



Southern Colorado Sustainable Communities Conference

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*Bio-Fuels have a role in developing a
Diverse Energy Portfolio and increasing
Rural Economic Development*



presented by:
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LiquidMaize





LiquidMaize

- ★ LiquidMaize, LLC. (LQM), located in Denver, CO is a non-traditional bio-fuels company producing ethanol within cattle feed yards and dairy operations that are located near fuel blending terminals instead of near corn fields, resulting in a more reliable and cost effective supply of ethanol, that can be produced from diverse feedstocks.

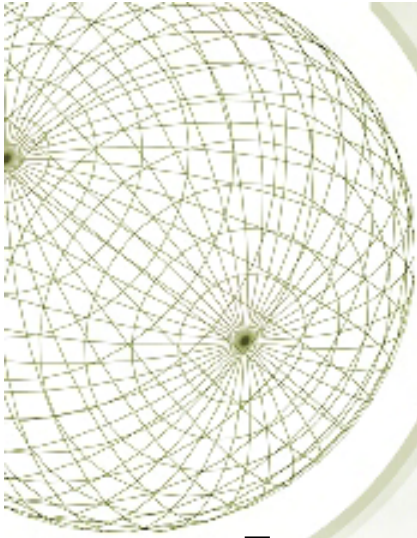


Fueling the Future



Today's Discussion Items:

- ★ What are the drivers for the transportation fuels sector?
- ★ What are some of the key challenges facing this sector?
- ★ Do Bio-Fuels have a role in meeting some of these challenges?
- ★ Conclusions and Q and A.

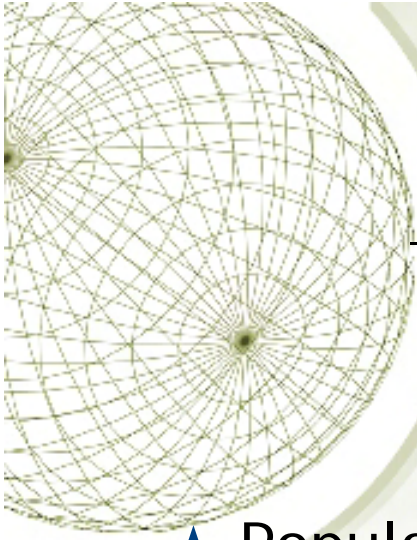


What are the key drivers in the transportation fuels sector today?

Historical Summary:

- ✦ From 1700s- mid 1800s whale oil for lighting was one of the world's first multinational businesses.
- ✦ 1859 oil industry (kerosene) was launched in Titusville, Pa. **The first alternative fuel!**
- ✦ In 1896 Ford built his first auto the quadricycle and the Model T in 1908, to run on pure ethanol.
- ✦ In 1980 175 million gallons of ethanol used. In 2007 almost 7 billion gallons used.

Source: Renewable Fuels Assn and New York Times 20 April 2008

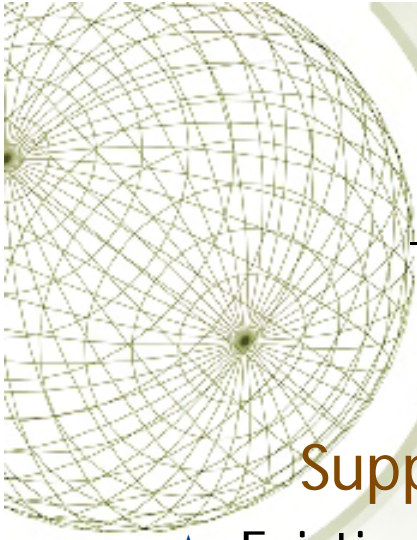


What are the key drivers in the transportation fuels sector today?

Demand up 65 % next two decades:

- ✦ Population Growth -50% to 9B by 2050.
- ✦ New Cars and Trucks - double to more than 2B in 30 years.
- ✦ Passenger Jets- double to more than 36,000 in 20 years.
- ✦ International Growth - China and India Lead the way
[the number of vehicles in China rose seven-fold from '90-'06 to 37M could be 300M by 2030!]

Source: Energy Information Agency

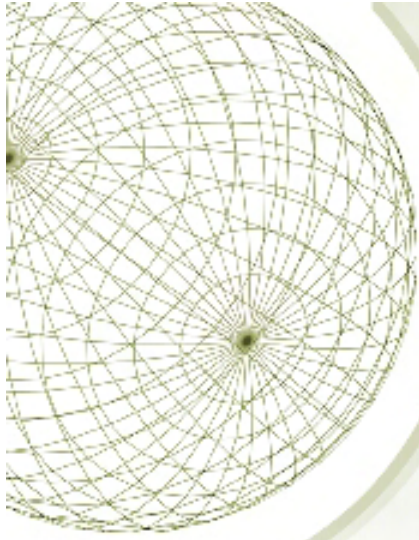


What are the key drivers in the transportation fuels sector today?

Supply: Where is the fuel going to come from?

- ✦ Existing supplies are stretched. OPEC- record revenues reduce incentive to produce more oil.
- ✦ Non-OPEC countries expect little or no production growth this year. Alaska, North Sea, Mexico, Russia struggling to keep production from falling.
- ✦ The world has consumed 1T bbls over last 100 years, with 1T in known reserves 30 yr life and 1T estimated reserves.
- ✦ **Despite investing over \$100B last year, 5 largest oil companies found less oil than they pumped out of the ground!**

Source: New York Times 20 April 2008

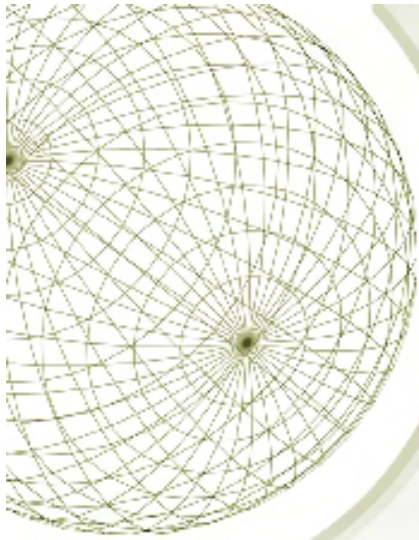


What are the key drivers in the energy and transportation fuels sector today?

Environment:

- ◆ Harmful emissions - 2007 CO₂ output up 3%.
- ◆ Threat to groundwater supplies.



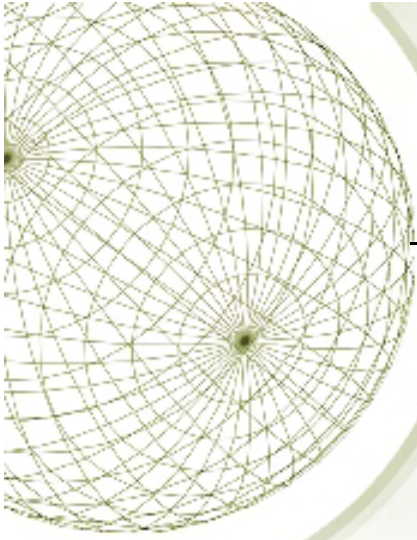


What are the key drivers in the energy and transportation fuels sector today?

Security:

- ★ Geography - Two-thirds of known reserves are in volatile regions of the world.
- ★ Volume - US imports 65% of its petroleum needs
- ★ Control - Western Oil companies control less than 10% of world supply.

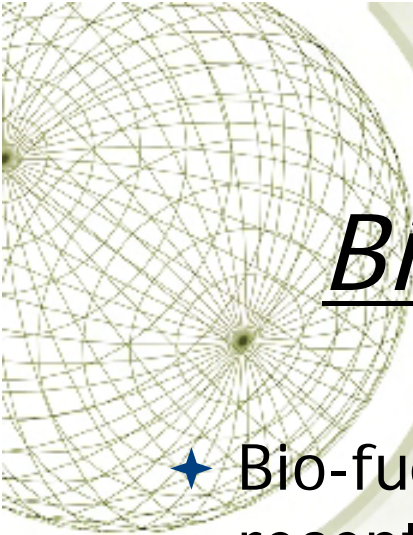
Source: Renewable Fuels Association



What are the key drivers in the transportation fuels sector today?

Review of Key Drivers:

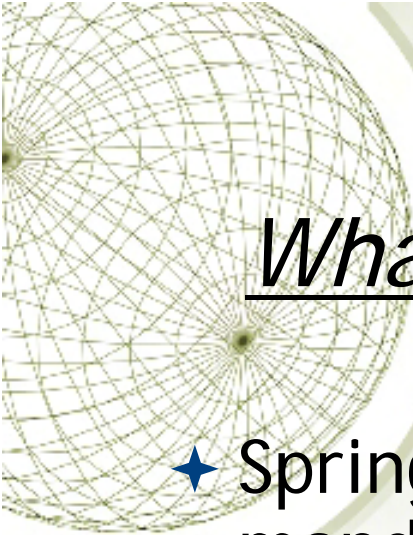
- ★ Significant Increase in Energy Demand
- ★ Resource Nationalism in Supply Countries
- ★ Negative Environmental Impact
- ★ Volatile Energy Security



Bio -fuels have a role to play.

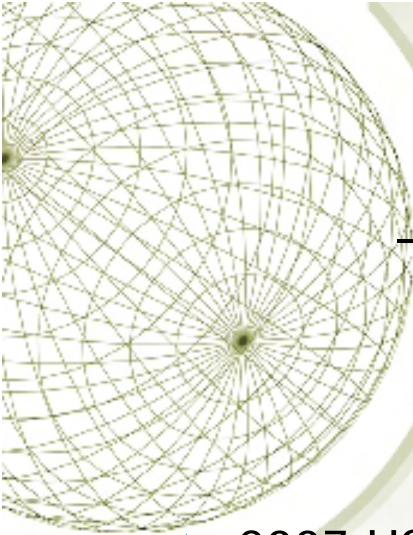
- ★ Bio-fuels are renewable energy sources derived from recently living organisms such as plants and include ethanol, bio-diesel, bio-butanol.
- ★ Fossil fuels are derived from long dead organisms and are finite - oil, coal.
- ★ Bio-fuels can be produced and utilized locally.
- ★ Bio-fuels extend existing fuel supplies.
- ★ Bio-fuels reduce tailpipe emissions and do not negatively affect surface or ground water.

Source: Renewable Fuels Association



What role do bio-fuels have today?

- ★ Spring '08 Bio-fuels began entering non-mandated markets.
- ★ Favorable pricing economics has caused a surge in discretionary blending.
- ★ Ethanol reduces gasoline prices by 15%.
- ★ US refiners may profit more on a per-gallon basis from blending 10% ethanol (E10) than from gasoline output.
- ★ Increases Rural Economic Development.



What are first-generation bio-fuels challenges?

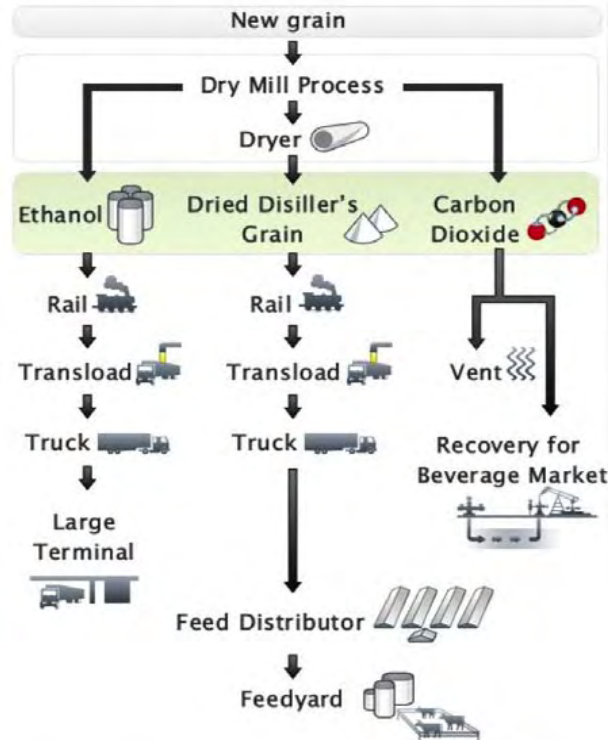
Food v Fuel - Some facts:

- ★ 2007 US farmers grew a record 13b bush of corn on 85M acres.
- ★ 22% went to produce 7B gal of ethanol
- ★ Corn supplied the domestic market with enough surplus to increase exports to record levels and stockpile a 10% surplus.
- ★ Higher energy prices (transportation and fertilizer) have twice the impact on the CPI than grain which adds about 4%.
- ★ US farmers produce about 150 bush per acre, developing country yields are closer to 30 bushels.
- ★ There are currently over 400k farmers being paid over \$1.8B to idle over 35M acres of farm land.

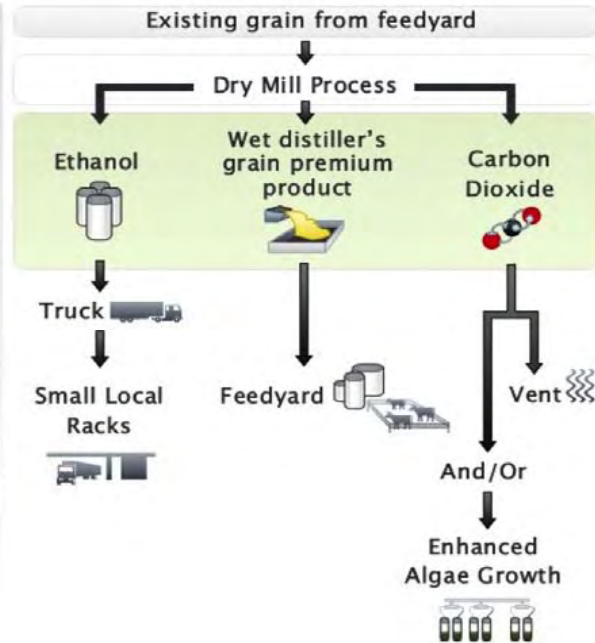
Source: Renewable Fuels Assn and US Farm Bill 2007

LiquidMaize Short Haul Model - From Plant to Pump

Typical Midwest Ethanol Plant



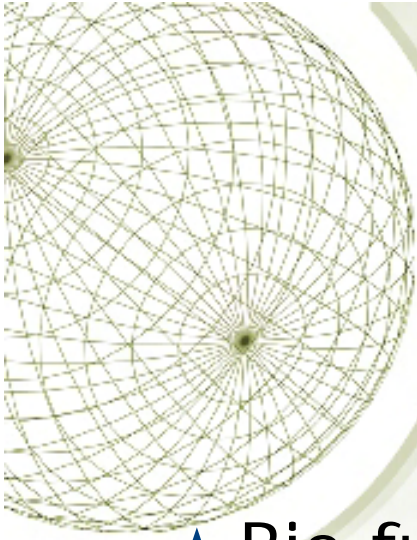
More Efficient Short-Haul Process



How can second and third-generation bio-fuels address shortcomings?

- ★ Produced from materials currently regarded as agricultural waste - **corn stalks, wood chips and other "energy crops"** not used for food.
- ★ Utilize closed loop production systems.
- ★ Use flex-fuel vehicles in farming.
- ★ Locate production assets closer to fuel terminals.
- ★ Challenges to broad use remain.

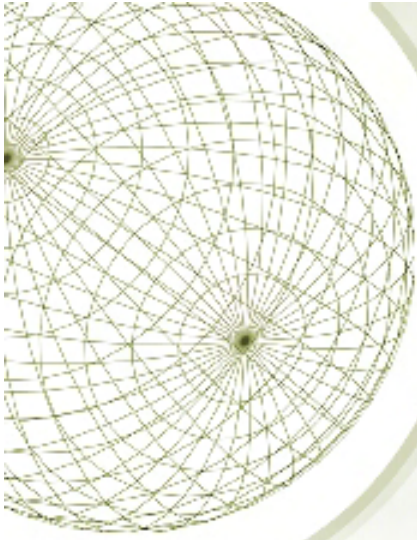




Conclusion

Is there really a choice?

- ★ Bio-fuels can extend existing energy supplies.
- ★ Bio-fuels reduce fuel costs.
- ★ Bio-fuels are produced securely at home.
- ★ Bio-fuels increase rural economic development.
- ★ Non-food bio-fuels are on the horizon.



Thank you!

Questions?

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