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Economics of Ethanol from Sucrose

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American Crystal Sugar Company

- Co-op located in RRV of MN/ND
 - Approximately 2,900 shareholders & 500,000 planted acres
 - 5 RRV factories
 - Non-Co-op, wholly owned factory located in Sidney, Mt
- Largest beet sugar producer in the U.S.
 - Annual production = 3.0 – 3.5 billion pounds

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U.S. Sucrose Ethanol

Amounts shown are approximate

- No sucrose ethanol plants are operating in the U.S. currently
- Costs estimates from different sources vary widely
 - USDA beet cost = \$2.35/gallon
 - LECG beet cost = \$3.85/gallon

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The Problem for Sucrose Ethanol in U.S. is Feedstock Cost

Corn as feedstock

- \$3.00/bushel of corn
- Divided by 3.00 gallons/bushel =
- \$1.00/gallon raw material cost

Raw sugar as feedstock

- \$21/CWT of raw sugar
- Divided by 6.77 gallons/CWT =
- \$3.10/gallon raw material cost

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U.S. Ethanol Total Cost Corn Vs. Sucrose

	<u>Corn</u>	<u>Raw Sugar</u>
Feedstock	\$1.00	\$3.10
Agri-product Cr.	(.45)	-
Processing	.50	.35
Marketing	<u>.45</u>	<u>.45</u>
Total	<u>\$1.50</u>	<u>\$3.90</u>

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ACSC Preliminary Conclusion

- Assuming \$2.50 wholesale/spot price
 - Ethanol spot price approximately equals retail gas price
 - Includes impact of \$.51/gallon tax credit
- Ethanol made from U.S. sugar currently not economically viable

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How does Brazil do it?

Very low feedstock costs

- Brazil produces sugar at a much lower cost than any other country in the world
- Cost/CWT produced is less than 1/2 of that in the U.S.

30 years of national support programs

- Ethanol volume mandates, diesel ban, fuel tax credits, producer subsidies, debt relief, low environmental standards and other governmental support

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Integrated Sucrose/Ethanol Facility - Potential Savings

- Fixed cost spreading
 - Only works if mill/factory is currently underutilized
- Transportation
 - \$1.00/CWT = \$.15/gallon
- Agri-product credits
 - Some savings from pulp (for beet) and molasses (beet & cane)
 - Approximate savings = \$.25/gallon

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Integrated Sucrose/Ethanol Facility - Potential Savings

- Lower operating cost by utilizing less processed feedstock (ie. thin juice)
 - However, vinasse (residue) disposal could offset operating cost savings
- Synergies
 - Energy from cane bagasse could be significant
 - Water savings for beet likely not significant

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Integrated Sucrose/Ethanol Facility Savings

- Total savings from integration not enough to economically justify U.S. sucrose ethanol
- Assuming \$2.50 spot ethanol price, tax credit would need to be increased from \$.51 to \$1.00-\$2.00/gallon for sucrose ethanol to be economically viable

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Other Reasons for Sucrose Ethanol Program

- Increase energy security
- Create jobs
- Promote renewable energy
- Diversify U.S. feedstock
- Increase ethanol production
 - If 100% of corn converted to ethanol only 10%-15% of 140B gallon annual gasoline “addiction” would be replaced

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Other Reasons for Sucrose Ethanol Program

- Promote passage of Free Trade Agreements with countries that subsidize sugar exports
 - The sugar industry can not support FTAs that allow subsidized imports to replace domestic production
 - NAFTA will allow approximately 1.0 billion pounds of unneeded Mexican sugar into the U.S. market this year even though almost half of the mills in Mexico are government owned
 - Sucrose ethanol could act as a home for subsidized surplus sugar from current and future FTAs

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Sugar Industry Position on Sucrose Ethanol Program

- U.S. sugar industry does not believe sucrose ethanol is economically viable under current prices and credits
 - Hawaii is the exception
- Would consider program that compliments current sugar for food structure while allowing subsidized imports to be converted to ethanol

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