

Biobased Products-Overcoming Myths and Moving Forward

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Some of the Myths

- Biobased products are always more expensive than petroleum based products.
- New sources of biomass like algae or switchgrass are needed before biobased products will take off.
- The technology to make biobased products competitive is decades away, if ever.
- Using crops for fuel or chemicals creates a shortage of food.

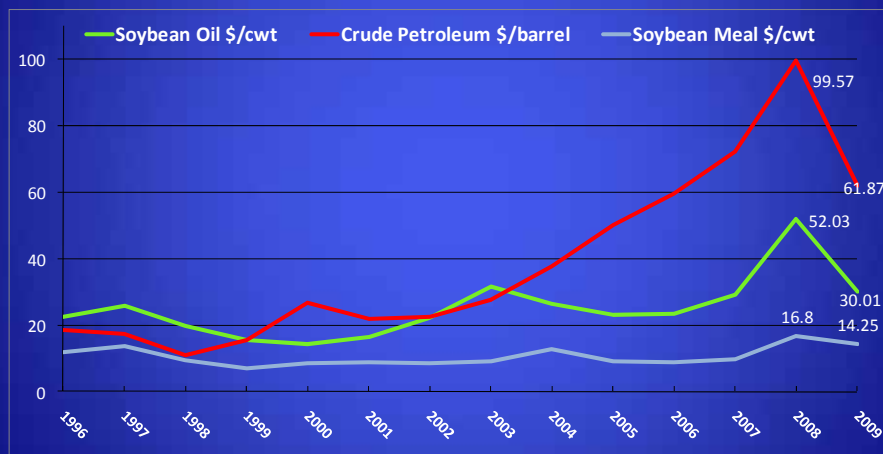
Biobased products are always more expensive

Ask yourself-

When was the last time you saw a new car with vinyl seats?

Cash Price Changes – FY 1995-2009

USDA or DOE annual average (2009 estimate)



Chemical Prices versus Soy Prices

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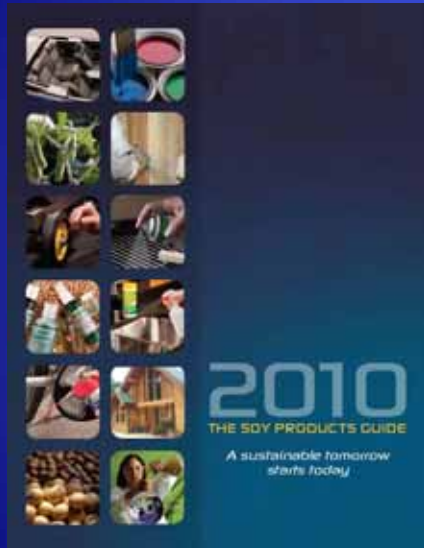
Biobased products are always more expensive

- Soy polyols have been competitive with petrochemical polyols to make polyurethanes since 2004.
- Soybean meal adhesives have been competitive with urea formaldehyde adhesives in plywood since 2006.

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Over 400 Soy-based Industrial Products



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Look at the Petroleum Refinery Model

- 5-10% of the output generates 30-40% of the revenue.
 - Asphalt prices/lb are 2-3x gasoline
 - Petrochemical prices have risen to 3-10x fuels
- Fuel generates almost no margin

New sources of biomass like algae or switchgrass are needed before biobased products will take off.

Two major hurdles:

- Water
- Density (physical and energy)

Plus, we don't know how to grow, transport or process them.

Water Content & Density

Material	% H ₂ O Content at Harvest/Collection	KG/M ² dry weight	MMBTU/M ² dry weight
Coal, Anthracite	<5	1105	13.8
Coal, Bituminous	<10	833	7.3
Wood chips	50	240-520	1.9
Sawdust	10-20	210	1.6
Switchgrass	<10	160	1.3
Corn, Wheat	10-12	750-770	5.6
Soybeans	12	753	7.2
Cotton Gin Trash *	<10	500-600	3.6-4.0
Recycled cardboard	<10	900	7.0
Algae (Micro)	65>	?	?

* Compacted into briquettes

Look at What is Already Here

- Traditional crops and residues
- Processing wastes: gin trash, rice hulls, soy hulls, sawdust
- Native species: forest thinnings, waste wood, bamboo/cane.
- MSW- paper, cardboard
- Animal wastes- poultry litter, swine manure

Technologies for Converting Biomass

- Fermentation: Ethanol, PLA, butanol, fumaric & succinic acid, acetic acid, others.
- Direct combustion: Combined heat and power units already supply 2% of the nations power.
- Torrefaction: fancy word for charcoal.
- Gasification: heat and power (rice hulls in Stuttgart AR) ethanol, ammonia & hydrogen (Range Fuel in Soperton GA)
- Chemical modification: Over 400 soybean products, i.e. soy polyols in Fayetteville AR, Biodiesel. Terpenes/tall oils from pine.

Using Crops for Fuel Creates Food Shortages

Reality

- The world has more than enough food to feed the world's entire population and food supplies are growing faster than population.
 - World Hunger Institute, Brown University
 - USDA and FAO statistics
 - Hunger is real, but it is not a matter of shortage. It is a matter of poverty, war and policy.

Path Forward

- Fuel alone probably won't be economically viable, you need:
 - High value products
 - High volumes fuels
 - Biopower
- Look at what is already here first.
- Choose appropriate technologies.

Path Forward

Establish a plan:

- State policies aligned
- Incentives for outside investment
- Outreach

Questions?

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