



Innovated Concepts of Ethanol

Bio-refining Management and Consulting Services

Small Scale Ethanol Facilities

Michigan Bio-Energy Summit

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Outline of Topics

Ethanol Basics

Why Small Scale

Small Scale Ethanol Basics

Ethanol Subsidies ?

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Ethanol Basics

- Industry Standard 2.8 gal denatured ethanol/bu corn
- Water usage 3 gallons H₂O/ gal den. ethanol
- Energy usage 28000 btu's/ gal den. ethanol
- Electric usage .75 kw/ gal den. ethanol
- Water treatment

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Why move to small scale?

- Reduce Transportation Costs
- Ensure Corn Supply
- Ensure Distillers Grain Supply
- Close to Cellulosic Sources
- Regionalize Gasoline Supply
- Create on farm value and a sustainable system
- Reduce corn basis effect

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- On Farm
- Carbohydrate Source
- Sized to Cattle or Dairy Operation Size
- Partner with the producer
- Supply Management and Operations
- Work with Existing Petroleum Blenders

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Small Scale Ethanol Facts

- Energy usage < 10,000 btu/ gal
- Water Usage 1.5 gallons H₂O/ gal den. ethanol
- Conversion > 3.0 bu./ gal den. ethanol
- Electric usage .75 kw./ gal den ethanol
- NO NPDES required water all recycled

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Construction Costs

Traditional Plants

- Dryer Systems
- Additional Grain Handling
- Thermal Oxidizers
- Cost to build 1.50 to 1.80/gal
- Increased Working Capital

Small Scale Plants

- No Dryer Systems
- Use On Farm Systems
- No Thermal Oxidizers
- Cost to build .50 to 75/gal
- Less Working Capital

Economics (per gallon)

Traditional Plants

- Corn Costs 1.25
- Electricity .045
- Natural Gas .232
- Employee Costs .04
- Chemicals .08
- Ethanol Transport .10

Small Scale

- Corn Costs 1.23
- Electricity .045
- Natural gas .086
- Employee cost .0625
- Chemicals .05
- Ethanol Transport .07
- Advantage .2035



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Ethanol Facts

- Blenders Credit to Petroleum Blender not ethanol producer
- MI State Incentives?
- Energy Balance

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