Ethanol Use, Benefits and Production

Steve ten Doeschate
Plant Manager
Kawartha Ethanol
What is Ethanol

- Ethanol is a renewable, clean-burning, high octane motor fuel.

- This liquid alcohol is made up of oxygen, hydrogen and carbon and is obtained from the fermentation of sugar or converted starch contained in grains and other agricultural or agri-forest feedstocks.
Environmental Benefits

- Ethanol cuts emissions from our cars. Ethanol reduces tailpipe carbon monoxide emissions by as much as 30%, toxic content by 13% (mass) and 21% (potency) and tailpipe fine particulate matter emissions by 50%.

- Ethanol lowers GHG’s by up to 62%.

- The 5% RFS alone will generate 4.2Mts fewer emissions – or the equivalent of removing one million cars from our nation’s highways.

- Ethanol replaces carcinogens in your fuel. Ethanol actually cuts down cancer-causing emissions such as benzene from our fuel. Ethanol is an oxygenate, a fuel additive that raises the octane level of gasoline, producing a motor fuel that burns more cleanly. For example, a study by the Colorado Division of Public Health and the Environment (DPHE) study showed E10 reduced hydrocarbon pollution like benzene by 16.5%.

- The most reliable third party studies show that ethanol clearly has a positive energy balance. For one example, the USDA states a value of 1.34.

- Ethanol cuts smog. Studies show that ethanol reduces particulate matter by up to 50%, reduces tailpipe emissions by as much as 30% and reduces toxic emissions by 30%.

- No harm to water. A study conducted for the Governors' Ethanol Coalition, "The Fate and Transport of Ethanol-Blended Gasoline in the Environment," concluded that ethanol poses no threat to surface water and ground water.
Ethanol Usage

- The RFS in Canada ensures 5% ethanol (renewable content) in gasoline began December 15, 2010

- Almost 1.8 Billion litres of ethanol produced annually in Canada
Kawartha Ethanol Inc.

- Grand opening March 27th, 2010
- Operated at 100% July, 2010
- 24/7 Operation
- Highly automated
- Employees: 30
- 2 operators per shift
“Nameplate” - Design Capability

- 80 million L per year design
- 100 million L per year currently
- 8,333,333 litres per month
- 285,714 litres per day
- 11,905 litres per hour
- 198 litres per minute
Operating our current rate of 100,000,000 litres per year the plant will use the following tonnes (T)/ bushels (bu) of corn:

- 246,914 T or 9,720,510 bu per year
- 20,576 T or 810,036 bu per month
- 705 T or 27,754 bu per day
- 29 T or 1,141 bu per hour
- 0.49 T or 19 bu per minute
Corn Grading
Corn Receiving
Grain Storage
Control Room
Mashing and Liquification
Fermentation
Distillation, Dehydration and Evaporation
Distillation Columns
Evaporators
Ethanol Storage & Truck Loading
Centrifuges
Wet Distillers Grains with Soluables
Advantages to Wet Distillers Grains

- Palatability, cows love eating it!
- Mid level protein similar to soy meal
- Competitively priced against soy meal
- Contain by-pass protein which is digested in later stomachs for better milk production
Corn Oil Extraction Process
Corn Oil Storage
Corn Oil

- Can be used as animal feed additive
- Primarily for biodiesel production
- Producing approximately 0.5 lbs / bushel
Boilers
Water Source for Plant
Issues for Ethanol into the Future
US Renewable Fuel Standard

E10 blend wall and ethanol use needed to comply with conventional RFS

Billion gallons

Ethanol use needed to meet conventional RFS requirement (mostly ethanol derived from corn)

10 percent of U.S. motor gasoline use (the blend wall)

Calendar year


RFS = Renewable Fuel Standard. E10 = 10-percent ethanol/gasoline blend.
Access to Higher Ethanol Blends

- Very limited gas stations offering blends above 10%
- Oct 16th Gales Gas Bars started offering E30, the first station to in the Niagara region
Is ethanol made from cellulose, a non-grain material that provides the cellular structure for all plants.

Cellulose is the world's most abundant organic compound.

Challenge is breaking it down to glucose.
Questions?