Natural Solutions™

Applied CleanTech
Increased Profits
Decreased Risk
Cleaner Environment

BACKEND FRACTIONATION

*The Solution is in Solution*

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THE EVOLUTION OF CORN ETHANOL

- The Corn Ethanol Industry contributed over $65 billion to the GDP by offsetting 7% of America’s fossil fuel needs during 2008.

- The existing fleet must evolve into increased sustainability.

- ‘Increased sustainability’ means that we need to make better use of feedstock for less cost, energy, carbon, and risk.

- Making ‘better use’ of corn requires innovation.
CHALLENGES

➤ Innovation requires Emerging Technology Development Risk.

➤ **Technology Risk:** does it work? what is the impact on my existing plant?

➤ **Financial Risk:** how do I generate a return on my R&D and my CAPEX? am I in compliance with banking covenants? what is the impact on my cash flow?
CORN ETHANOL & CO-PRODUCTS

- For every 1 Pound of ethanol we produce 1 Pound of co-product (DDGS)
- **Bad News:** The second pound is an untapped proven reserve of additional yield.
- **Good News:** Technology is available to mine these co-products in ways that reduce cost, energy, carbon and risk.
THE SOLUTION IS IN SOLUTION
BACKEND FRACTIONATION: The Solution is in Solution....

- In solution, we can separate components by:
  - vapor pressure (distillation)
  - density (centrifuge technology)
  - filtration (membrane/micro/nano)

- In solution, we can create reactions that:
  - alter molecular structures making new products
  - alter physical and chemical characteristics to allow recovery
BACKEND FRACTIONATION: Do What You Do Best Better  ... and Then Do It More

➢ If what you have works, don’t reinvent it  ................................................................. improve it; add to it

➢ If it is wet, keep it wet  .................................................................................. and then use water to increase yield

➢ If it quacks like fermentation, ferment better  ............................................. and then ferment some more

➢ If oil is worth more than grain, extract as much as you can  ...................... and then extract more

➢ If feed is worth more with protein, concentrate protein  ......................... and then produce more

➢ If a residual is worth more as a biopolymer, sell biopolymer  ................... and then sell some more

(and don’t burn or digest it)
BACKEND FRACTIONATION: Technology Portfolio

- **Desiccation & Cavitation**  
  Condition feedstock to increase yield

- **Corn Oil Extraction**  
  Extract corn oil from thin and whole stillage

- **Cellulosic Oil™**  
  Convert residual biomass into additional oil and protein

- **Biopolymer Extraction**  
  Extract and convert byproducts into bioplastics

- **Integral Refining**  
  Refine extracted oil for additional yield

- **CO2 Recycling**  
  Reform exhaust carbon dioxide into natural gas and yield
BACKEND FRACTIONATION: Deploy in a controlled and rational manner

▸ We need to minimize Emerging Technology Development Risk as we innovate ‘better uses’ of corn.

▸ Our approach is to achieve this with **incremental shifts** forward, where each shift favorably impacts the financial and environmental needs of our clients by decreasing raw material needs, facilitating co-product reuse, and reducing the generation of wastes and emissions.

▸ We focus on upgrades designed to ‘trim the fat’ to create and capitalize on operating synergies with the host facility, and of each preceding technology upgrade ... $1 + 1 = 3 \ldots 1 + 3 = 5 \ldots 1 + 5 = 7$

▸ Less ‘fat’ means less cost and incremental cash flow ... **more cash flow mitigates Technology Risk**.
CORN OIL EXTRACTION
ONE KERNEL: TWO FUELS™

CORN ETHANOL INDUSTRY

3,750 MM Bushels of Corn
10.5 BGY of Ethanol
29.7 MM TPY of DDG

<< 680 MMGY of Extracted Corn Oil >>

GreenShift intercepts the flow of Distiller’s Dried Grain (DDG), extracts corn oil, and returns the flow with increased protein content for less energy

BIODIESEL INDUSTRY

2.9 MM TPY of FOG
700 MMGY of Biodiesel

<< 630 MMGY of Corn Oil Biodiesel >>

70% of the biodiesel industry is shut down due to lack of conventional Fats, Oils & Greases (FOG); GreenShift’s extracted corn oil is a new feedstock that could fill the industry

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SECOND GENERATION FEEDSTOCK

GreenShift integrates turn-key, skid-mounted, plug-and-play Corn Oil Extraction facilities into ethanol plants in two stages, or Methods:

- **Method I** extracts oil from Thin Stillage
- **Method II** frees oil from Wet Cake for added extraction with Method I.

Extracted corn oil is shipped for refining into biodiesel or renewable diesel.

Benefits of Corn Oil Extraction:

- Increased revenue and earnings
- Decreased commodity and financial risk
- Increased nutritional content of DDGS
- Enhanced energy balance from corn with less carbon emissions
- Increased sustainability and competitiveness

GreenShift's Method I Corn Oil Extraction Facility
BENEFITS OF CORN OIL EXTRACTION

corn by 7% while *reducing the energy and greenhouse gas* emissions by 21% and 29%, respectively.

There are currently no other technologies that have been developed for the corn ethanol industry that begin to approach these results—*in the entire history of the ethanol industry.*
IMPACT ON STARCH SPREAD: Tastes Best When Needed Most

- be the *quickest path for margin improvement* for corn

- gives participating producers

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OFFERING

License Agreement  Right to use technology in return for the right to purchase the extracted oil.

Purchase Price  51% of diesel spot.

Financing  Licensee installs: ................................................................. receive 90% of cash proceeds until ROI
           51% of diesel spot thereafter
           GreenShift installs: ................................................................. 51% of diesel spot from inception
OFFERING

Purchase Price  
51% of diesel spot = 85% of the Net Value (after COGS & CAPEX) = 60% of Total Value

<table>
<thead>
<tr>
<th>Material</th>
<th>Unit Price</th>
<th>Price</th>
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<tbody>
<tr>
<td>Crude Oil</td>
<td>$75.00</td>
<td>$75.00</td>
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<tr>
<td>Diesel</td>
<td>$2.10</td>
<td>$2.10</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>$5.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>Yellow Grease</td>
<td>$0.23</td>
<td>$0.23</td>
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</table>

Yellow Grease % of Diesel: 85.00%

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Unit Price</th>
<th>Price</th>
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<tbody>
<tr>
<td>Corn Oil Sales Price</td>
<td>$1.79</td>
<td>$1.79</td>
</tr>
<tr>
<td>Costs of Goods Sold</td>
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<td>$0.25</td>
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<tr>
<td>Capital Expenditures</td>
<td>$2.00</td>
<td>$2.00</td>
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</table>

Net Value of Corn Oil to GreenShift: $0.19

Total Net Value of Corn Oil: $1.26

<table>
<thead>
<tr>
<th>Cost Distribution</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Net Value Paid to Ethanol Producers</td>
<td>85%</td>
</tr>
<tr>
<td>Percent of Net Value Retained by GreenShift</td>
<td>15%</td>
</tr>
<tr>
<td>Percent of Gross Sales Price Paid to Ethanol Producers</td>
<td>60%</td>
</tr>
<tr>
<td>Percent of Gross Sales Price Retained by GreenShift</td>
<td>11%</td>
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</tbody>
</table>

GreenShift Method I: 2.75% Thin Stillage: 2,750
GreenShift Method II: 3.75% Wet Cake: 3,750
Total: 6,500

Ethanol Production: 100,000 gallons
Energy Reduction: 8,986 MMBTU/year

Corn Oil Purchases from GreenShift: $6,964
Energy Savings: $4,493
Contribution of Extraction to Ethanol Producer EBITDA: $11,457
Expressed per gallon of ethanol produced: $0.11
CONTACT INFORMATION

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