BBOP barley bioproducts opportunities project

update

SEPTEMBER 2008

Barley can compete study finds

BBOP demonstrates barley is a legitimate crop platform for biofuel production in Western Canada – and that it can do more than just produce ethanol

Barley CAN compete as a biofuel.

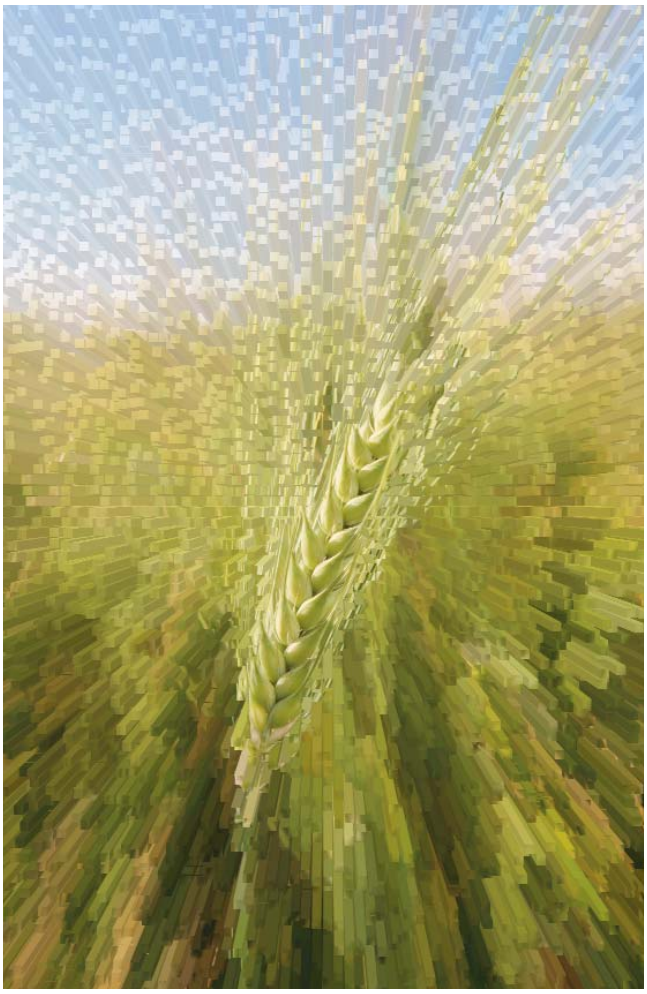
That's the bottom line of a comprehensive feasibility study and business plan by the Barley Bioproducts Opportunities Project (BBOP). The Alberta Barley Commission and the Western Barley Growers Association launched BBOP in May 2007 to discover barley's potential as a crop platform in the rapidly emerging sector of biorefining.

Carman Read

From the beginning, the project has looked beyond just ethanol production, delving into the technical feasibility and market potential of other barley biorefining products such as distillers grains and value-added components such as betaglucan and antioxidants.

"We have several good stories to tell. New processing technologies are making barley biorefining much more competitive and attractive for producers and investors," BBOP project manager Carman Read says. "Plus, markets for renewable energy and high-quality food and feed are growing significantly every year in Canada and around the world."

"This is an extremely good time for the barley industry to get into biofuel production," Brian Kelly says. His firm, Kelwin Management Consulting of Winnipeg, compiled BBOP's feasibility study and business plan with Shambrock Consulting Group Ltd., also of Winnipeg. "One reason is farm-based investors can offset a significant portion of their start-up costs with funding from various government programs."



Kelwin and Shamrock's report recommends starting a barley biorefinery with a base model, or initial building

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Alberta Barley Commission · WBGA · Agriculture & Food Council The Catalyst · Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada · Canada

Study finds barley can compete

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block. Over time, investors could expand to the optimized model envisioned in the report; expansion can be driven by opportunities created by ongoing research, new technology or strategic partnerships.

One of the report's key findings is that the base model would be profitable and provide debt coverage and free cash flow to secure financing for investors and support future business development (with or without partners).

Among the areas that could lead to an optimized business are:

- Adopting innovative technology to utilize barley screening and hulls to reduce plant energy costs
- Isolating, extracting and marketing higher-value barley fractions
- Optimizing the use of byproduct starch (produced by strategic partners focussed on barley fractions) to improve ethanol production.

"BBOP demonstrates barley is a legitimate crop platform for biofuel production in Western Canada – and that it can do more than just produce ethanol," Mike Leslie, the CEO of the Alberta Barley Commission, says. "Now we're going to share and test our findings with producers and industry. Our next steps will depend on the information and research they need to make barley a crop platform of choice for biorefining.

We made our project as comprehensive as we could just the funding and time available to us. Our project sponsors and partners are very satisfied with the depth of our research, and our report provides well-researched answers and is full of practical information."

He adds more work remains: "To quote Winston Churchill: 'Now this is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.' It's clear we need more research and we need it to be shaped by producers, investors and organizations already in the business and/or looking at entering the business."

"This kind of value-added project is an opportunity for farmers to gain stability and control – it's a way for them to be at the frontlines of changes in agriculture rather than at the sidelines," Jeff Nielsen, president of the Western Barley Growers Association, says.

Leslie adds: "We are always looking for ways to expand demand for barley and add more value to farmers and our customers in our major markets – feed, malt, food and industrial."

Mike Leslie

Jeff Nielsen

Why Process Barley?

Advantages of barley as a crop platform for biorefining in western Canada:

1. Western Canada has a large (and often surplus) supply of barley
2. Barley is a good crop platform it generally is less expensive to grow on a per bushel basis and has strong agronomic performance across most of the Canadian prairies
3. New enzymes and processing methods convert barley starch to ethanol More effectively and more affordably than previously
4. Barley is proven: large scale plants using barley as a crop platform are currently operating in Sweden and Spain; Osage Bio Energy is moving ahead with plans for four new integrated barley plants in the eastern U.S.A.
5. Distillers grains from barley are likely to have more protein and a better balance of amino acids than distillers grains from corn. Distillers grains from barley will likely compete well with canola meal and, in some cases, with soy meal, says Randy Baldwin of Kelwin Management Consulting
6. Barley biorefining is a strategic approach to building better markets for barley while also creating a more sustainable livestock industry
7. Barley's existing germplasm provides an excellent base for developing high-yield, high-starch varieties. Virginia Polytechnic Institute has already developed three high-starch varieties specifically for biorefining in the eastern U.S.A.
8. Additional research will reinforce and/or broaden the potential of barley's value-added components (including beta glucans, protein and tocopherols) and the scope of their markets. A geographically large, economically sizable and diverse market already exists and includes functional foods, traditional food products, supplements and natural health products in Canada, the U.S. and Japan.

BARLEY THEN – AND BARLEY NOW

Previous barriers to using barley for biorefining	Overcoming the barriers to using barley for biorefining
Barley's high level of beta glucans resulted in a high viscosity mash requiring increased processing and handling times and costs.	New enzymes reduce viscosity caused by high beta glucan level.
High beta glucans also resulted in reduced-value distillers grains that were restricted to the ruminant livestock market.	New enzymes break down beta glucans for processing, resulting in distillers grains with lower beta glucan levels.
The United States did not have the volume or consistency of barley needed for large-scale processing.	Western Canada has the volume and consistency of barley needed for large-scale processing.
Plants using barley had to process large volumes of non-starch materials, leading to bigger, costlier facilities.	New processing methods (dehulling, beta glucan conversion and lower temperature fermentation) are bringing new efficiency to barley plants.
Abrasive barley hulls increased the maintenance and decreased the life of plant pumps, pipes and valves.	Improved dehulling prior to fermentation removes most abrasiveness and retains most starch.

Barley biorefining as one expert sees it

The biggest mistake in U.S. [biorefining] was producers forgot that about half of what comes out of their plants is animal feed

Phil Madson has a few words of advice for businesses and investors considering barley as a crop platform for biorefining.

Look beyond ethanol production, the president of KATZEN International says. In the past 50 years, KATZEN has designed more than 150 biorefineries around the world that use crop platforms ranging from corn and barley to cassava and sugar cane.

Madson and other KATZEN employees jokingly refer to companies focused solely on ethanol production as "alcoholics."

After 25 years in the biorefining industry, Madson resolutely believes any model for a barley based biorefinery has to generate revenue from both premium livestock feed (from distillers grains) and ethanol.

He says the majority of the corn-ethanol industry has been so ethanol-focused that it cared little about its distillers grains, and has routinely sold them for half of the true nutritional value.

"The biggest mistake in U.S. [biorefining] was producers forgot that half of what comes out of their plants is animal feed."

When Osage Bio Energy recently came to KATZEN with plans to build multiple barley-based biorefineries in the south eastern United States, Madson says his company responded with an aggressive animal feed program.

"Their model now is to produce a high-protein, high-quality animal feed . . . which is more stable for turkeys and swine," Madson says. "They're certain to get a premium price for their distillers grains."

An integrated biorefining model requires a focus that established, traditional ethanol producers would scoff at: the most valuable product becomes distillers grains, and ethanol becomes a major "byproduct."

"The secret to a barley plant is to recognize that your most important product is the animal feed co-product. A gallon of ethanol is a gallon of ethanol – it's exactly the same as everybody else's," Madson says, emphasizing the nutritional profile of distillers grains varies by crop platform and variety, thereby creating unique products and distinct competitive advantages.

He adds: "He who serves animals wins. And he who keeps his animals at home and feeds them from his plant wins more."

While the North American ethanol industry has few such integrated models, some shining successes exist, including, Madson says, several barley and wheat facilities in Europe and the Poundmaker biorefinery at Lanigan, Saskatchewan. Poundmaker has demonstrated how having a feedlot next to a biorefinery can reduce costs and improve feed efficiency.

Of course, Madson says a successful barley model involves other important factors, beginning first and foremost with knowing where you can create and capture value.

As well, currrent and future developments in enzyme technology promise at least partial conversion of barley's beta glucans to fermentable sugars which will not only increase ethanol yield from barley, but also further increase feeding value of barley distillers grains.

Madson says experience has shown farmers increas-

KATZEN's barley biorefineries

Using highly proprietary technology, KATZEN has developed plants for:

- Abengoa Bioenergy's Bioetanol Galicia and Castilla Y Leon plants in Spain, were designed and built to process barley and wheat, although the Galicia plant has also operated on corn and milo for economic reasons. Similarly, an Abengoa plant in Cartagena produces 100 million litres/year of ethanol from barley or wheat. KATZEN president Phil Madson says a plant designed to use barley as its crop platform can easily be converted to process wheat or corn. However a plant built for corn production requires extensive and expensive retrofitting and additions to use barley or wheat effectively. "It's like trying to process oil from the oil sands in a facility made for light crude processing"
- Osage Bio Energy, which recently announced plans to build multiple KATZEN-designed plants in the eastern U.S., will use barley as the feedstock. Each plant will have more than 200 million litres of annual capacity and cost an estimated US$160 to US$170 million.

KATZEN also has other barley-based facilities in the planning stages in Canada and elsewhere.

Barley biorefining as one expert sees it

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ingly benefit from devoting a portion of their acreage to growing crops for local, defined and stable markets rather than gambling on more volatile local or export markets.

"I believe the next wave [of biorefining] will include the Great Plains (in the U.S.) and Western Canada adding value to their barley and wheat."

Barley's first step in biorefining: proving technical feasibility

BBOP's technical research team found barley has several abilities and advantages as a competitive crop platform

The first phase of the Barley Bioproducts Opportunities Project (BBOP) was purely technical.

In May 2007 a team of researchers and analysts set out to determine if barley was a suitable crop platform, or feedstock, for biorefining. Within months they found barley's potential is considerable. It could be used in everything from functional foods to health and wellness applications to industrial applications such as ethanol for fuelling vehicles and distillers grains for livestock feed.

Dr. David Bressler

Previous research had revealed various high-value compounds in barley, but baseline information was lacking, especially analysis on fermentation and distillers grains from barley. Furthermore, it was unclear what effects biorefining processes would have on barley's high-value components (tocopherols – better know as the building blocks of Vitamin E – phenolics compounds, fatty acids and proteins).

BBOP's technical research team found barley has several abilities and advantages as a competitive crop platform (or feedstock) in biorefining. Researchers Drs. David Bressler, Ruurd Zijlstra and Jonathan Curtis, all with the University of Alberta's Faculty of Agricultural, Life and Environmental Science (previously Agriculture, Forestry and Home Economics) found:

1. New modified low temperature processing methods of the barley varieties tested resulted in starch to ethanol conversion ratios similar to corn and wheat
2. The analysis of the distillers grains found the barley varieties tested yielded less residual starch than the corn tested
3. The distillers grains produced from barley varieties tested have a high in-vitro digestibility and a high crude protein content
4. Low temperature processing methods preserved (and in some cases concentrated) high-value components such as phenolics, unsaturated fatty acids, tocopherols, trienols and sterols
5. Researchers found modifying the cold hydrolysis system of converting barley starch to fermentable sugars, known as the Stargen method, yielded higher results
6. Laboratory-scale analysis of the dried distillers grains solubles (DDGS) found barley had in vitro digestibility and residual starch content at least similar to corn. By comparison, corn was highest in crude fat and lowest in crude protein and in vitro digestibility; wheat was highest in crude protein
7. Potential co-products of barley biorefining include protein, fibre, fatty acids and tocols
8. The Stargen method of fermentation, which uses a new line of enzymes, reduces the heat needed for processing (potentially lowering operating costs and increasing profits)
9. This method also exposes distillers grains to less heat, which may result in undenatured proteins (undenatured distillers grains' proteins are worth two to three times more than denatured proteins).

Barley biorefining would go beyond ethanol production

Ultimately, the optimized biorefinery business model would take advantage of all the components in barley to capture full value for the business

The Barley Biorefinery Opportunities Study outlines how a barley-based biorefinery could, theoretically, be established and then expanded to capture barley's unique competitive advantages.

The initial "base model" business calls for a facility that produces and markets ethanol, distiller's grains and other co-products. Over time, the business would add improvements to increase processing yields, decrease processing costs and develop new business initiatives focused on new revenue streams. In the study, each aspect of development is referred to as a new business model.

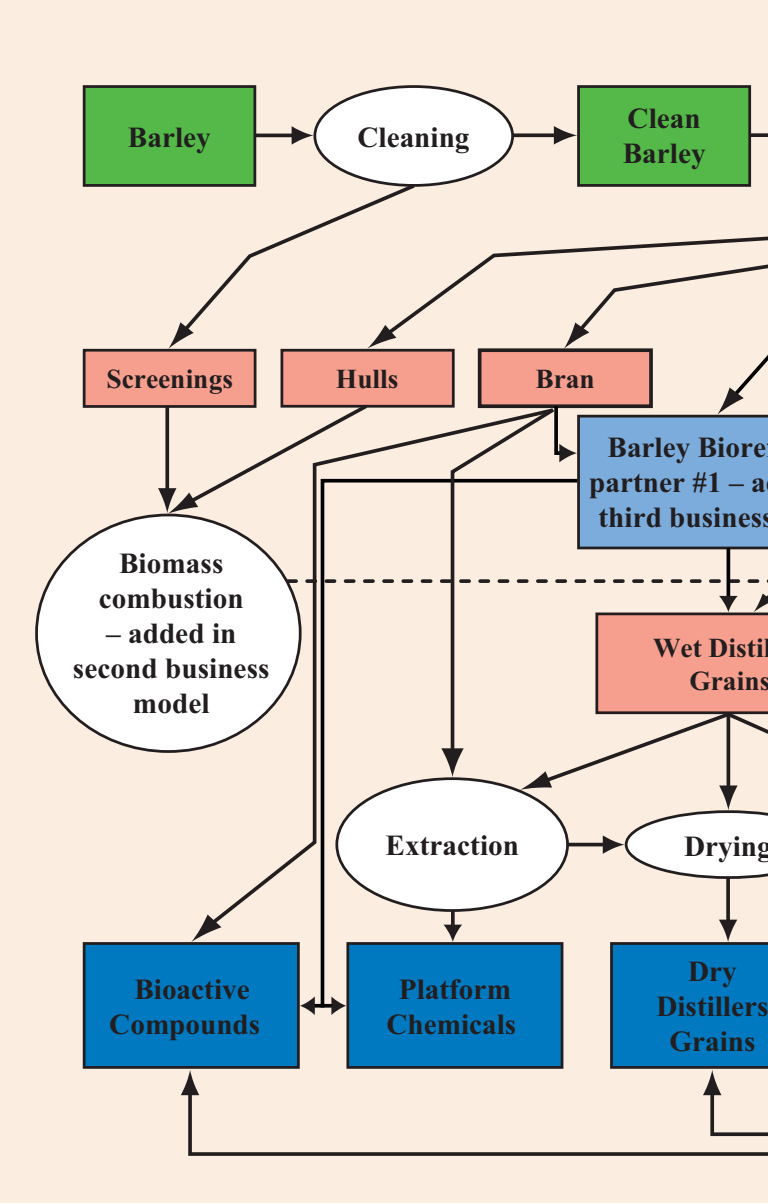
"Ultimately, the optimized biorefinery business model would take advantage of all the components in barley to capture full value for the business," Carman Read, manager of the Barley Bioproducts Opportunities Project (BBOP), says."

The **base model**, the initial processing facility, would be immediately viable, producing ethanol for transportation fuel, distiller's grains for livestock feed and carbon dioxide for industrial and food uses.

The **second business model** would add biomass combustion to the plant to reduce or even replace the need for electricity and/or natural gas. (Screenings and hulls would be burned to produce energy.) This model would also see the production facility expand to extract several important chemical compounds (tocopherols, sterols, phenols and fatty acids) from wet distillers grains after distillation and prior to drying. The study points out additional research is needed to determine the commercially feasibility of extracting compounds.

The **third business model** is based on extracting additional compounds, some from the barley kernel and the "beer" produced during fermentation. These highly specialized operations would likely require a partner or

OPTIMIZED BARLEY BIOREFINERY MODEL

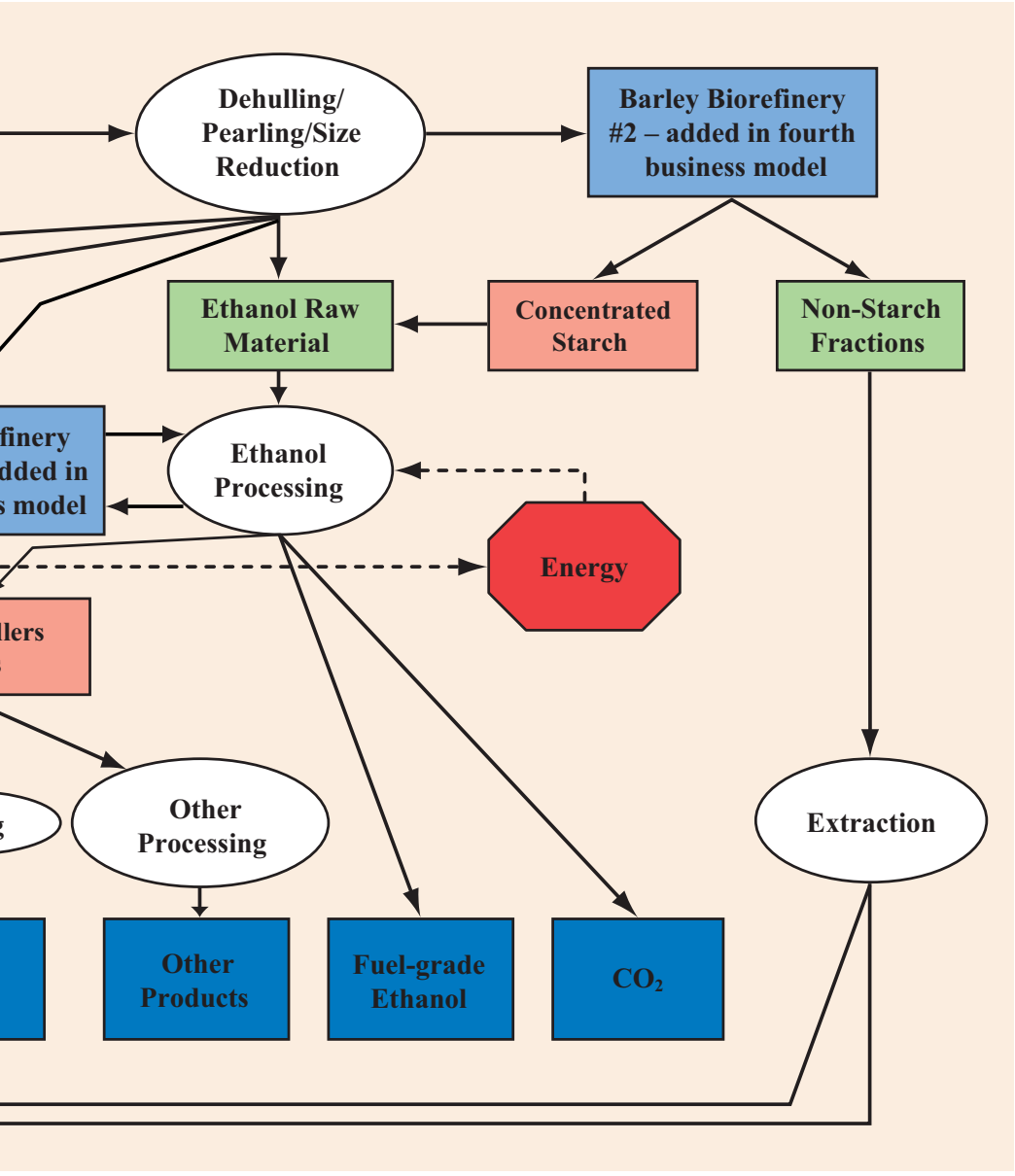


strategic alliance with expertise in processing technology, marketing and high-value compounds.

The **fourth business model** would add a second strategic partner focused on extracting high-value compounds such as beta glucans from barley. Such extraction processing is likely to produce very high purity residual starch, which the biorefinery could secure through a business arrangement with the partner to improve ethanol and overall plant operations at the biorefinery.

"We believe the optimized business model is a sound and realistic approach and our study outlines in detail how to manage process flow," David Shambrock of Shambrock Consulting Group Inc. says. "Our view is with this sort of business development a barley based biorefinery will generate more and more opportunities for plant investors over time."

"Biorefining is at the point crude oil was in the 1920s . . . a whole line of petroleum-based products were just being discovered and produced," Brian Kelly of Kelwin Management Consulting says.



Detailed explanations of the four business models are in the complete Barley Biorefinery Opportunities Study. For a copy contact:

The Alberta Barley Commission
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Government funding for biofuel development

Producers and investors interested in developing biofuel facilities may be able to offset costs with funding from any number of government programs, including those mentioned below. A detailed list of government biofuel programs is in the Barley Biorefinery Opportunities Study.

ECOENERGY FOR BIOFUELS INITIATIVE

The Government of Canada's ecoENERGY for Biofuels Initiative will invest up to $1.5 billion to increase Canadian biofuel production. Through ecoENERGY, biofuel producers can reduce some risks of developing production facilities, namely fluctuating feedstock and fuel prices.

The program runs to 2017. Eligible recipients can receive funding for up to seven consecutive years provided they are a for-profit legal entity that owns and produces or has advanced plans and strategies for building a renewable energy facility.

Incentives will be paid on every litre produced and calculated by subtracting the profitability margin from the industry margin. The government has set the profitability margin for renewable alternatives to gasoline for nine years at $0.29/litre; the profitability margin for renewable alternatives to diesel for the first year is $0.32/litre. Incentives will be paid quarterly.

ECOAGRICULTURE BIOFUELS CAPITAL INITIATIVE

The federal government's ecoAgriculture Biofuels Capital Initiative (ecoABC) is a $200-million, four-year program running to 2011. It provides repayable contributions for the construction or expansion of transportation biofuel production facilities.

Agricultural producers must invest a minimum of 5% and the project must use an agricultural feedstock to produce biofuel. Increasing percentage ownership by agricultural producers increases the funding available for capital costs. A maximum of $25 million per project or 25% of eligible capital costs applies.

SASKATCHEWAN BIOFUELS INVESTMENT OPPORTUNITY

The Saskatchewan Biofuels Investment Opportunity (SaskBIO) program offers up to 5 cents/litre (to a maximum of $10 million per project) in repayable contributions to build or expand renewable biofuels facilities in Saskatchewan. The $80-million project is open to corporations (including cooperatives), individuals or partnerships with a minimum of 5% Saskatchewan ownership; and new or increased production of at least two million litres a year.

Funding is contingent on production; the program runs for four years beginning April 1, 2008.

BIOREFINING AND COMMERCIALIZATION/ MARKET DEVELOPMENT PROGRAM

One of several Government of Alberta programs in the province's Bioenergy Plan, the Biorefining and Commercialization/Market Development Program has $24 million available in 2008/2009 for expanding or developing biorefining in Alberta.

For biorefining development, funding can be applied to a maximum of 50% of eligible costs for feasibility studies, business planning and worker training, or for up to 20% of capital costs.

The program will also fund up to 50% of technology development and commercialization and/or market development costs.

BIO-FUEL AND BIO-GAS PRODUCER CREDIT PROGRAM

This four-year Government of Alberta program, also part of its Bioenergy Plan, runs to March 31, 2011, and supports the Alberta production of biofuel or biogas from agricultural or forest biomass.

Funding is 9 cents/litre (to a maximum of $20 million a year) for plants with capacity of 150 million litres or more a year; 14 cents/litre (to a maximum of $15 million a year) for production from plants with capacity of 150 million litres or less a year.

Applicants must produce certified fuel-grade biofuel or biogas on a commercial basis in an Alberta facility. As well, they must record and report the energy content of projects powered by dual or multiple sources, and calculate the corresponding net eligible production.

Manitoba consultants conducted business feasibility and plan

The business model we created represents a value chain – 85 per cent of which exists right now

Kelwin Management Consulting and Shambrock Consulting Group Inc. conducted the research for the Barley Biorefinery Opportunities Study (Phase 2 Feasibility Study and Phase 3 Business Plan). Their thorough final report reflects the depth and breadth of knowledge they possess in business, agriculture and processing.

Both companies are based in Winnipeg, but their experience extends across Canada and to a number of other countries.

Kelwin Management Consulting provides clients in several industries a variety of planning, analytical, developmental and commercialization services. The company's clients include the Ag Waste Management Corporation; Alberta Agriculture, Food and Rural Development; the Alberta Barley Commission; Alberta Egg Producers; Farm Credit Canada; the Richardson Centre for Functional Foods & Nutraceuticals; and the Saskatchewan Agriculture Equity Fund.

Kelwin's principals, Brian Kelly and Randy Baldwin, led the company's activities in the barley study.

A professional agrologist and certified management consultant, with a master's in business administration, Kelly established the company in 1992 as Kelly Associates. Since then he has worked with hundreds of companies on the Prairies and across the country and has been active with the Canadian and Manitoba chambers of commerce. Previously, Kelly founded Envirosys Inc., a recycled packaging business; chaired Kipp Kelly, which manufactured food processing and density separation machines; and was a practice director with Deloitte Haskins & Sells. From 1976 to 1985, he was a regional manager for the Bank of Commerce.

"The business model we created represents a value chain – 85 per cent of which exists right now," Kelly says. "One of the challenges for producers in a value chain is how to get value out of it. Because this project would be producer-led, farmers have the opportunity to be a shareholder in numerous companies."

Baldwin joined Kelwin Management Consulting in 1994 after running Dandy Dairy in St. Malo, Man. Previously, he worked with May & Baker Canada Inc. in the agrochemicals division as well as with the Alberta Wheat Pool's crop chemicals division. Baldwin earned a bachelor of sciences in agriculture from the University of Manitoba in 1975 and became a certified management consultant in 2000.

Baldwin's work on the study focused on distillers grains. "Distillers grains would initially be about 15 per cent of a barley biorefinery's revenue but their value would change as optimization is reached and valuable fractions are extracted from them," Baldwin says. "Barley distillers grains are high in protein – and protein markets around the world are growing."

BBOP's business researchers: Randy Baldwin (left) and Brian Kelly (centre) of Kelwin Management Consulting and Brian Shambrock (right) of Shambrock Consulting Group.

Shambrock Consulting Group advises companies in the agri-food sector on managing, marketing, research and development, and technical services and works in valued-added processing across Canada and in the United States, India and Ireland.

Shambrock himself has also been the executive director of the Manitoba Food Processors Association since 1993. Prior to that he was interim director of the National Agri-Food Technology Centre (1991 to 1993) and director of marketing for the Manitoba Research Council (1989 to 1991). He has also worked with the Canadian Food Products Development Centre, the National Research Council of Canada and Lucerne Foods Ltd.'s dairy division.

In addition to bachelor's and master's degrees in food science, Shambrock also has a master's of business administration, all from the University of Manitoba.

"Our report demonstrates barley is a feasible crop platform for bioproduction – and our research clearly points out that if farmers want to capitalize on this opportunity they should act now," Shambrock says.

Biofuel news and outlooks

The **Freedonia World Biofuels Market Report** predicts global demand for biofuels will approach 90 million metric tons in 2011. That represents a 20 per cent increase every year for the next three years.

In its 2008 **North America Biofuels Report** industry analysts Frost & Sullivan said biofuel sales reached almost US$10 billion and forecast revenues would exceed US$18 billion by 2012.

The company notes: "There is a strong venture capital investment climate in the next-generation biofuels, which are expected to be more efficient, using algae, waste, straw, wood, and other forest-based inputs that can be found in abundance in the United States."

Biofuels production by country, 2007

	Ethanol	Biodiesel	Total biofuels
	(in millions of litres)		
United States	26 500	1 688	28,188
Canada	1 000	97	1,097
European Union	2 253	6 109	8,361
Brazil	19 000	227	19,227
China	1 840	114	1,954
India	400	45	445
Indonesia	0	409	409
Malaysia	0	330	330
Others	1 017	1 186	2,203
World	52 009	10 204	62,213

Source: OECD Economic Assessment of Biofuel Support Policies, 2008

General Motors promotes alt fuels

Speaking at the Globe Conference 2008 this past spring, Beth Lowery, General Motors vice president of Environment, Energy and Safety Policy, said: "One way [GM is] working to reduce oil consumption and CO_2 emissions, is by changing the fuels – offering vehicles that run on alternative fuels, such as ethanol . . . and, very importantly, by promoting the development of improved alternative fuels, such as cellulosic ethanol.

Why ethanol? E85 ethanol helps to reduce greenhouse gas (GHG) emissions.

It also helps to improve vehicle performance, because E85 ethanol has a higher octane rating than gasoline. This enables more horsepower and torque."

Suncor Energy's St. Clair Ethanol Plant is expanding to double its production of cleaner-burning, renewable energy, thanks to a $25 million investment by the Government of Canada's and equity investment from farmers totaling $12.5 million.

The St. Clair plant will double its capacity to 400 million litres per year by September 2009. This expansion will create new opportunities for farmers who are growing the feedstock to produce the ethanol, as well new opportunities for those who are involved as financial and business partners in the plant's expansion.

In addition to ethanol, the plant will produce dried distillers grains with solubles (DDGS), sources of high-protein and high-energy feed for dairy and beef cows, hogs and poultry, as well as carbon dioxide (to freeze foods and produce carbonated beverages and fire extinguishers).

Osage Bio Energy (OBE) recently announced it has received $300-million to build four next generation biorefining facilities that will produce ethanol and a specialty protein feed. OBE will differentiate itself from traditional Midwestern corn-to ethanol production companies in several key ways.

First, the ethanol will primarily be produced from regionally grown barley and will be an advanced biofuel as defined by the Renewable Fuel Standard (RFS). Currently, in the U.S.'s mid-Atlantic and Southeast nearly five million acres per year remain fallow in winter months. Barley is a winter crop that will be grown for the production of ethanol and does not compete for land for food production. OBE considers it an environmentally superior to corn because it requires less fertilization and prevents nutrient runoff in winter months.

Second, OBE has negotiated an exclusive agreement with KATZEN International, Inc., one of the leading and oldest privately held process design and technology company in the biofuels industry. The arrangement allows for exclusive use of KATZEN technology capable of producing ethanol from barley within a 200-mile radius of each plant site.

Third, OBE's site selection model provides significant energy balance advantages over corn- based ethanol, especially in the mid-Atlantic and Southeast. OBE is committed to maximizing the opportunity to produce a truly renewable fuel by partnering with existing steam producers, utilizing its own waste products for energy and procuring locally grown biomass.

Global commodity price outlook

Speaking at the International Grains Council's Grain Conference in June 2008, John Johnson, the president and CEO of CHS Inc., said current market volatility has challenged the global grain sector and consumers on

Biofuel news and outlooks

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many fronts but ultimately will strengthen the industry's ability to serve worldwide customer needs.

"We are in a period of unprecedented complexity and change. There are no easy answers," said Johnson. "But I believe as a result of the challenges we are facing today, we will emerge at a new level in terms of our ability to respond to and meet customers' needs."

Johnson described current market conditions as a "perfect storm" produced by the convergence of increased global demand, especially from developing economies such as India and China; a shift in currency values driven by a weaker U.S. dollar; growth of grain use by biofuels; commodity market involvement by index funds; the impact of natural events like weather; and increased awareness of resources and sustainability issues.

Whether the world is running out of oil is debateable. But it does appear the days of cheap, abundant oil are over. Oil prices have been at record highs for much of the past year. Although oil is the most traded commodity in the world, the New York Times Media Group recently reported seven major Western oil companies **saw their production fall 650,000 barrels a day** in the second quarter of 2008.

"While that drop might not sound like much in a world that consumes 86 million barrels of oil each day, today's markets are so tight that the slightest shortfalls push up prices," Jad Mouawad wrote.

Mouawad cited several reasons for the dip, including less favourable contract terms, competition from state-run organizations, eroding influence and waning production in regions such as Alaska and the North Sea. Plus, it is getting harder – and more expensive – to find and extract new sources of oil.

Christophe de Margerie, the head of Total of France recently warned global oil supplies are unlikely to increase beyond 95 million barrels a day by 2020. Still demand is not expected to wane. Other sources of energy will be needed – and biofuels are one way of meeting demand.

The **Canadian Renewable Fuels Association** (CRFA) promotes greater renewable content in transportation fuels, which are cleaner-burning and more sustainable fuels, and they mitigate against price increases at the pump. With a feedstock-neutral approach, the CRFA supports the environmentally sustainable production of ethanol from a variety of sources, such as corn and wheat today, and not just cellulosic feedstocks in the future, but also the potential that other grains such as barley have. Barley could not only provide another great source from which to make ethanol, but with the co-product of distillers grains being made in the ethanol production process, it could also help provide a high-protein feed for the livestock industry. Barley-based ethanol could be another piece of the puzzle in helping Canada grow beyond oil.

Acknowledging our partners

We gratefully acknowledge the support of our funding partners in the Barley Bioproducts Opportunities Project (BBOP).

The Government of Canada's Biofuels Opportunities for Producers Initiative (BOPI) provided $262,500 of funding for BBOP through the Agriculture and Food Council, which administers Agriculture and Agri-Food Canada's Advancing Canadian Agriculture and Agri-Food Program. BOPI is a part of the Canadian Agri-Food Council's Advancing Canadian Agriculture and Agri-Food Canada (ACAAF) program.

The Alberta Barley Commission and **Western Barley Growers Association** jointly managed the Barley Bioproducts Opportunities Project (BBOP) and provided in-kind support for the project.

One of the world's leading agri-businesses, **Syngenta** is committed to sustainable agriculture through innovative research and technology. Syngenta supported BBOP with a $45,000 contribution.

Edmonton-based **Ceapro Inc.** committed $10,000 to BBOP.

A family-owned business with offices around the world, the **Wilbur-Ellis Company** markets and distributes agriculture commodities. Through its Lethbridge office, Wilbur-Ellis Co. Canada contributed $2,000 to BBOP.

Parkland Agri Services operates from nine locations in central Alberta, offering independent agricultural service and inputs to producers. Parkland Agri Services gave $1,000 to BBOP.

BBOP – Information you can use

The project is generating reliable and scientifically based technical and business information on processing, operations, costs, revenues and market trends

The Barley Bioproducts Opportunities Project (BBOP) is designed to give barley producers information they can use in today's new and emerging valued-added markets.

"Our primary objective is to improve farm gate returns and to offer barley producers new and diversified business opportunities," says Mike Leslie, CEO of the Alberta Barley Commission. "BBOP has focused on four major areas: technical feasibility; business feasibility; business plan and marketing considerations; and knowledge and technology transfer plan."

This update is one of three that gives producers and regional producer organizations evidence-based information about investing and participating in renewable fuel or other bio-industrial projects. The project's first update was distributed in the fall of 2007; the third update (on business feasibility) will be distributed later this spring.

BBOP's goal is to provide producers, investors and funders with:

- Reliable scientific data on production processing and operations
- Reliable assumptions on costs, revenues and operating margins
- Reliable assumptions on end-use markets and market trends
- Operational management considerations including feedstock procurement, production and product marketing.

Additional information, such as the full scientific report or the business feasibility/business plan report, is posted at www.wbga.org and www.albertabarley.com.

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The Barley Bioproducts Opportunities Project (BBOP) focused on evaluating barley's potential in rapidly evolving bio-based industries to provide Alberta producers and their customers with the information they need to invest in barley. BBOP is jointly managed by the Alberta Barley Commission and the Western Barley Producers Association.

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