systems

John Paul, owner of Transform Compost Systems in Abbotsford, British Columbia, understands the science of soil. His PhD in soil science and experience working with Agriculture and Agri-Food Canada have provided him with the expertise to form profitable partnerships with other agribusinesses to capture the value of waste. By understanding what compost or manure is needed for each crop, Paul can provide tailored solutions that divert waste from landfills and turn it into valuable crop inputs. According to Paul, "Waste has value. It's time to turn the negative effects of organic materials in landfills – odour, pollution, ammonia emissions and greenhouse gases – into positive value." The partnership between poultry farmers, mushroom growers and Paul's lawn fertilizer business allows waste to be used multiple times for multiple savings.

www.transformcompost.com

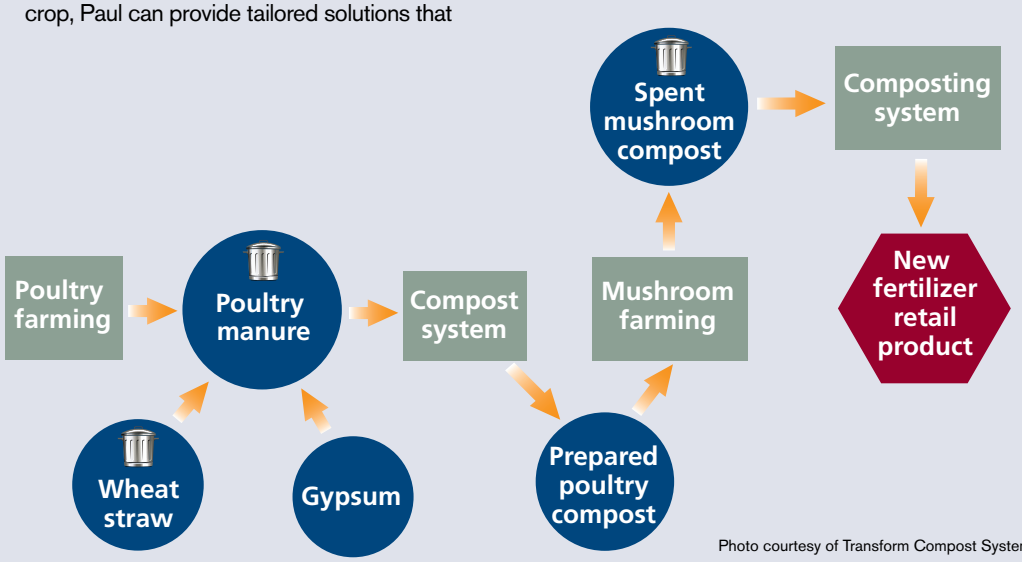


Photo courtesy of Transform Compost Systems

companies can voluntarily submit their greenhouse gas emission levels to the Carbon Disclosure Project, which houses the largest database of corporate climate change information in the world. Emissions-trading infrastructure is still its infancy. As harmonization of existing systems occurs, what can you do to position your business effectively?

Emissions as commodity

Are you ready to view greenhouse gases as valuable commodities instead of unwanted or harmful waste products? Experts are currently looking for ways to sequester carbon to dispose it safely. With innovative technology, will carbon dioxide become a valued commodity? Dow Chemical Co., in partnership with Florida-based Algenol Biofuels Inc., is investigating how to use salt water, sunlight and algae to turn carbon dioxide into ethanol. They are growing algae in clear photobioreactors to capture the ethanol the algae secrete. The process can produce 6,000 gallons of ethanol per acre of land, compared to only 400 gallons per acre for corn-based ethanol.[23]

Finding value in waste products

Most agribusinesses have solid or liquid waste outputs. With pressures on landfills and concerns about environmental impacts, waste disposal costs are increasing. Some businesses are turning solid and liquid waste into energy through anaerobic digestion, which uses micro-organisms to convert feedstock to biogas. Others are recycling chemical byproducts so they can be reused. For some, co-location with another industry means the waste from one business becomes another business's feedstock. Roughly 40 per cent of food produced in North America ends up as waste. New technology can turn food waste into biohydrogen, an alternative energy source. New composting technologies are accelerating the turnaround time or improving the quality of end products.

Agribusinesses with green business models are seeking zero waste or energy-neutral operations. Others are looking for quick ways to save money on waste disposal. Whatever level of green you choose, rethinking waste can save or make you money. Is there a new way for you to look at waste?

Final thoughts

To find value in the green economy, you may need to make big or small changes. Maybe you can find savings through conservation or by reusing materials. You may choose to become more socially responsible. You may uncover opportunities to work within sustainable, environmentally friendly value chains or rebrand your products. Perhaps you'll work with a consultant to review your environmental footprint and identify cost savings. You may decide to redesign your business model or processes for long-term efficiency.

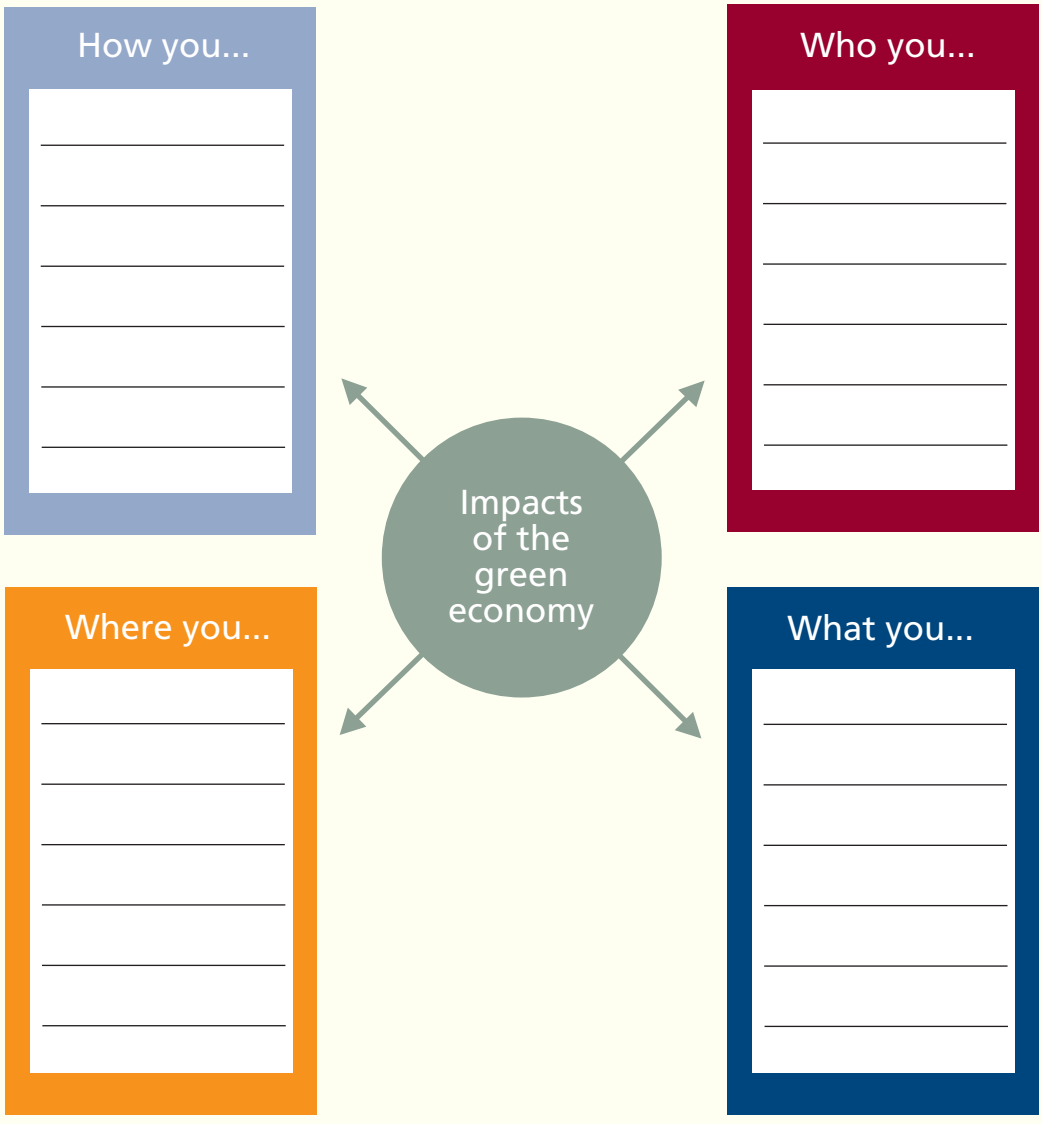
Investing time and resources in environmental initiatives may provide an immediate return on investment or may result in positive returns years from now. Working with specialists in environmental design, risk management and other areas can help you make the best choices to balance the needs of people and the planet with your need to run a sustainable, profitable business.

With foresight and strategic planning, agribusinesses are becoming more profitable through green thinking and actions. What innovations will you consider to harness the opportunities of the green economy?

Knowledge Insider

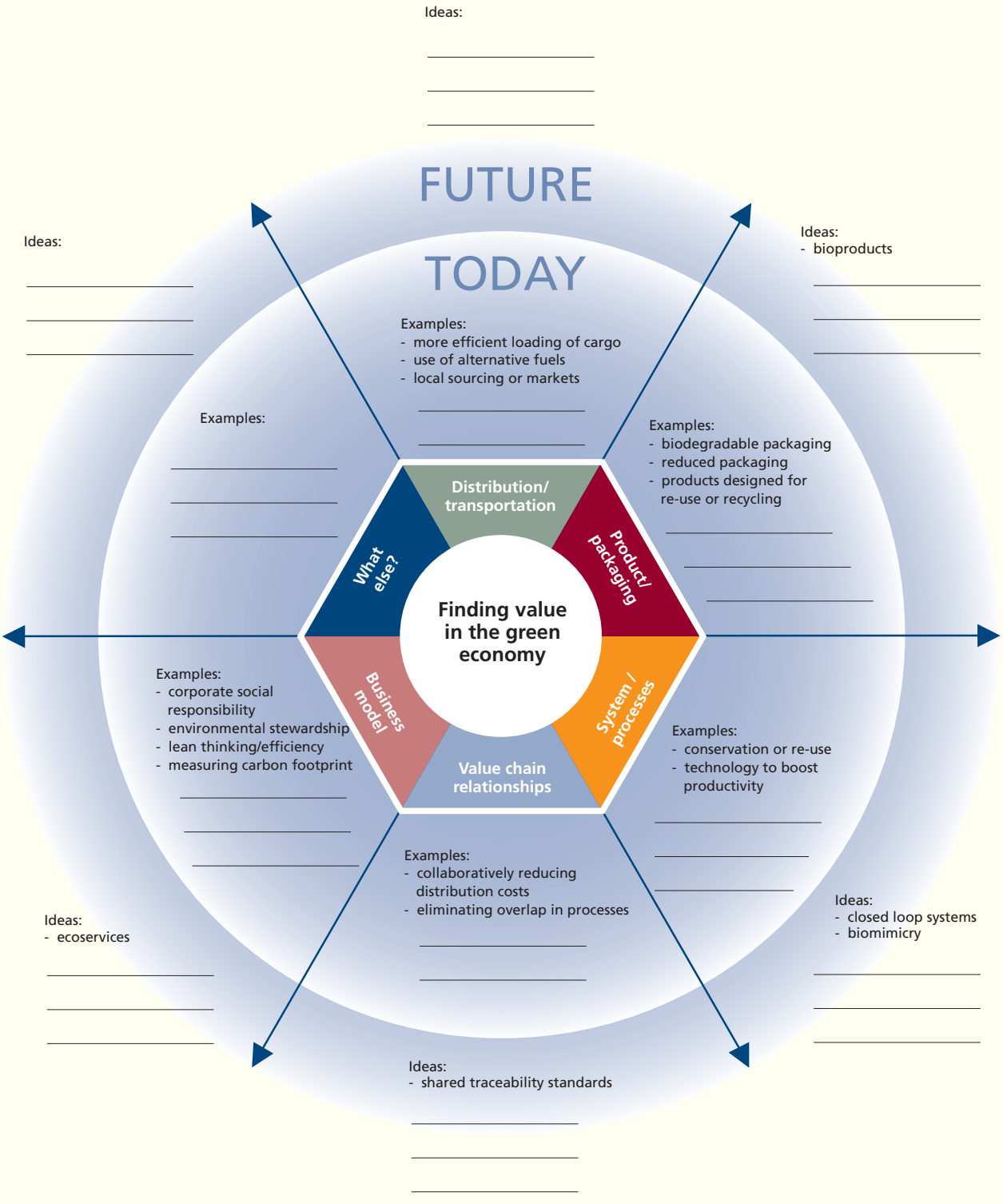
Tips, tools and strategies | **Finding value in green**

How will you create opportunities in the green economy?

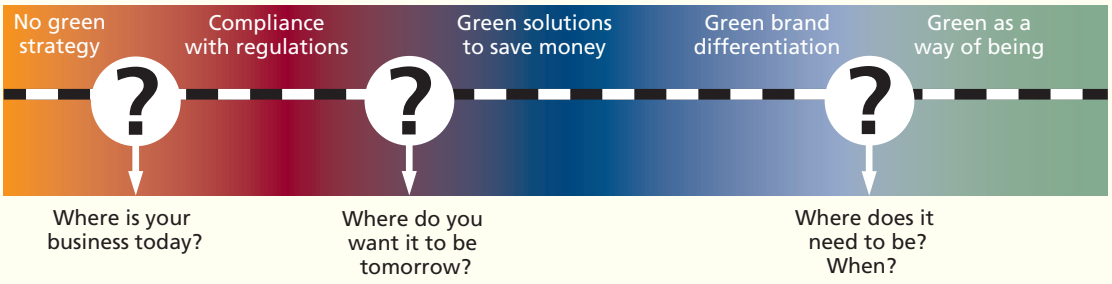


Thinking about possible impacts today can help your business find opportunities for profit or savings through environmental initiatives.

Find value for your business in the green economy



How green is your business?



Ask yourself a few key questions to decide where you want your business to be and how it can get there.

Vision

How do green initiatives fit with your business vision? Using a green lens when reviewing your business model can uncover opportunities to meet the needs of people, the planet and your profit (triple bottom line).

Knowledge

What information do you need to make an informed, strategic decision about the future of your business? Who can you work with to fill any knowledge gaps?

Investment

What are you willing to spend upfront to make changes to your operations, marketing or business model? How will you calculate the return on investment for infrastructure investments?

Risk

What level of risk will you take? How will you assess risk? Who can you work with to complete a risk and opportunity assessment?

Making it work – Houweling Nurseries

Four years ago, B.C.-based Houweling Nurseries started thinking about expanding its California hothouse operation, since the climate allowed for year-round harvesting and increased production. Faced with escalating energy costs and anticipated water shortages, the company developed a green business model. Today, Houweling hothouses are energy-neutral, featuring solar energy, water reclamation and environmental control technologies. With the help of U.S. tax credits, accelerated depreciation and energy incentives, the company has reduced its projected payback period. According to CFO Peter Cummings, "Ultimately, we were looking for ways to embrace green technologies while improving our competitiveness, both in sustainable agriculture practices and through reduced cost of production."

www.houwelings.com

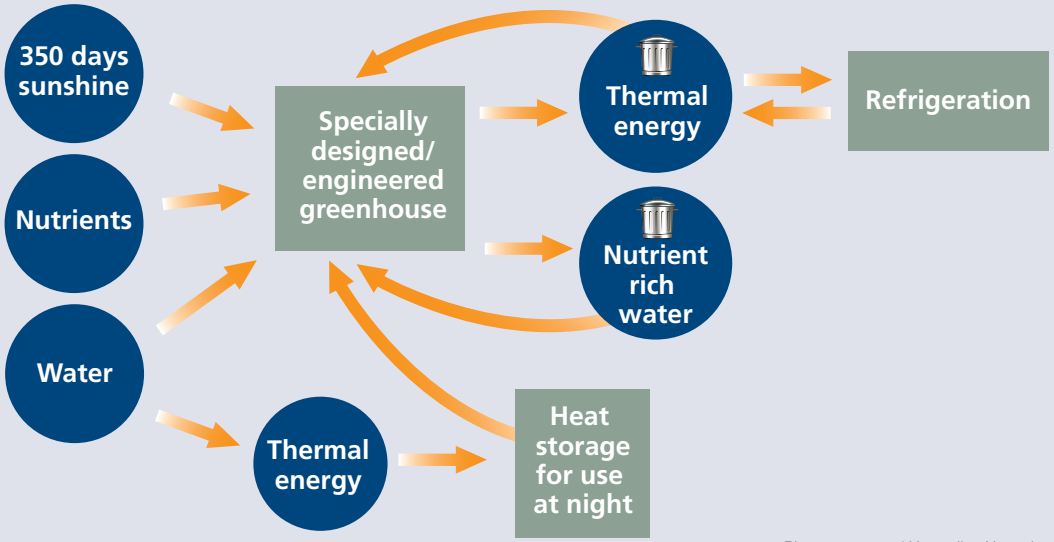


Photo courtesy of Houweling Nurseries

Metrics and measurement in the green economy

New ways of doing business need new ways of measuring success. Changes in policies or practices from governments and partners in the value chain will affect how and what you measure. One change, like Walmart's new environmental labelling initiative, can alter how value chain partners measure their environmental impact. With environmental factors included in the bottom line, how will your measurement be different tomorrow?

We can already measure anything from the environmental footprint of a farm to the efficiency of converting waste to energy. We are beginning to calculate the value of ecosystems to the economy. For example, the Pembina Institute studied the value of natural capital in Canada's boreal forest. It calculated that the non-market value of boreal ecosystem services was $93.2 billion, including flood control and water filtering by peat lands, carbon sequestration and pest control by birds.[26] New metrics spur new thinking about what we value.

Did you know?

The Soil Conservation Council of Canada (SCCC) is evaluating a new computer-based tool called Holos, which helps agricultural producers identify opportunities to calculate and reduce greenhouse gas emissions in their operations. Holos has been designed by Agriculture and Agri-Food Canada to analyze a range of on-farm conservation management scenarios and determine potential reductions. It's currently being tested by teams across Canada.[24]

www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1226606460726&lang=eng

Did you know?

Agriculture and Agri-Food Canada has developed eco-efficiency indicators for soil, water and air quality, biodiversity and the food and beverage industry. Five issues have been identified for the food and beverage industry: energy use, greenhouse gas emissions, solid organic residue generation, packaging waste regeneration, and water use and waste water production.[25]

Reliable measures can help you assess whether a green solution is bringing value, or even profitable. How will you determine whether a greener solution will positively affect the environment and your business?

We can measure the amount of resources needed to produce a consumer product, such as how much virtual water is in a product, or the net sum of all the water needed to produce it. This hidden history of products can be eye-opening. For example, two quarts of gasoline and a thousand quarts of water are required to produce a quart of Florida orange juice.[27] We can measure the water footprint of a country or the total draw of that nation on the global water supply. What aren't we measuring yet? What do these new measures mean to your agribusiness? What do you need to measure to

Notes

Finding value in green

✔ Water	✔ Design	✔ Products
✔ Energy	✔ Marketing	✔ Services
✔ Feedstock or ingredients	✔ Transportation	✔ Packaging
	✔ Technology	✔ Emissions
		✔ Waste products
What else?	**What else?**	**What else?**
_____	_____	_____
_____	_____	_____

make strategic decisions within the green economy?

What I'm thinking of:

- ❒ reducing costs
- ❒ increasing revenue
- ❒ rethinking waste
- ❒ conserving inputs (water, feedstock, energy)
- ❒ accessing green tax initiatives, grants and incentives
- ❒ evaluating production practices
- ❒ getting involved in emerging carbon markets
- ❒ assessing my environmental footprint
- ❒ improving productivity
- ❒ improving efficiency
- ❒ eliminating waste energy
- ❒ creating new products or revenue streams
- ❒ learning more about green design principles
- ❒ monitoring changing policies or regulations
- ❒ conducting scenario planning or doing case studies
- ❒ analyzing risk with a green lens

Knowledge Insider tools

What you'll find	Web address
Water	
Rural water quality information tool	www.agric.gov.ab.ca/app84/displayInfo?type=showFeatures&value=1
Learn about your water footprint and virtual water	www.waterfootprint.org/?page=files/WaterFootprintCalculator www.gdrc.org/uem/footprints/water-footprint.html
Find information about new approaches some communities are taking to manage their water issues	www.sekid.ca/links.html www.nation.on.ca
Find information about reducing agricultural impacts on water resources	www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1187702145201&lang=eng
Monitor the business of water	www.globalwaterintel.com/useful-links
Environmental services	
The Canadian Society for Bioengineering helps you find information about energy generation from your business's biomass	www.bioeng.ca/members
Canadian Green Chemistry Network	www.greenchemistry.ca/index.html
Packaging Association of Canada	www.pac.ca/index.html
Canadian Environmental Technology Advancement Centres can help you develop green technologies	www.enviroaccess.ca/index-en.html www.cetacwest.com www.oceta.on.ca
Access information on financing and support through Sustainable Development Technology Canada	www.sdtc.ca/en/index.htm
Find environmental programs for your province or region through Agriculture and Agri-Food Canada	www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1204137480722&lang=eng www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1204137480722&lang=fra
Find the closest collection site for your empty pesticide containers from Crop Life Canada	www.croplife.ca/web/english/stewardship/empty_container_program.cfm
Find out if your product meets criteria for environmentally friendly	http://ethiquette.ca/index2.html
Monitoring new developments	
Carbon markets: • Climate Change Central – Alberta • Western Climate Initiative • European Climate Exchange • Chicago Climate Exchange	 • www.climatechangecentral.com • www.westernclimateinitiative.org • www.ecx.eu • www.chicagoclimatex.com

What you'll find	Web address
Monitoring new developments	
Algae	www.nrccnrc.gc.ca/eng/news/nrc/2009/09/16/algae-biofuels.html www.nrc-cnrc.gc.ca/eng/projects/nbp/biofuels.html www.nrc-cnrc.gc.ca/eng/programs/imb/national-bioproducts-program.html
Bioproducts	www.ic.gc.ca/eic/site/lsgpdsv.nsf/eng/hn01663.html
Research on life cycle of products, processes and services	www.groupes.polymtl.ca/ciraig/
Monitoring green trends	
Database on what the federal government and Canada are doing in support of sustainable development	www.sdinfo.gc.ca
The Wall Street Journal's daily analysis of the business of the environment	blogs.wsj.com/environmentalcapital
Get a daily green briefing	www.environmentalleader.com
Source for news, opinion, best practices and other resources on the greening of mainstream business	www.climatebiz.com
Follow consumer trends for environmentally friendly food products	www.greenlivingonline.com/food

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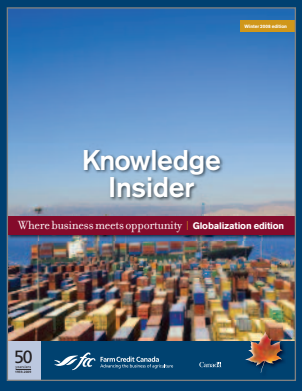

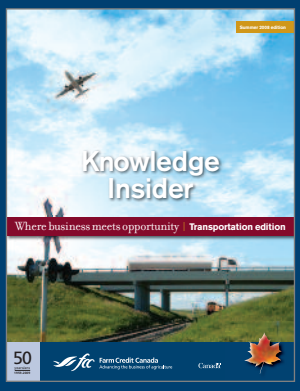

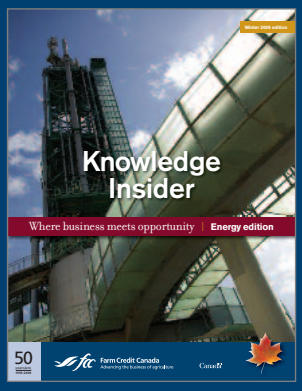

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