

CELLULOSIC ETHANOL

DRIVING IDAHO'S FUTURE

Cellulosic ethanol production is a significant economic opportunity for Idaho.

logen (a Canadian ethanol manufacturer) announced recently that it is looking at **investing** millions of dollars in a cellulosic ethanol production facility in Southeastern Idaho. logen surveyed over 900 counties nationally to find potential communities for building the world's **first** commercial scale cellulosic ethanol facility. The Southeastern Idaho area emerged as the top candidate.

A 50 to 60 million gallon per year cellulosic ethanol production facility would bring immediate rural economic development to Idaho:

Employment and Economic Benefits

- 100 permanent full-time jobs at the plant facility
- Close to 100 job equivalents for straw assembly (some permanent with trucking)
- 1000 job years equivalent during the 18-24 month construction period
- 450 spin off jobs from plant/assembly operations
- \$25 million annually into the rural economy from the purchase of surplus straw

Additional Benefits

- Keeps jobs on the farms and in the community
- Source of economic diversity for farm economies
- Ethanol is a domestically produced fuel made from renewable resources
- Adds value to raw materials
- Expands rural tax base
- Dramatically reduces the need for straw burning

What is Cellulosic Ethanol?

Cellulosic ethanol is exactly the same as grain-based ethanol but it is made from agricultural residues. After harvesting, some of the plant (e.g. straw) is often left on the ground to keep the soil fertile and prevent erosion. But the rest of the material must be disposed of as a form of residue. Residue disposal is generally done through burning or removal at cost to the farmer.

Conventional ethanol is derived from grains such as corn and wheat. The raw material for cellulosic ethanol does not compete as a food source for humans or livestock feed and is immediately available based upon existing farm practices.

In logen's cellulosic ethanol manufacturing process, about two-thirds of the straw is converted to ethanol, with a yield of about 75 gallons of ethanol per ton of straw. Most of the remaining one-third of the agricultural residue, lignin which cannot be fermented, is burned to generate power to run the plant, so there is little waste or reliance on fossil fuels.

Until recently, cellulosic ethanol was very costly to produce because of expensive and inefficient processes. Recent innovations in both biotechnology and processing technologies have made large-scale cellulosic ethanol



IOGEN IDENTIFIED AS WORLD'S LEADER IN CELLULOSIC ETHANOL

logen is a pioneer in the production of ethanol from biomass. They have been in operation since the 1970's and have spent over \$80 million in research and development. The company built the world's first and only demonstration plant to convert biomass to cellulosic ethanol using enzyme technology. With over \$30 million invested, the facility is designed to process 40 tons of wheat straw per day. logen also has two \$7 million ethanol pilot operations currently in production.

Key strategic and investment partners in logen's operations include the Royal Dutch/Shell Group, which has invested close to \$35 million to speed the development of the world's first commercial plant. Petrol-Canada, one of Canada's largest integrated oil companies, has invested over \$15 million to further develop the cellulosic technology. logen is committed to full-scale commercialization of cellulosic ethanol production with ground-breaking of their new facility in the summer of 2005.



Commercial roll-out criteria and plant site evaluation — In addition to feedstock, infrastructure and market proximity considerations, both government policies and the investment climate are critical to the site evaluation process. There must be a favorable tax situation, strong local demand, a stable supply of raw materials, local partners, and strong community support. Idaho is well-positioned to attract logen's substantial investment dollars and foster economic development opportunities for the region. A state Renewable Fuels Standard, such as the one proposed by the interim Air Quality and Public Transportation Committee, would ensure a strong in-state ethanol market, thereby meeting a key logen criteria.



Senator Craig supports cellulosic ethanol development

"Cellulosic ethanol could develop very quickly as an industry and have a major impact on rural incomes and the environment as well as our energy security." Senator Craig continues, "logen has partnered with Shell and together they want to build the world's first full-scale cellulosic ethanol production facility right here in the United States. We are talking about putting money into U.S. farmers' pockets instead of the pockets of the sheiks in the Middle East."

— *Congressional Record, September 15, 2004*



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For more information on cellulosic ethanol, visit:

logen Corporation: www.iogen.ca

National Renewable Energy Lab: devafdc.nrel.gov/pdfs/8245.pdf

Harvesting Clean Energy: www.harvestcleanenergy.org

Washington State University: www.pacificbiomass.org/publications/WSUCEEP2001051.pdf

US DOE Biomass Program: www.eere.energy.gov/biomass/sugar_platform.html

US DOE Energy Info Admin: www.eia.doe.gov/oiaf/analysispaper/biomass.html

Oregon Dept of Energy: www.energy.state.or.us/biomass/study.htm