Biofuels in Oregon: Why, What, Where, and other Questions…

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Background: The Challenge Ahead is one of Supply vs Demand and Resulting Costs

Worldwide liquid fuel energy demand is projected to grow 57-60% by 2030 -- only 22 years away. This increase in demand is approximately 50 million barrels/day, which is the equivalent of the total combined current output of the top 10 oil producing nations in the world, or 5 times the current output of Saudi Arabia.

Current production of petroleum is not keeping pace with increased demands. While current economic conditions are bringing a welcome relaxing of prices (index funds pulling out of commodities), the relief is likely temporary. Competition for limited supplies will continue to pressure prices higher in the future, and may even create tension in world politics over these resources that require dedication of military efforts. Increased production from new drilling will take years to come online and cannot keep pace with demand.

Oregon Renewable Energy Action Plan: "Fossil fuels pose significant risks when considering the availability and price. Oregon is vulnerable to oil price spikes and shortages. Oregonians spent $4.1 billion on oil products in 2000. The vast majority of this money left the state. If oil prices doubled it would have a severe impact on the state." http://www.oregon.gov/ENERGY/RENEW/docs/FinalREAP.pdf, pg. 3

Oil prices more than doubled.

- At prices over $100/barrel, the U.S. will pay more than $800 billion for its oil supply in 2008, and the world as a whole will pay $3.2 trillion.
- These amounts are both **up a factor of 10 from what they were in 1999 and represent a huge regressive tax on the world economy.**
- Since oil is priced in dollars, a decline in the dollar's value means oil prices increase in a self-feeding cycle. China and others holding billions in US dollars have the ability to bid up, or pay higher prices, for commodities, including oil and food, because they have no need to hold US dollars that are declining in value.

WHY BIOFUELS -- The broad policy goals and purposes of biofuels are to:

1) *Reduce reliance on foreign imported oil and thereby enhance national security.* The U.S. imports over 60% of our transportation fuel needs and much of this from areas of the world where supply security is uncertain; Oregonians spend $5 billion per year on transportation fuels and almost all of this expenditure leaves the state.
2) *Enhance the domestic/local/rural economies* by reducing the trade deficit. Oil is the single largest component of the trade deficit (nearly 60%), and drags down the value of the dollar. Biofuels create domestic jobs, keep "fuel dollars" in the US, and support rural communities -- millions of dollars have been invested in biorefinery construction and operation, infrastructure and distribution, lab services, and many other support services in Oregon; billions have been invested nationwide and thousands of jobs created);
3) *Reduce air quality pollutants and greenhouse gases associated with petroleum-based fuels*, and to replace MTBE as the oxygenate and octane enhancer (groundwater contaminate). 6.5 billion gallons of ethanol in America's automobile fleet in 2007 resulted in the reduction of carbon dioxide and greenhouse gas emissions by 10 million tons, the equivalent of removing more than 1.5 million cars from US roads (based on life-cycle analysis).

WHAT BIOFUELS: ETHANOL and BIODIESEL

These two "renewable" fuels are the *only two* that have current approval from the US Environmental Protection Agency, approved ASTM standards, engine manufacturer approval at specified use levels, and years of road experience.

These fuels can be utilized in our nation's transportation system *today*, replacing petroleum imports *now*. While these fuels cannot replace all of the nation's fuel needs, they can play a role in reducing reliance on foreign fuels – currently about 6% and pushing towards 10%. They are part of the strategy, fitted with other efforts, to address energy needs. Electric and hybrid cars, better fuel efficiency, increased mass transit in cities, better inter-model use of rail and water for shipping, and other strategies will all play a part in the nation's energy future.

But most of these other efforts will take years to implement. As example, turnover of the privately owned automobile fleet in the US can take 20+ years. All of these will require massive investments and time to develop.

Biofuels are here, *now*. They can and are contributing to lower fuel costs (25-40 cents/gallon) *today*, due to additional supply of biofuels in the marketplace.

WHAT INCENTIVES, AND WHY? Distributed biorefineries that produce domestic transportation fuels from America's farms and forests:

All forms of energy, including liquid transportation fuels, receive various forms of government incentives, tax credits, special leasing privileges, depreciation allowances, and a variety of other support structures. Biofuels are not unique in this aspect.

Moving new fuels into a transportation fuel infrastructure that has existed for 100 years necessitates policies and incentives to provide access and compatibility.

"The real issue with biofuel market development [is] not so much the cost (though that is an issue), but getting access to compete in the market place. Usually the real issue isn't making the biofuel, delivering the biofuel, or finding customers for the biofuel. Usually it's the bigger market players using their established positions to prevent biofuels from existing in a petroleum fueled world." – Mark Fritz, Star Oil Co. Portland, Oregon

Primary Federal incentives for biofuels:

- 51-cent/gallon tax credit provided to the blender of ethanol – goes largely to refineries, distributors, or blending racks that handle the distribution of ethanol. It does not go to the ethanol facility. This credit will be reduced to 45 cents/gallon on Jan. 1, 2009. (There is a rational argument that with the RFS now in place at the national level, this "blender's credit" may no longer be needed.)
- $1.00 gallon tax credit for biodiesel production; this credit goes to the processing facility that transforms oils into biodiesel.
- Renewable Fuel Standard that requires blending of biofuels into the nation's liquid transportation fuels on a volumetric basis will reach 36 billion gallons in 2022. The fuels in the market at the present that are functional for meeting the RFS are ethanol and biodiesel. Ethanol produced from corn is capped at 15 billion gallons (probably will reach this around 2012). Additional biofuel must be "next generation" from biomass feedstocks that reduce greenhouse gas emissions and provide enhanced environmental benefits (cellulose, algae, etc.).
- Import tariff of 41 cents per gallon on ethanol produced outside of the U.S.

There are some additional grant/loan programs that can assist in the construction of facilities and research efforts.

Primary Oregon incentives for biofuels:

- Biomass Feedstock Tax Credits (supply) – varies by feedstock; intended to encourage the development of feedstock supplies for biofuel and bioenergy generation in Oregon.
- Business Energy Tax Credit (processing infrastructure) – provides 50% credit against the cost of facility, equipment, and other qualifying assets used to produce and distribute renewable energy, including biofuels.
- Renewable Fuel Standard (demand/market access) – 10% ethanol by volume in gasoline, triggered by in-state production levels; 2% biodiesel by volume in diesel fuel, triggered by in-state production levels from regional feedstock (can further increase to 5% base on production levels).

WHERE:

Currently built and operating in Oregon (may not be at full capacity):

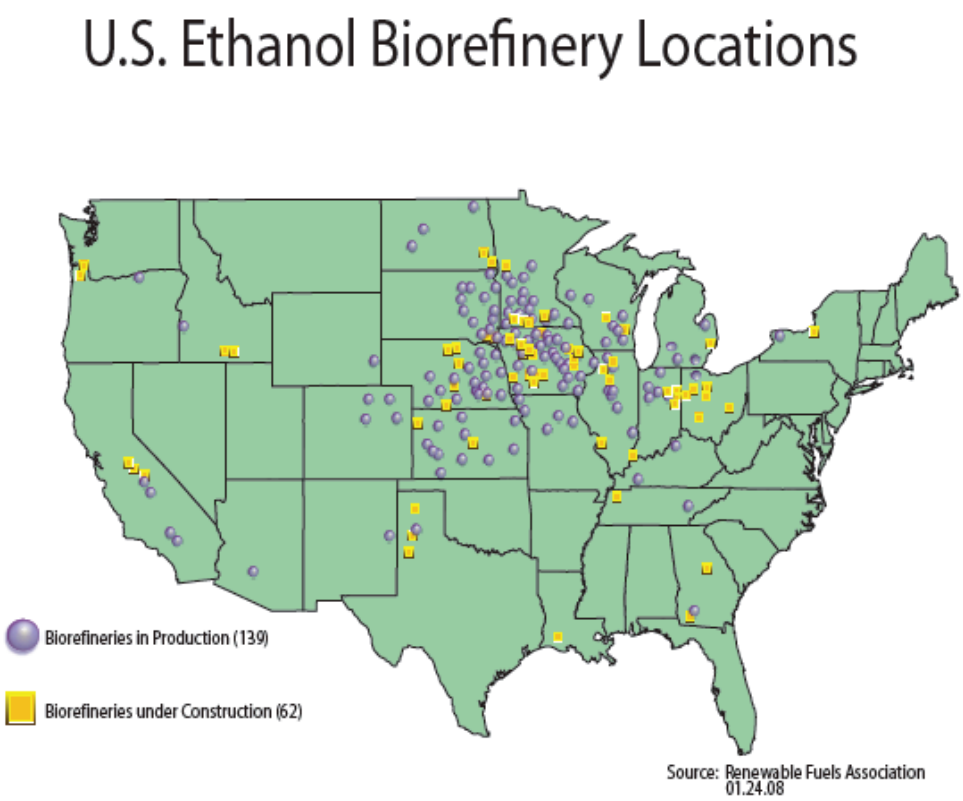
- Pacific Ethanol, Boardman, 40 million gallons per year. Primarily corn as feedstock, mostly railed in from Midwest. Investing $50 million (half from federal grant) into cellulosic pilot plant at this facility. Byproduct distillers grains provide livestock feed in Eastern Oregon and Washington.

- Cascade Grain, Clatskanie, 110 million gallons ethanol per year. Primarily corn as feedstock, mostly railed in from Midwest.

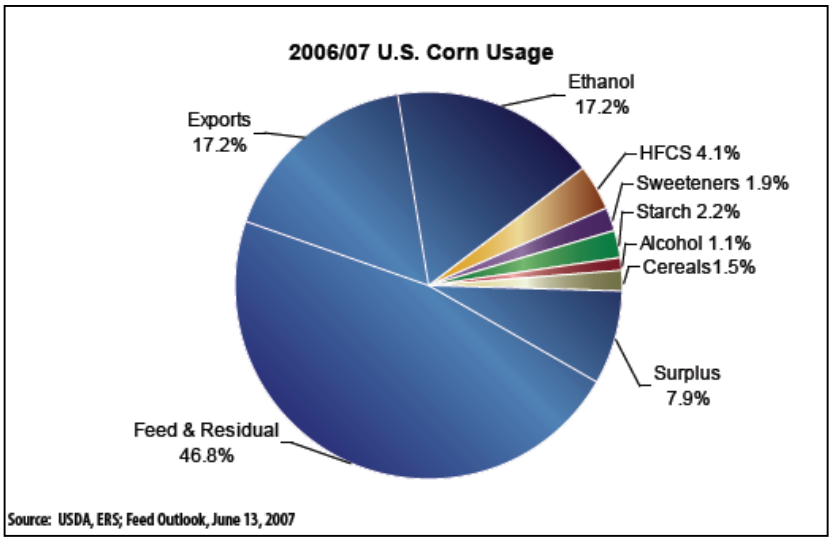
- SeQuential Biodiesel, Salem, 5 million gallons biodiesel per year. Feedstocks include waste grease/used cooking oil, canola oil, soy oil, Camelina and other oil seed sources.

- Other smaller facilities are scattered around the state, some on farms, some at other facilities, totaling approximately 3 million gallons of various biofuel types.

National Capacity: seven new plants have started producing ethanol since the beginning of June; construction is ongoing at 42 new ethanol plants and seven expansion projects. The total number of operating U.S. ethanol facilities stands at 161, with an annual production capacity of 9.36 billion gallons.
Source: Brock Associates, as reported by USAgNet.com.



BIOFUELS AND COMMODITY PRICES:



There are four general categories of corn produced in the US. *Ethanol uses only "field corn."* Field corn is not eaten by people directly (it's livestock feed), is not exported to developing nations for food, and is not used in tortillas in Mexico to any great extent (that's white corn).

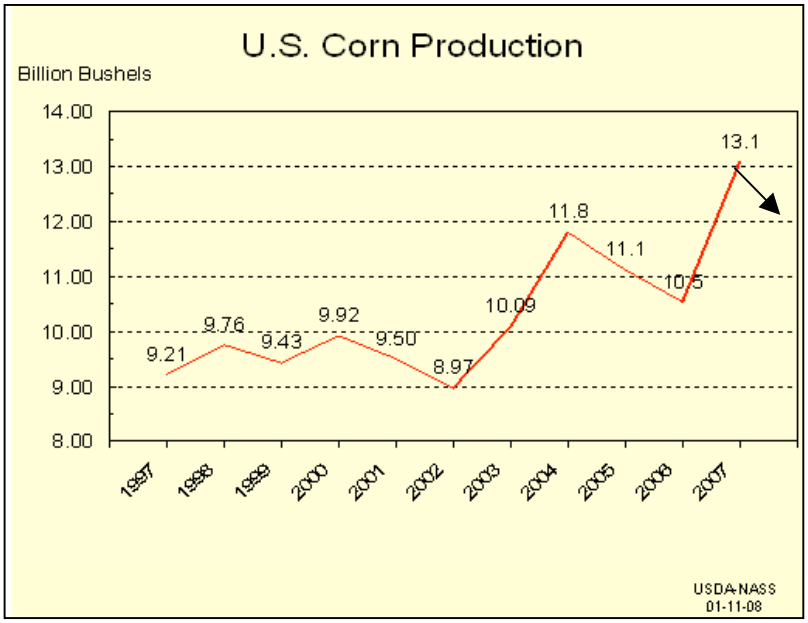
<u>Acreages of corn categories (2007):</u>

1) Food Grade Corn for milling:
- White corn: 1 m. acres
- Yellow corn: 1.5 m. acres

2) Sweet corn:
- For canned or frozen processing: 500,000 acres
- Sweet corn for fresh consumption: 200,000 acres

3) Popcorn: 200,000 acres

4) Field corn: for animal feed, ethanol, and food byproducts (corn syrup, corn starch, etc.):
   - **91 million acres**



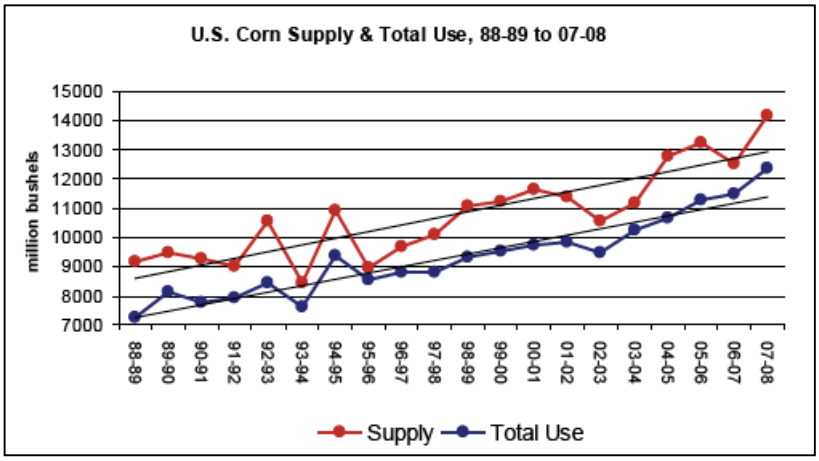
The increase in acres from 2006 to 2007 more than met the ethanol demand/usage of corn. Ethanol utilizes only the starch from the corn. The protein, fiber, and other components are passed through the ethanol facility and are available as livestock feed, about 25% by weight of the corn going into the facility.

2007 was the largest corn crop in US history; 2008 the 2nd largest, despite weather challenges.

2007 US corn exports were the highest in history (to China, Europe, and other nations as livestock feed), despite increased ethanol use. 2007 also witnessed record livestock use of corn in the U.S.

While demand increase from the three predominant uses of corn increased in 2007/08, the corn production was available for all uses.

- Total corn ***demand*** in 2007/08 was about 900 million bushels higher than in 2006/07;
- Total ***supply*** was about 1.6 billion bushels higher.
- There was more market volatility as demand rapidly increased, but **there was no shortage of corn**.



So what caused commodity prices to spike in mid-2008?

<u>Many factors contributed to food price increases:</u>

1) Energy/oil prices reverberate throughout the food system;
2) Fertilizer prices (US imports most all N now; prices tripled in past 3 years);
3) Increase in demand (higher incomes abroad);
4) Drought/disaster (Australia and other areas had <60% of normal yields);
5) Labor costs (40% of food dollar in US);
6) Falling U.S. dollar (increases export demand; makes imported food more expensive; 35% of US fruit & veg. supply is imported);
7) Index fund investments/speculation in commodity markets (The amount of pension and index fund money invested in commodity indexes climbed from $13 billion in 2003 to a staggering $260 billion in March, 2008.)
8) Conversion of ag lands out of agricultural production;
9) Food choices: prepared foods; organic; certified; rBST-free milk -- all cost more to produce, more in feed and labor costs = higher retail price;
10) Governments worldwide have backed off investments in agriculture research in the past decade, with crop yields in many nations reaching stagnation or declines.
11) Biofuels (very small % of increase).

This combination of factors converged in a “perfect storm” just as the housing “bubble” was bursting in the U.S., and index funds jumped from housing into the commodity markets and pushed non-traditional buying and market panic.

Since that time, commodity prices have responded to: 1) increased plantings by growers and better production conditions/weather worldwide = increased supply; 2) moderation in demand as the economy softens; 3) lower oil prices that reverberate throughout the food chain; and 4) investment/speculative money pulled out of the commodity markets. **Corn and wheat prices have fallen 70% from highs in July.**

<u>Tradeoffs</u>: High grain prices hurt some, and benefit others. Alternatively, low grain prices result in more affordable food for urban poor, but also bring:

- The slow devastation of agricultural economies throughout the world and out migration of populations to crowded cities;
- The loss of farmland to non-farm uses that present economic profits at a quicker pace;
- More confined livestock production systems; and,
- Developed countries spending billions in subsidies to keep farmers viable.