

Fueling a new economy

EXPLORING THE
OPPORTUNITIES OF

**ETHANOL
PRODUCTION
IN MANITOBA**

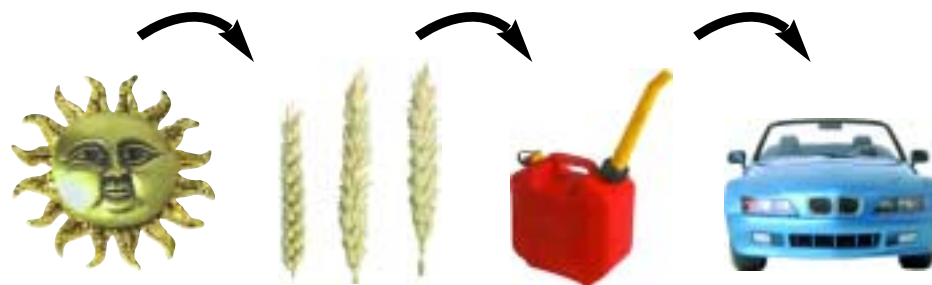
ethanol

WHAT IS ETHANOL?

The process of making alcohol has been around for thousands of years. In recent years the manufacturing process has been refined, leading to improved quality and efficiency of production. Ethanol can be produced from any biological feedstocks that contain sugar, or materials that can be converted into sugar, such as starch or cellulose.

Sugar cane and sugar beets produce most of the world's ethanol. In the United States, corn is the primary feedstock, while in Canada, corn and wheat are used. A large quantity of the ethanol produced in Canada and the United States is destined for use as fuel.

Ethanol is used as an automotive fuel by itself or can be mixed with gasoline to form what has often been called "gasohol" – the most common blend contains 10% ethanol, while other blends can contain up to 85%. Because the ethanol molecule contains oxygen, it allows the engine to more completely combust the fuel, resulting in less pollution. Since ethanol is produced from plants that harness the power of the sun, ethanol is also considered a renewable fuel. Therefore, ethanol has many advantages as an automotive fuel.



GLOBAL PERSPECTIVES ON ETHANOL PRODUCTION AND USE

The production of fuel ethanol on a large scale began in Brazil in the 1970s during large oil price escalations and a collapse in the price of sugar, one of Brazil's largest export commodities. The government mandated fuel ethanol as a way to reduce foreign currency expenditures on oil and as a way to support their sugar cane industry. Today Brazil is the largest producer and consumer of fuel ethanol, with about 12 billion litres used in 2001.

Brazil will soon be passed by the United States in ethanol production and consumption. In California, the upcoming ban on MTBE, an octane-enhancing additive, will create a demand for additional ethanol production. Combined with similar bans suggested for the North Eastern U.S., production could exceed 13 billion litres annually. Production is also fueled by the US agricultural lobby. In some states, such as Minnesota, 97% of all gasoline sold contains some blended ethanol.

The circumstances in Canada are similar where ethanol is produced and distributed as an automotive fuel in the prairie provinces and Ontario.



HENRY FORD'S FIRST AUTOMOBILES RAN ON ETHANOL

Henry Ford originally designed his cars to run on ethanol. When gasoline became the dominant fuel the design was changed.

Today, all car manufacturers are producing vehicles that run on ethanol blended gasoline. The Ford Taurus and Explorer are vehicles that can use up to E85 (85% ethanol-15% gasoline).

These FFVs (flexible fuel vehicles) automatically adjust to any ethanol-blend mixture for hassle-free and environmentally-sound driving. On-board sensors monitor the fuel mixture and the on-board computer adjusts spark timing and fuel flow to optimize performance. As Yogi Barra once said, "It looks like deja vu all over again".

in Manitoba

MANITOBA GOVERNMENT CONSIDERS ETHANOL



"The Manitoba government has announced plans to expand the production and use of ethanol in Manitoba. This renewable fuel can help

preserve our environment while expanding our economic opportunities. We owe it to ourselves – and our children – to explore its vast potential."

Public consultations are a part of the government's plan. These consultations will give Manitobans an opportunity to learn about the potential of this new industry. People can express their own ideas and comments on how the province, should approach its development for the greatest benefit of all the province. Jobs and economic stability, especially in rural communities, and a cleaner environment are just some of the potential benefits.

The government wants to hear the views of all citizens and stakeholder groups. Information on the facts about ethanol, its potential as an economic bonus and the challenges to be overcome has been produced to help inform the public.

Public consultations

Winnipeg - Sept. 19

Thompson - Sept. 23

Brandon - Sept. 30.

Swan River - Oct. 1

Arborg - Oct. 2

Morden - Oct. 3



GROWING INTEREST IN ETHANOL

Canadian farmers are increasingly more interested in the opportunities offered by producing fuel ethanol. The fundamental reason for this is that traditional grain farming, with today's high production and marketing costs, is no longer an option for many. Borderland Ventures has been working on establishing a cattle feedlot and ethanol plant near Russell for more than five years. All their efforts may soon come to fruition, as they firm up their plans with the help of Canadian BioEnergy of St. Albert, Alberta.

"We have come full circle," says Borderland spokesperson Terry Jackson, "They bring to the table expertise in all the fields that we need to make this a reality." This partnership creates an opportunity to pursue niche grain product markets. However initially the focus will be on the production of ethanol, along with a feedlot operation," notes John McCook, President of Canadian BioEnergy.

The Beausejour-Brokenhead Development Corporation sees an integrated fuel ethanol production - cattle feedlot operation as an option for sustaining their community and creating opportunities for their children. A number of other similar proposals are being developed across Manitoba.

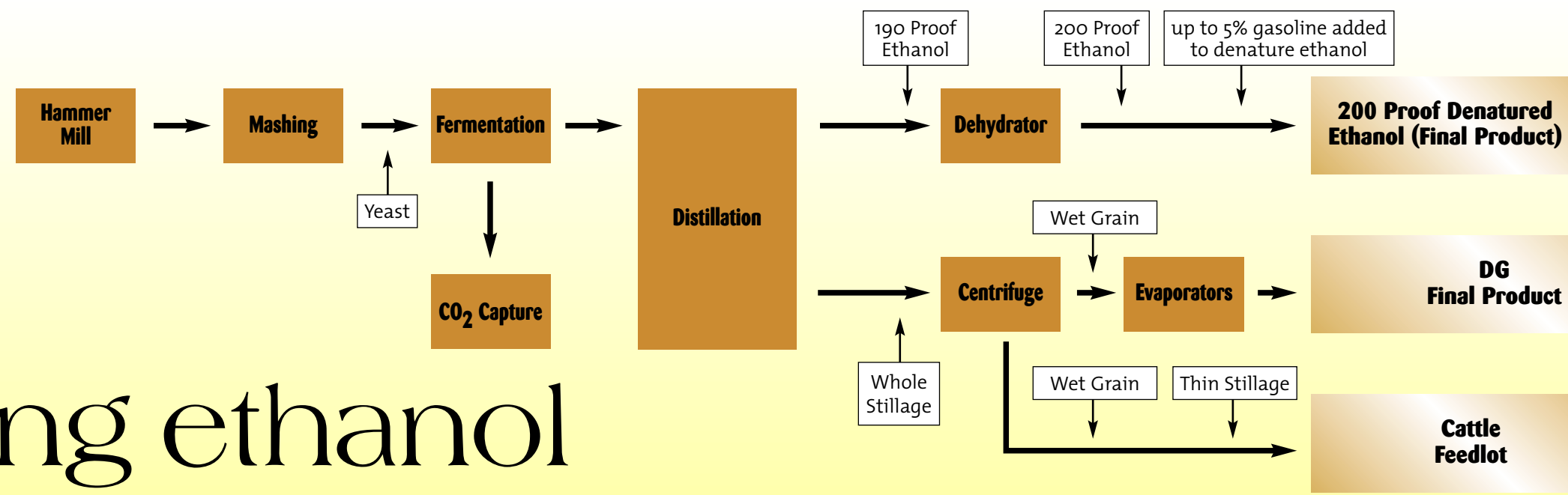
A major coproduct of ethanol production is distiller's grains (DGs), a high protein product ideally suited for feeding cattle. The sale of DGs has been essential for the success of ethanol production facilities both in Canada and the USA. The DG can be either dried and marketed broadly or sold wet for use in nearby feedlots. Each has its particular advantages which are dependent on location and surrounding circumstances.

For ethanol production to be attractive, mandating the use of ethanol blended gasoline is key. A 10 percent blend which is being proposed would create a market of about 140 million litres of ethanol a year in Manitoba. This is 14 times the current output from Husky's plant in Minnedosa. In addition, mandating has the potential to expand, in a major way, the number of feedlots and other related byproduct facilities. It is obvious why the possibility of an expanded ethanol industry is generating so much enthusiasm in rural Manitoba. While there are many proposals, not every one will result in a plant being built.



making ethanol

Grain is used to produce alcohol (ethanol) and its co-products in a well-developed dry milling process with little waste. The major steps in the dry milling process are outlined below.



Milling: The grain first passes through hammer mills, which grind it into a fine powder called meal. The meal is then fed to the mashing system.

Mashing: The meal is mixed with water and enzymes, and passes through cookers. The action of heat liquifies the starch, and enzymes begin the process of breaking down the starch into sugars. The mash from the cookers is then cooled and pumped to a fermenter.

Fermentation: Yeast is added to the mash to convert the sugars to ethanol and carbon dioxide.

Distillation: The fermented mash, now called "beer", contains about 11% alcohol, as well as all the non-fermentable solids from the grain and the yeast cells. The mash is then pumped to the distillation system, where the alcohol is removed from the solids and water. The alcohol leaves the top of the final column at about 95% strength, and the residue mash, called stillage, is transferred from the base of the column.

Dehydration: The alcohol from the top of the column passes through further dehydration where the remaining water is removed. The alcohol product at this stage is called anhydrous (pure) alcohol or ethanol.

CONVENTIONAL FERMENTATION

There is very little difference in the fermentation process for production of ethanol (Ethyl Alcohol) for industrial, beverage or fuel uses. Basically the process requires the conversion of starch to sugars by the use of enzymes and then fermenting those sugars by adding yeast. During fermentation the yeast converts the sugars to ethanol and carbon dioxide. The fermentation process itself does not produce a product with sufficient alcoholic strength to serve its final purpose. Distillation and dehydration are also required. There are precautions that must be taken when producing ethanol, alcohol above 14% destroys the enzymes and fermentation stops. Successful fermentation demands close control of temperatures during the process.



CELLULOSE TECHNOLOGIES

Ottawa-based Iogen Corporation, a high-tech green technology company, is not proposing the return of the Stanley steamer, but rather using agriculture and forest residues as the raw material to produce ethanol. Iogen operates a 'straw to ethanol' demonstration plant that is used to research ways to improve the efficiency of converting cellulose into ethanol. At present the conversion rate is about 300 litres of ethanol for every tonne of straw. Because of the low cost of straw versus grain, Iogen believes that their process could be far more competitive with regular gasoline than grain-based processes.

Jeff Passmore, Iogen's Executive Vice President notes "At present we are evaluating the availability of straw, existing infrastructure and government policies in several jurisdictions." Passmore said Iogen plans to start building a bioethanol production plant in late 2004 and one of the locations being considered is at Killarney, a farming community in southern Manitoba. The 220 million litre plant would create about 100 direct jobs. Although the company has looked at the western provinces as potential locations, Mr. Passmore prefers to wait until their analysis is complete before making further comments on plant location. "We'll make the decision based on where the business environment and the plant economics are the most attractive," he said.

CANADIAN ETHANOL PLANTS

Of the six existing plants in Canada, except the one in Quebec, produce alcohol using either corn or wheat as the feedstock. There is one plant in each of Alberta, Saskatchewan and Manitoba, these plants all depend on revenue from by-products to be profitable. The API plant in Red Deer, Alberta is the only one producing flour and gluten as coproducts. Of the two in Ontario, the Commercial Alcohol Inc. plant in Chatham is Canada's largest.

Low grain prices, concern about climate change, and a changing political will, have increased interest in fuel ethanol, which is fostering an expansion in the industry. Several plants are now on the drawing board. If built, these plants could easily double or triple the size of the existing Canadian ethanol industry.

BORDERLAND TEAMS UP

Even before the Manitoba Government's public consultations were announced, entrepreneurs were developing their project proposals and business plans. A good example is Borderland Ventures of Russell who originally proposed a flourmill, gluten plant, ethanol plant and feedlot. They have subsequently teamed up with Canadian BioEnergy Inc. of St. Albert, Alberta to form Manitoba Biorefiners Inc. Canadian BioEnergy Inc. and its associates have particular expertise in integrated ethanol plants/feedlot designs and operations and financial and financing acumen. As a result, "Manitoba Biorefiners Inc. is looking at a 24 million litres/year ethanol plant and a 20,000 head feedlot," reports Herb Lovas, Chair of Borderland.

As John McCook, President of Canadian BioEnergy Inc., sees it, the venture is a highly efficient biorefinery. Grain being converted to automotive fuel and the co-products, grain mash and water, fed to cattle; with the manure spread on the land as fertilizer. The whole process, in addition to making good economic sense, will contribute to sustainable agriculture in an environmentally responsible manner.

THERE ARE STILL PLENTY OF CHALLENGES

Prof. William Paton of Brandon University, sees a lot of challenges for the ethanol industry in Canada. "First of all there isn't a level playing field for the Canadian versus American farmers. Another major challenge is being able to produce a crop with lot of starch per hectare at a low cost. Although wheat prices are currently low, ethanol producers would have a tough time should grain prices return to near historic highs. Maybe Canadian farmers have to look at some new crops like fodder beets or certain types of potatoes." Like most business ventures there will be no shortage of challenges for an expanded ethanol industry in Manitoba.

This is one of the reasons why there is research underway at various Canadian and US universities and laboratories into refining ethanol production processes and improving the starch content of the grains and other crops that might be used to produce the ethanol. Others think that ethanol from cellulose is the way of the future. As a result there are at least half a dozen processes in various stages of research and development for producing ethanol from such things as straw, woodchips and even willows. One thing for sure, western Canada's large landmass could be the basis of a sustainable fuel industry for cars and trucks.

The Ethanol Bulletin

BUCKING THE TREND

Some say it will never work while others say it's the only way to go. The debate is over how small can an ethanol plant be and still be viable. Some see this as being a great opportunity for New Generation Co-ops where the farmer supplies the wheat as well as processing it into ethanol on farms. The scale would be about one hundredth the size of plants currently in operation on the prairies.

A BC company has recently introduced a small scale ethanol production option that may add further opportunities for some producers.

The process is called a Micro Energy Food Facility(MEFF) and consists of a barn for the cattle, a second building in which the ethanol making equipment is housed and a bio-furnace or gasifier located between the barn and the ethanol building, that burns the used bedding and manure. The total cost of the ethanol building, the bio-furnace and the ethanol making equipment for each MEFF, is reported to be around \$150,000, not including the cost of the barn and cattle handling facilities.

If successful, there could be several such small facilities in an area and tankers would routinely pick up the ethanol not unlike what is done with milk. Instead of tens of thousands of cattle in a feedlot, each plant would only be big enough to feed a few hundred head at a time. The environmental and infrastructural benefits are obvious. Suitably sized equipment is available. The catch is to get the economics to work.



COMMERCIAL ALCOHOLS INC. LEADER ON CANADIAN ETHANOL SCENE

Being environmentally friendly is just one of this world-class company's claims to fame. From a standing start only ten years ago, Commercial Alcohols Inc. has grown to be Canada's largest manufacturer and supplier of fuel and industrial grade alcohol. What started out as a small company in Tiverton, Ontario, with annual sales of \$6 million in 1990, has exploded into a \$225 million Canadian success story. Headquartered in Brampton, Ontario, Commercial Alcohols has a distillation facility in Tiverton, a packaging facility in Brampton, and a state-of-the-art, fully computerized alcohol plant in Chatham producing 120,000,000 litres of fuel ethanol per year with plans to double its output. In addition, Commercial Alcohols has a 120 million litre plant under design in Varennes, Quebec and is examining the possibility of a plant in Saskatchewan.



Commercial Alcohols Chairman, Kenneth Field was named Canada's Entrepreneur of the Year by the accounting firm Ernst and Young.



SHELL INVESTS IN ETHANOL

'Who knows how big this could become?' oil giant says of investment in Iogen.

The Royal Dutch/Shell Group has bought an equity stake in Iogen Corporation, the Ottawa-based firm that made its name by developing bioethanol from unused plant fibres. Company representatives were all smiles on a stage surrounded by straw bales as they announced that the oil giant has invested \$46 million to help Iogen establish the world's first commercial-scale bioethanol production plant.

"The investment is one-time for now," said Duncan Macleod, manager of portfolio development for Shell Global Solutions International, who was here from the Netherlands for the announcement. "But who knows how big this could become?" The investment gives Shell slightly more than a 20 percent share of Iogen Corporation, as well as two seats on the company's board of directors. Petro Canada has also made investments in Iogen.

Where do the bright new ideas in ethanol come from?



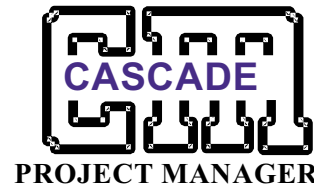
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SOMETIMES IT TAKES A FRESH APPROACH

Many small communities in rural Manitoba and Saskatchewan have been assisted by a corporation they previously knew little about, but in only a few short years have come to appreciate and value. As Canada's two major railways applied to abandon rural lines throughout the west, their theme was a common one, the lines are not viable, the companies are losing money and the lines are being subsidized by the main lines.

Fortunately for The Pas, the Port of Churchill and many prairie communities, Denver based OmniTRAX and its parent, Broe Companies Inc, took a fresh look at the circumstances, saw the potential and put these assets to work. Prior to OmniTRAX taking over the Churchill route in 1997, an average of 250, 000 tonnes of wheat were shipped annually. Four years later, close to 800, 000 tonnes of wheat were shipped - a phenomenal increase. The same solid results have taken place on other neglected rail lines.

Credentials in western Canada now solidly established and a demonstrated expertise working with the public sector, Broe is now focused on combining the strengths of two other basic prairie industries, agriculture and energy. It is actively involved in promoting the development of a western Canada ethanol industry.

Broe has recently negotiated development agreements with several Saskatchewan community based groups, as well as the provincial government's Crown Investment Corp., towards the construction of four 80 million litre ethanol plants at locations throughout the province. Involving local investors and the provincial government, Broe hopes to have its first Saskatchewan project, located near Belle Plaine, under construction by late 2002. The company is awaiting the outcome of the Manitoba ethanol review before it announces any discussions for developments in the province.

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Our 20 years of involvement in the ethanol industry provides a background for our understanding of the business and process of bringing an ethanol opportunity from concept to an efficient, fully operational facility.

Wardrop designed and supervised the construction of the Husky Energy production facility located in Minnedosa, converting the old Minnedosa Distillery. In addition, numerous designs and feasibility studies for plant sizes of 15, 50, 75 and 110 million litres per year capacity, considering various feed stocks, including: wheat, barley, potato waste, and corn have been completed by Wardrop.

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A VALUED PRODUCER

The Husky Energy ethanol production facility at Minnedosa has been in operation for over twenty years, and has been a reliable producer of ethanol for Husky/Mohawk retail outlets, and environmentally conscious gasoline consumers throughout western Canada.

With increased interest nationally, and indeed throughout North America, in using ethanol as a fuel additive, an expansion of the Minnedosa ethanol plant is a frequent topic of conversation on coffee row in Minnedosa. The 10 million litre capacity plant presently uses approximately 30,000 tonnes of grain annually, which helps local farmers, and provides about fifteen good quality jobs in Minnedosa itself. According to Pat Gibson, Chairperson of the Minnedosa Chamber of Commerce, it's a great employer for the town. "Husky Energy and Mohawk are well regarded names in Minnedosa," notes Gibson. She also confirms that there has been a lot of talk and interest over Husky expanding its Minnedosa plant, "Although Husky Energy has not made any announcement on its plans, if something like that happens, it will be a good news story for our community!" It would also be a good news story for the local agricultural community, since it would translate into additional sales of grain, as well as good news for the truckers of both grain and ethanol.

As pioneers of ethanol production in western Canada, Husky/Mohawk has gained a strong public recognition for their contribution to the environment and for adapting to new technologies. Their many years of practical experience in ethanol production, distribution and marketing will position them well to be a competitive factor in the expansion of ethanol use in Manitoba and in Canada.

FEDERAL SUPPORT FOR DEVELOPMENT

The Government of Canada supports ethanol development and use mainly through four types of measures:

- research and development programs that support the market development of technologies to overcome technical barriers to ethanol market penetration;
- the exemption of 10 cents per litre federal excise tax for the ethanol portion of blended gasoline;
- the inclusion of ethanol powered vehicles in the federal vehicle fleet; and
- the Future Fuels Initiative.

The Future Fuels initiative was announced in November 2001 under Canada's Action Plan 2000 on Climate Change. It aims at an increase of 750 million litres in Canada's annual capacity to produce ethanol, which represents a four-fold increase in current production. Such an increase could result in 25% of Canada's total gasoline supply containing 10-percent ethanol. The Future Fuels initiative is jointly delivered by Natural Resources Canada (NRCan) and Agriculture and Agri-Food Canada.

The major component of the Future Fuels Program is the renewal of the National Biomass Ethanol Program (NBEP). The renewed NBEP will help overcome lender resistance to investing in large ethanol plants because of uncertainty about excise tax policy. Under Future Fuels, NBEP provides for \$140 million in contingent loan guarantees to encourage financing for three to six new ethanol plants. The loan guarantee program would only come into effect if all or part of the excise gasoline tax on ethanol were imposed prior to December 31st, 2010.

In addition to the loan guarantees, the Future Fuels Program adds \$3 million over five years for a public outreach component to provide essential market information to retail consumers. The initiative also provides for such activities as public education on fuel ethanol, analysis of fuel ethanol markets and producer economics, research on a possible renewable fuel standard, and liaison with provinces and industries interested in the ethanol plant expansion.

ETHANOL PRODUCTION IN CANADA

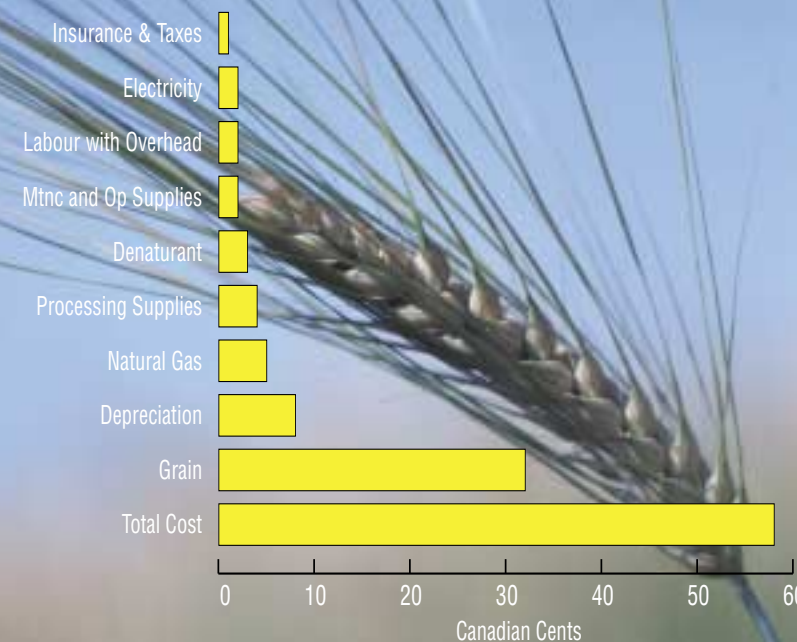
Current Producers	Location	Capacity (millions of litres)	Other Information
Mohawk Oil, Canada Ltd.	Minnedosa, Man.	10	Wheat-based
Pound-Maker Agventures Ltd.	Lanigan, Sask.	12	Wheat-based, partnered with feedlot
Commercial Alcohols Inc.	Tiverton, Ont.	23	Corn-based
Commercial Alcohols Inc.	Chatham, Ont.	150	Corn-based
API Grain Processors	Red Deer, Alta.	26	Wheat-based, also makes flour and gluten
Tembec	Temiscaming, Que.	17	Forestry product based
Total annual production capacity		238	

Proposed or Under Construction.

Seaway Grain Processors Inc.	Cornwall, Ont.	66	Corn-based
Commercial Alcohols Inc.	Varenes, Que.	120	Corn-based
Commercial Alcohols Inc.	Chatham, Ont.	150	Corn-based
New Saskatchewan Projects	Saskatchewan	Potential 300	Wheat-based
New Manitoba Projects	Manitoba	Potential 300	Wheat, corn and cellulose-based
Total annual production capacity,		936	

COST TO PRODUCE A LITRE OF ETHANOL

It costs about 60 cents to produce a litre of ethanol (including dg) in Canada as shown in the accompanying illustration. The largest component by far is the cost of the grain itself which currently amounts to about 30 cents. A litre of refined gasoline can cost (wholesale and before taxes) between 28 and 38 cents depending on the price of crude oil and other factors. This means that ethanol must be subsidized if it is to compete with gasoline as a fuel. Some people are concerned that these subsidies must be maintained on an on-going basis and thus represent a drain on either the taxpayer or the consumer, or both. As in many cases, there is something to be said on both sides of the issue.



the business case

RATIONALE FOR PARTNERSHIPS

Some agricultural producers see ethanol production as a solution to selling their wheat at higher prices and in larger volumes. While it is true that feedstocks are critical to the success of any plant, several other factors are equally important skills that producers themselves may not always possess. Marketing, finance and management are three areas where the success or failure of any plant is equally vulnerable. Where ethanol plants are undertaken in conjunction with cattle feedlots, the viability of both operations may benefit and the economic impact on the community is magnified. For this reason, developing partnerships with firms that have expertise, capital and marketing capabilities is seen by many as essential.



NEW TECHNOLOGY ASSESSED BY KILLARNEY

The renewed interest in ethanol is encouraging a group from Killarney, and the surrounding area, to explore one of the newest technologies for ethanol production. They have been exploring the possibility of producing ethanol from straw for at least four years. This area is one of the most productive wheat growing areas in Canada, thus an ample supply of straw should not be an issue.

Although this 'cellulose process' is a little more complex than the traditional fermentation of grains, the economics are potentially far more favorable because of the lower price of straw versus grain as a feedstock. Another advantage is it can use materials that would otherwise be waste products requiring stockpiling or costly disposal.

Consequently, the Killarney project, if it proceeds, would benefit the environment twice, by producing an environmentally valuable fuel and using thousands of tonnes of otherwise surplus straw.



SUPPORTS VOLUNTARY PROGRAMS

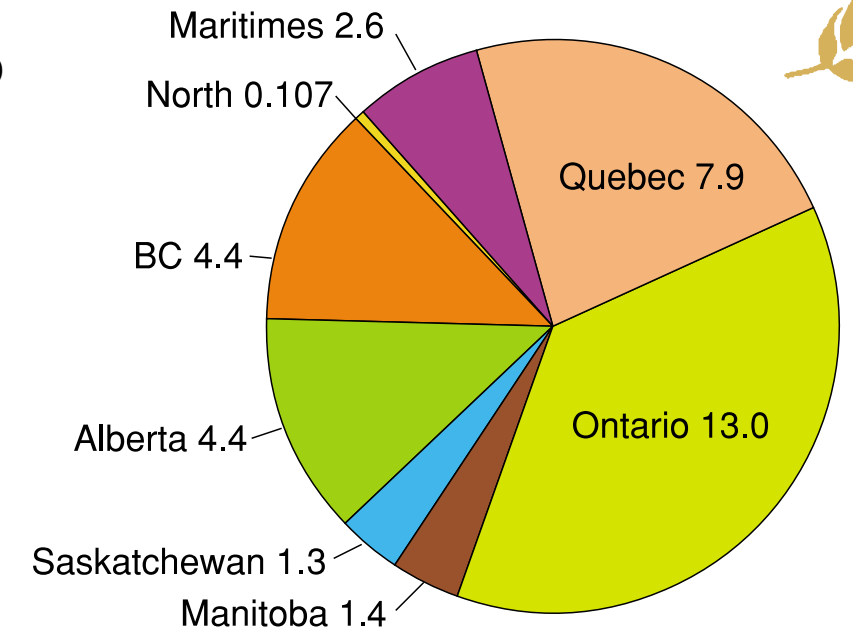
The gasoline industry in Canada has been using ethanol as an additive for many years. In western Canada, Mohawk Oil, now Husky Energy, was the first company to promote ethanol based fuels. Husky Energy itself has a production facility at Minnedosa, Manitoba. In eastern Canada, Petro Canada and Sunoco are currently exploring major expansions to the ethanol supply through partnerships with Commercial Alcohols Inc. of Chatham, Ontario. But, the industry is adamant that the introduction of ethanol fuels should be voluntary rather than government mandated. Their views seem to be based on the complexities of oil refining and distribution processes, pipeline capacities, distribution arrangements and the need to incorporate a variety of fuel additive technologies rather than just one.

tax & regulation

CANADIAN GASOLINE USE BY PROVINCE (billions of litres per year)

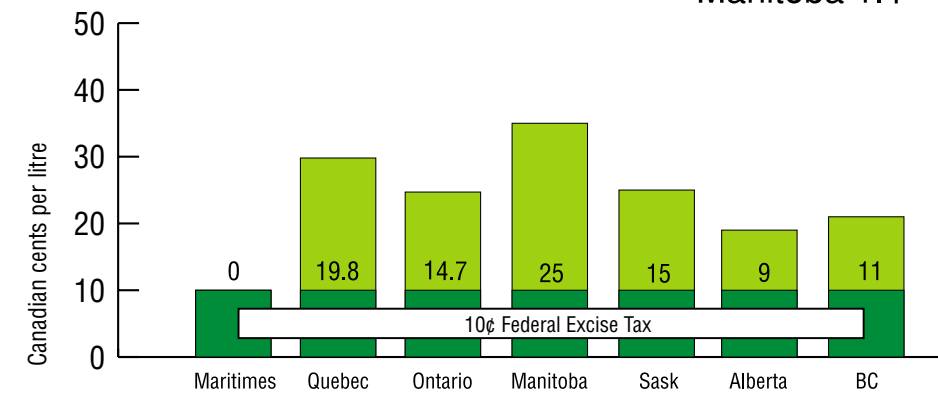
POTENTIAL ETHANOL USE

Gasoline is blended with ethanol and in most provinces is sold as E10. At that level, potential provincial consumption of ethanol would be 10% of the amount of gasoline in the adjoining pie chart.

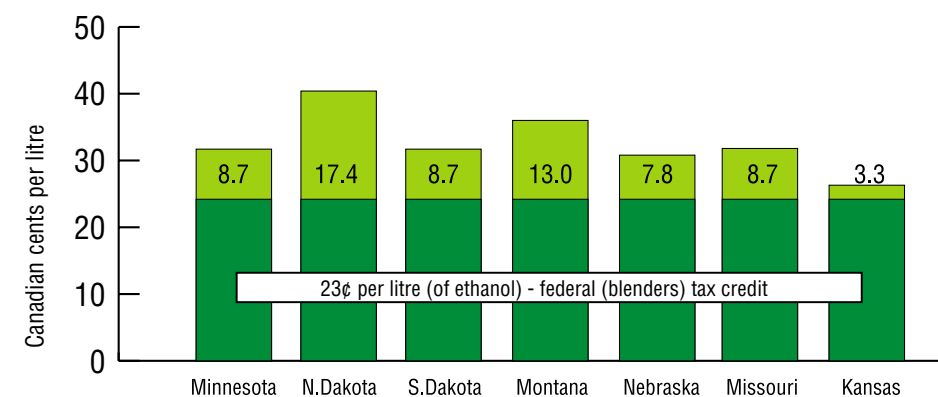


Canada's Gasoline Consumption
36 billion litres per year

CANADIAN ETHANOL SUBSIDIES



UNITED STATES ETHANOL SUBSIDIES (Selected States)



SOME U.S. PROGRAMS

(All figures in US dollars)

Minnesota: \$3 million per plant, 10 year program.

N.Dakota: 40 cents per gallon for specified plants, ethanol must be sold in the state.

S.Dakota: Max \$1 million per year per plant, \$10 million cap per plant.

Montana: \$3 million per company, program ends in 2005.

Nebraska: Expanded production receives 7.5 cents per gallon to a maximum of 10 million gallons. New production receives 18 cents per gallon to a maximum of 15.6 million gallons.

Missouri: First 12.5 million gallons get 20 cents, next 12.5 million get 5 cents, maximum per plant \$3.125 million annual cap.

Kansas: \$3.5 million annual cap.

In addition to ethanol subsidies, U.S. Agricultural subsidies further reduce the cost of ethanol production.

economic impacts

RESEARCHERS ADDRESS FEEDSTOCK SUPPLY

Ethanol can be produced from a wide variety of feedstock. In western Canada cereal grains are used to produce ethanol while in eastern Canada, corn is the primary feedstock. A future feedstock for ethanol may also be crop residues, straw and chaff.

Considerable research work is being done to assess the potential of crop residues at Agriculture and Agri-Food Canada's (AAFC) research facilities in the west. According to AAFC's researcher Mark Stumborg, an advantage of using straw is that it is considered a waste product in many locations and is often burned. By using it to produce ethanol, the massive amount of combustion products going into the atmosphere every fall through burning of straw on farmers' fields could be reduced. An additional source of revenue could also be created for agricultural producers, two quite attractive benefits!

Another approach is to utilize hybrid species of poplar trees that grow rapidly, and are suitable for the prairie regions since they are hardy enough to withstand prairie winters. The Prairie Farm Rehabilitation Agency (PFRA) has developed a number of poplar plantations and is monitoring growth rates under various conditions. Professor Martin Entz of the University of Manitoba is also doing research on hybrid poplars in the Red River valley.

This research is intended to address two important questions, what can be produced and how can that production benefit rural Canada.

HELPING THE RURAL ECONOMY

Manitoba has 200 municipalities, of which 84 are urban municipalities and 116 rural. These municipalities are represented by the Association of Manitoba Municipalities (AMM), which recently announced the creation of a Task Force on Economic Development. The goal of the task force is to encourage the creation of a community-driven economic development plan for the province. Although the Task Force has yet to comment on the ethanol development program proposed for Manitoba, its approach seems to be in harmony with

the approach to ethanol developments in Minnesota. In Minnesota the state government provides an overall policy and individual communities and regions determine plant locations and other details together with project proponents.

In Minnesota, almost all new ethanol plants are some form of producer-based co-op or other form of community-based ownership. Many elected municipal leaders acknowledge that the impacts of an expanded ethanol industry can be significant. After the construction and operations jobs are created, the most noticeable economic impact of a Manitoba ethanol plant is the demand for feedstock, usually wheat, especially in the vicinity of the plant. Considering Manitoba's annual gasoline consumption is 1.4 billion litres, a 10% ethanol blend represents 140 million litres of ethanol per year. This translates to a new market for about 400,000 tonnes of grain. A new, local market for that much wheat gets a lot of attention in a rural based society. In the case of cellulose technologies using straw as a feedstock could increase producers revenues for a material which might otherwise create a disposal problem.



environment

CLIMATE CHANGE & RURAL ECONOMIC DEVELOPMENT

The dominant view is that if unchecked, climate change will have a significant effect on the Prairie Provinces. Droughts will be more frequent, the drier weather will make crops more susceptible to insects and disease and there will be more forest fires. None of this is good news for the rural economy. Adaptation by rural regions ahead of climate change will enable them to develop programs which can maintain the way of life important to so many people. One of the ways to ensure continued renewable development is to consider ethanol production. The plant feedstock, whether grain or cellulose, is a renewable resource. The by-products can be inputs to other economic developments in the area.



ETHANOL-DIESEL FUEL STUDY UNDERWAY IN WINNIPEG

Husky Energy and the City of Winnipeg have partnered to conduct the first road test in Canada of an environmentally friendly diesel fuel. The road test involved ethanol-blended diesel fuel (e-diesel) which is a mixture of diesel fuel (91.5%) and ethanol (7.5%) combined with 1% of a co-solvent that allows the diesel fuel and ethanol to mix. Ethanol blended diesel fuels are used in the United States and Europe.

Ten City of Winnipeg buses recently completed the six-month road test. The buses were used on their normal routes, to ensure valid comparisons. It is expected that greenhouse gas emissions will be reduced by 3% as well as a reduction in particulate matter by 50%, carbon monoxide by 20% and nitrogen oxides by 5%. The ethanol for the road test was supplied by Husky Energy from their Minnedosa plant. If the results of the road test are favorable, it could lead to the further use of e-diesel in trucks, farm machinery and other applications. In each of these applications the environment will benefit from a renewable fuel "grown" in Manitoba.

ENERGY AND CO₂ BALANCE

There is some difference of opinion on the validity of the energy balance associated with ethanol production. The energy balance is calculated by adding all the energy inputs involved in grain and ethanol production and comparing that to the energy contained in the ethanol and its co-products. Inputs include the fuel used in farming operations such as tractor, truck and combine fuels, the energy used to produce fertilizer and the cost of irrigation in the cases where it is used. The energy used in the plant to produce ethanol is also factored into the calculation. If the energy in the ethanol is less than the combined total of the inputs then producing it is considered energy-inefficient. Most, but not all, researchers agree that ethanol production is an energy-efficient activity.

CO₂ is of concern among scientists because of its effect on global warming. It is a major by-product of ethanol production. It can be captured and used in flash freezing of foods and in carbonated drinks. Scientists generally agree that on an overall ethanol production and use cycle basis, more CO₂ is absorbed than is released into the atmosphere.



TARGETING TRANSPORTATION

Transportation is the largest source of Canada's greenhouse gas emissions, contributing about a quarter of total emissions. In the context of Canada's Kyoto commitments on GHG emission reductions, the Government of Canada considers the development and use of ethanol to be an effective way to reduce these emissions and address the issue of climate change. Blended into transportation fuels, ethanol from biomass offers important environmental benefits, while contributing to regional economic growth and job creation, particularly in rural communities. Compared to conventional fuels, ethanol reduces greenhouse gas emissions and offers air quality benefits. The potential for Canada to capitalize on this environmentally advantageous fuel is great; renewable feedstocks for ethanol production are abundant in several provinces.



For more information, please visit the following websites:

- Natural Resources Canadawww.NRCan.gc.ca
- Agriculture and Agri-Food Canadawww.agr.gc.ca
- Farm Credit Canadawww.fcc-sca.ca
- Manitoba Industry, Trade and Mineswww.manitobaenergy.com

Canada



Beausejour-Brokenhead Development Corporation
Beausejour, Manitoba

Virden Community Development Corporation
Virden, Manitoba

Keystone Agriculture Producers
Winnipeg, Manitoba

Boissevain Economic Development Committee
Boissevain, Manitoba

Melita and District Economic Development Corporation
Melita, Manitoba