Where High Performance and Sustainability Converge

Allen Barbieri - CEO
Biosynthetic Oils

**FEEDSTOCK**

Large variety natural oils

- High oleic soybean
- High oleic canola
- Palm oil, Coco oil, animal fats, algae oil...

**MANUFACTURING**

Continuous flow, catalyst chemical reaction process using standard equipment & low cost catalyst

**COMMERCIAL OPPORTUNITY**

Used in large high-value markets

- Motor Oils
  - Industrial lubricants
    - Gear oils
    - Hydraulic Fluid
    - Greases
    - Compressor
    - Marine
    - Dielectric
    - Metalworking

- Personal care applications

Exclusive license from USDA to patent portfolio, covering revolutionary new molecule class
Key Partners

Key Equity Investors
- Evonik Industries
- Sime Darby
- bp
- Monsanto

Manufacturing Partners
- Albemarle
- Jacobs Engineering Group

U.S. Government Partner

Investment Banking & Banking Partners
- J.P. Morgan
- Jefferies
- Silicon Valley Bank
Intellectual Property — Global IP Strategy Maximizes Protection

- **22 U.S. issued U.S. patents, 9 international patents, 20+ pending U.S. patents, and 40 pending PCT and Foreign applications**

- **Original molecule patents Assigned from the USDA** create a broad barrier to entry

- **Aggressive strategy to** cover downstream products to **maintain freedom-to-operate for customers** and end-users

- International IP strategy designed to control costs and maximize protection in commercially significant regions

- **Over 90% of portfolio will not expire until after 2031**
Customers

Working with the vast majority of all national and global brands of automotive & industrial lubricants, and most additive manufactures.

Over 80 NDA’s signed with samples sent to each of these potential customers
- Almost all performing bench testing
- Most have formulated finished products
- Many are in field trials
- Some ready to launch commercial products

Major automakers and industrial machinery OEMs are testing and evaluating lubricant products made from these biosynthetic base oils
Superior performance attributes enabling broad applications...

**Excellent Viscosity Index**

Base oil | Viscosity Index (6-8 cSt @ 100c)
---|---
Groups I & II | 80 to 119
Group III | 120 to 130
Group IV (PAO) | 130 to 145
Group V (PAG) | 145 to 165
BT Estolides | 170 to 175

**High Oxidative & Thermal Stability**

- Increased longevity

**Low Volatility / Evaporative Loss**

- Safe for high temp applications

**Excellent Hydrolytic Stability**

ASTM 2916 @ 144 hrs.

**Flash Point**

Biosynthetic Oils outperform competing products in several key categories
Biosynthetic Technologies’ Continuous Flow Process — Designed to Minimizes Operating Costs and By-products

**Chemistry**

\[
\text{Triglyceride (Veg oil)} \rightarrow \text{Fatty Acids} \rightarrow \text{high acid intermediate} \rightarrow \text{Acid Free Intermediate} \rightarrow \text{Fully Saturated Estolide}
\]

**Production Process Benefits**

- Continuous flow, moderate temp., low pressure, short residence time and recycle of unreacted material, creates efficient, low-cost process with no by-products other than high grade glycerin & water.

- Uses inexpensive, widely available catalyst and alcohol.

- Uses common chemistry equipment and processes.

- Contract manufacturing to be outsourced to existing chemical plants.

- Long-term supply agreement with Monsanto and Sime Darby for vegetable oil feed stocks.

*Continuous flow process creating high performing renewable synthetic esters*
Albemarle Chemical Has Built Both a Pilot Plant and a Demonstration Plant in Validating Both the Manufacturing Process and Cost of Goods
Engine Cleanliness Rating

CAM SHAFT WEAR (in microns)

API Certification – Engine Test Results

Minimum requirement to pass test is 4.0 rating

Working with Infineum Biosynthetic has certified one of the highest quality motor oil ever tested.
PENNZOIL® SYNTHETICS KEEP PISTONS CLEANER THAN ANY LEADING SYNTHETIC OIL:

PENNZOIL PLATINUM® MOTOR OIL
- Keeps pistons up to 8% cleaner than Mobil 1
- Up to 17% cleaner than Valvoline® SynPower®
- Up to 20% cleaner than Castrol® EDGE® with SYNTEC®

PENNZOIL ULTRA™ MOTOR OIL
- Keeps pistons up to 25% cleaner than Mobil 1
- Up to 35% cleaner than Valvoline® SynPower®
- Up to 40% cleaner than Castrol® EDGE® with SYNTEC®

MAKE IT A PENNZOIL CHANGE:

*Actual advantage over competitive products is greater than visually shown. Based on ASTM Sequence IIIIG piston deposit test using SAE 5W-30. Does not apply to Pennzoil Ultra™ Euro or Pennzoil Ultra™ 0W-40 motor oil. Pennzoil Ultra™ keeps pistons up to 25% cleaner than Mobil 1; up to 35% cleaner than Valvoline® SynPower®; and up to 40% cleaner than Castrol® EDGE® with SYNTEC®. Pennzoil Platinum® keeps pistons up to 8% cleaner than Mobil 1; up to 17% cleaner than Valvoline® SynPower®; and up to 20% cleaner than Castrol® EDGE® with SYNTEC®. Superior Active Cleansing Agents versus our conventional and synthetic blend oils. © SOPUS Products 2013. All rights reserved.
Working with Infineum (Exxon/Shell), BT received Automaker Certification* on 5W-20 and 5W-30 grade motor oils. These viscosity grades represent 79% of all motor oil sold in the U.S. No other bio-based motor oil has met these standards.

Infineum also completed a very successful 150,000-mile field trial on taxis in Vegas.

As seen on the following page, BT’s biosynthetic oil reduces sludge and varnish keeping engines cleaner.

* CERTIFICATIONS:
  • American Petroleum Institute: API-SN
  • International Lubricant Specification Advisory Committee: ILSAC GF-5
Engine Cleanliness after 150,000 Miles

Actual taxi engine
After 150,000 miles using all petroleum motor oil

Actual taxi engine
After 150,000 miles using Biosynthetic blend motor oil
The API certified motor oils show very high fuel economy gains:

- Mercedes 111 Fuel Economy test (M111FE) – passed showing **fuel economy savings of 3.05%**
- ILSAC Sequence VI-D Fuel Economy Test - passed showing 2.4% fuel economy savings, allowing for a “Resource Conserving” label on the bottle.

API CERTIFICATION MARKS:  
- “DONUT”  
- "STARBURST"
Environment, Regulations and Legislation

It’s all about Water Pollution
Environmental Discussion

Helping reduce pollution

- Of the 11 billion gallons of lubricants consumed each yr.
  - 38% are “lost in use” – released into environment
  - 16% are improperly / illegally disposed
  - 34% are burned as a fuel
  - 12% used in asphalt, other products or re-refined

Water Pollution

- 40% of U.S. water pollution comes from used motor oil
  - Used motor oil entering the world’s oceans equals one oil tanker sized spill every week
- 1 gallon of used oil contaminates over 1 million gallons of fresh water
- Petroleum oils foul water treatment plants – costing $$$$ 
- State and Federal Clean Water Acts give regulators authority to act
...and Addressing the Changing Environmental Requirements of Customers and Regulators

Other government regulations & mandates

- California Senate Bill 916 (not passed)
- EPA Vessel General Permit
  - Vessels must use Environmentally Acceptable Lubricants (EALs): biodegradable, minimally toxic, not bio-accumulative.
  - Addresses 16mm gallons/yr.
- US Government BioPreferred Program requires government agencies and contractors to use motor oil that has at least 25% bio content
- EU, EPA & three States are progressing toward regulations that will require EALs and/or bio content in other targeted areas include:
  - Hydraulic fluid (70+% lost into environment)
  - Motor oil (60% lost into the environment)

High bio-content – Percent Renewable carbon

<table>
<thead>
<tr>
<th>Base Oil</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I - III</td>
<td>0</td>
</tr>
<tr>
<td>PAO &amp; PAG</td>
<td>0</td>
</tr>
<tr>
<td>Diester</td>
<td>0-30%</td>
</tr>
<tr>
<td>POE</td>
<td>0-50%</td>
</tr>
<tr>
<td><strong>BT Estolides</strong></td>
<td><strong>82% - 90%</strong></td>
</tr>
</tbody>
</table>

Environmental Attributes

- Renewable
- Biodegradable
- Non-toxic
- Not Bio-accumulative

Life Cycle Analysis (LCA)

Biosynthetic Technologies’ Life Cycle Analysis shows an 67% to 79% reduction in Greenhouse Gases (GHGs)
Market Positioning

- BT’s oils generally meet or exceed Group IV and V base oil technical performance, at a lower cost.
- OEM’s and High performance equipment increasing require premium synthetic based lubricants.
- Desire/mandates for environmentally friendly lubes creates opportunities to penetrate Groups I, II and III.
- Using BT’s oils as a co-blend component to improve performance of Groups I – III has also created opportunities.

<table>
<thead>
<tr>
<th>Synthetic base oil</th>
<th>$/kg</th>
<th>$/gal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refined mineral oil</td>
<td>1.4 - 1.9</td>
<td>4.00 - 5.00</td>
</tr>
<tr>
<td>PAO (low viscosity)</td>
<td>3.0 - 4.0</td>
<td>9.00 - 13.00</td>
</tr>
<tr>
<td>PAO (high viscosity)</td>
<td>7.0 - 8.0</td>
<td>24.00 - 27.00</td>
</tr>
<tr>
<td>PAG</td>
<td>7.5 - 9.0</td>
<td>16.00 - 30.00</td>
</tr>
<tr>
<td>Alkylated naphthalene</td>
<td>6.0 - 8.0</td>
<td>20.00 - 27.00</td>
</tr>
<tr>
<td>Phosphate esters</td>
<td>15.0 - 20.0</td>
<td>51.00 - 68.00</td>
</tr>
<tr>
<td>Diester</td>
<td>6.0 - 8.0</td>
<td>20.00 - 27.00</td>
</tr>
<tr>
<td>Polyol ester</td>
<td>8.0 - 12.0</td>
<td>21.00 - 41.00</td>
</tr>
</tbody>
</table>

Source: Kline 2011

BT’s product will be price positioned well below Group V esters and PAGs and comparably to Group IV PAOs.
### Pro Forma Income Statements

**Years 1 - 5 (in 000s)**

<table>
<thead>
<tr>
<th></th>
<th>Yr 1</th>
<th>Yr 2</th>
<th>Yr 3</th>
<th>Yr 4</th>
<th>Yr 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sales volume</strong></td>
<td>-</td>
<td>-</td>
<td>10,000</td>
<td>20,000</td>
<td>20,000</td>
</tr>
<tr>
<td><strong>Revenues</strong></td>
<td>$ -</td>
<td>$ -</td>
<td>$ 130,000</td>
<td>$ 260,000</td>
<td>$ 260,000</td>
</tr>
<tr>
<td><strong>Cost of Goods Sold</strong></td>
<td>-</td>
<td>1,324</td>
<td>73,673</td>
<td>130,094</td>
<td>130,047</td>
</tr>
<tr>
<td>Gross profit</td>
<td>-</td>
<td>(1,324)</td>
<td>56,327</td>
<td>129,906</td>
<td>129,953</td>
</tr>
<tr>
<td><strong>Operating Expense</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External R&amp;D</strong></td>
<td>795</td>
<td>1,200</td>
<td>1,440</td>
<td>1,440</td>
<td>1,680</td>
</tr>
<tr>
<td><strong>Product certification</strong></td>
<td>420</td>
<td>600</td>
<td>720</td>
<td>720</td>
<td>720</td>
</tr>
<tr>
<td><strong>Selling, general &amp; administrative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Personnel</strong></td>
<td>2,565</td>
<td>3,024</td>
<td>3,300</td>
<td>3,630</td>
<td>3,993</td>
</tr>
<tr>
<td><strong>External legal &amp; accounting</strong></td>
<td>310</td>
<td>720</td>
<td>960</td>
<td>1,100</td>
<td>1,300</td>
</tr>
<tr>
<td><strong>Chemical registration</strong></td>
<td>240</td>
<td>500</td>
<td>600</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td><strong>Marketing &amp; consulting</strong></td>
<td>480</td>
<td>960</td>
<td>1,056</td>
<td>1,056</td>
<td>1,056</td>
</tr>
<tr>
<td><strong>Office overhead</strong></td>
<td>143</td>
<td>192</td>
<td>204</td>
<td>204</td>
<td>204</td>
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<tr>
<td><strong>Rent</strong></td>
<td>158</td>
<td>186</td>
<td>240</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td><strong>USDA royalty</strong></td>
<td>750</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>-</td>
</tr>
<tr>
<td><strong>Insurance</strong></td>
<td>48</td>
<td>71</td>
<td>150</td>
<td>156</td>
<td>150</td>
</tr>
<tr>
<td><strong>Travel &amp; conferences</strong></td>
<td>300</td>
<td>620</td>
<td>720</td>
<td>720</td>
<td>720</td>
</tr>
<tr>
<td><strong>High-Oleic Soybean Oil</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Research &amp; development</strong></td>
<td>1,215</td>
<td>1,800</td>
<td>2,160</td>
<td>2,160</td>
<td>2,400</td>
</tr>
<tr>
<td><strong>Total operating expense</strong></td>
<td>6,209</td>
<td>9,073</td>
<td>10,390</td>
<td>10,866</td>
<td>10,663</td>
</tr>
<tr>
<td><strong>EBITDA</strong></td>
<td>(6,209)</td>
<td>(10,397)</td>
<td>45,937 35%</td>
<td>119,040 46%</td>
<td>119,290 46%</td>
</tr>
</tbody>
</table>

**BT’s initial commercial plant:**

- **CapEx Cost**: Approx. $90mm
- **Revenues**: Approx. $260mm
- **EBITDA Once Sold-Out**: Approx. $120mm ... per year!
- **Market share of lubricants mkt.**: 0.20% (two tenths of one percent)
Biosynthetic Technologies is Working with Many of the Largest Global Manufacturers of Automotive and Industrial Lubricants

- 60+ major national and international lubricant companies are evaluating BT's biosynthetic oils.
- Most are formulating/certifying finished products they expect to sell under their brand names
- Majority of the global top 12 lubricant manufacturers are engaged with BT
- Numerous equipment/machinery and automaker OEMs evaluating & testing BT based lubricants for factory fill or for private label distribution
- 3 of the top global additive companies engaged in numerous product categories
- Fleet testing being performed by multiple PCMO majors.

Global lubricant demand by product type, 2011

- Automotive oils 56%
- Process oils 10%
- Industrial oils 26%
- Metalworking fluids & corrosion prevention 5%
- Greases 3%

Biosynthetic Technologies Customers:
With limited marketing, BT currently has...
Opportunities in Personal Care, Home Care, Plasticizer
Other Chemical Applications

**Personal Care**
- CocoEstolide is a Biosynthetic ester used in skin care, decorative cosmetics and hair care
- Benefits include:
  - Superior shelf life (up to 10x)
  - Outstanding hydration
  - Long lasting moisturization
  - Pleasant “silky” feel
  - Improves skin barrier function
  - Fast absorption and increased shine
- Multiple major brands testing CocoEstolide in skincare, hair care and decorative cosmetics applications
- Exceeds performance of competing materials in clinical & sensory tests

**Other Green Chemistries**
- BT co-funds other green chemistry projects at the USDA-ARS (where Estolides were invented)
  - BT has first rights to license IP that comes from these projects
- BT is also working with four research labs on additional green chemistries
  - Products will be complementary to the lubricants and chemicals sectors

**Plastics**
- A modified estolide molecule shows promise as a non-toxic, high-value plasticizer
  - Under an MOU, BT is working with a top five global plastics co. to develop this opportunity.
Conclusion

1. Game-changing technology with broad and deep intellectual property position
2. Industry leading strategic corporate investors/partners
3. Proven low cost manufacturing process using common equipment multiple low cost feed stocks and inexpensive catalyst  (Commercial demonstration facility is online)
4. Versatile molecule class ready for immediately use in the $120 billion lubricants sector, and other large industries thereafter
5. Extensive industry validation and interest

Increasing OEM requirements for higher performance oils and government regulation are driving strong demand for these products