2020 Webinar Series
Hosted by South Shore Clean Cities & Wisconsin Clean Cities

Biobased Engine Oil & Fleet Product Options
Biosynthetic Technologies is a US based innovative company. Dedicated to providing BIO-based alternative to petroleum products.

WHERE SUSTAINABILITY AND PERFORMANCE CONVERGE

Our Vision
To deliver Innovative Solutions for a Sustainable Future.

Our Mission
To be the Premier Synthetic Base Fluid Supplier Across a Variety of Specialty Markets.
After Almost a Decade, Biosynthetic® Technologies Has Been Repositioned for Commercial Success

- **Vision** - To deliver Innovative Solutions for a Sustainable Future.
- **Mission** - To be the Premier Synthetic Base Fluid Supplier Across a Variety of Specialty Markets.

- Stand-alone & independent entity
- Supportive & near-adjacent investors
- Employee engagement & ownership
- Providing solutions to long-time biobased issues
What are Prevalent Industry Challenges and Driving Forces?

- Lubricant Leaks and Spills
  - Difficult to prevent
  - Unplanned, sudden
  - Must be fixed, cleaned up

- Consequences of Spills
  - Lost productivity
  - Costly remediation, fines
  - Damage to environment
  - Negative community PR
Risk Exposure from the Extraordinary and the Everyday

Big spills get more coverage

Small spills can be more damaging

“Keep me out of the headlines”
Biolubes Can Help
Biolubes Have Been Used Since the Dawn of Time
But Only Recently Have Biolubes Been Able To Withstand The Tortures And Extremes Of Modern Applications.

- Oxidative and Thermal Stability
- Wear Protection
- Long Term Durability Testing
- Wet and Dry Testing
- Frequent Retest Requirements
- Component Review
Biobased Technology Has Also Changed
We’re Better and Smarter 😊

- Improved Formulation
  - Specifically designed for equipment
  - Extensive testing
- Improved Compatibility
  - Components
  - Contamination
- Improved Application
  - The right product for the right application
- OEM Approved
  - Years of field proven performance
More People Are Setting Higher Goals for Sustainability

- Sustainability Goal #1 **Renewable**
- Sustainability Goal #2 **Safe for the Environment**
- Sustainability Goal #3 **Performance**
- Sustainability Goal #4 **Cost**

- **Carbon Footprint**
- **Lifecycle Assessment**
- **Social Impact**
- **Economic Impact**

Products with High Bio-content
- High Bio-degradability, Low Toxicity, Low Bio-accumulation
- Must be equal or better than Petroleum based products
- Comparable Price Points
We Believe in Circular Sustainability

Carbon Negative Manufacturing

- Raw Materials
  - Sustainable both from an Environmental and Social Analysis:
    - Farmland not suitable for competing food crops
    - Crop can be harvested multiple times in a single planting

Sustainable Agriculture

- Manufacturing Impact
  - For each 1 MT of BT Product -9.16 Tons of CO2 is absorbed.

- Material Handling
  - Fields, crushing, processing, and shipping locations are integrated in a small geographical region to minimize transportation effects on CO2 use.

- Manufacturing Process
  - Primary Production Facility Energy produced from:
    - Wind Farm
    - Boilers utilizing spend Castor Cake from Oil Crushing

Sustainable Economically

Lifecycle study conducted by Gujarat Agriculture University, Dantiwada and Pandam Environmental consultancy laboratory, Baroda, India. A full life cycle assessment report can be delivered upon request for CO2, Water, NOx, SOx, COD, and TDS impacts from production.
There are Many Eco Label Specifications

- VGP 2013 US EPA
- USDA Biopreferred
- CEN TC19 WG 33
- Ecolabel EU
- Nordic Swan
- German Blue Angel
- Japan Eco Marek no. 110
- OSPAR North Sea
ISO 6743/4 Environmental Fluids Classifications:

- Hydraulic Environmental Triglycerides (HETG)
- Hydraulic Environmental Polyalkylene Glycols (HEPG)
- Hydraulic Environmental Synthetic Esters (HEES)
  - Novel Secondary Esters - Estolides
- Hydraulic Environmental PAO (polymethylene oxides) and related products (HEPR)
- Undefined
  - EcoHydrocarbons (Renewable Hydrocarbons)
What to Look For in a Biolube

- Sustainably Sourced
- Biodegradability
- Ecotoxicity
- Bioaccumulation
- Oxidative Stability
- Hydrolytic Stability
- Wear/Extreme Pressure Protection
- Seal/Hose/Elastomer Compatibility
<table>
<thead>
<tr>
<th>Class</th>
<th>Typical Performance</th>
<th>Biodegradability</th>
<th>Seal &amp; Hose Compatibility</th>
<th>Water Tolerance</th>
<th>Limitations</th>
<th>Application</th>
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</thead>
<tbody>
<tr>
<td>Petroleum</td>
<td>Good</td>
<td>No</td>
<td>Good</td>
<td>Good</td>
<td>Environmental</td>
<td>No chance of leakage</td>
</tr>
<tr>
<td>HEPG</td>
<td>Weak</td>
<td>Mixed</td>
<td>Very Poor</td>
<td>Miscible</td>
<td>Incompatible with many seal materials. Absorbs moisture. Prices vary</td>
<td>Fire hazard, especially designed system</td>
</tr>
<tr>
<td>HEPR</td>
<td>Excellent</td>
<td>Some</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Expensive</td>
<td>Heavy duty, chance of contamination</td>
</tr>
<tr>
<td>Estolide</td>
<td>Excellent</td>
<td>Readily</td>
<td>Good</td>
<td>Good</td>
<td>Oil phase water</td>
<td>Heavy duty, wide range</td>
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</table>
There are Many Sustainable Applications In Clean Fleets

- Engine Oils
- Hydraulic Fluids
- Gear Oils
- Drive Line Oils
- Greases
- Tractor Fluids
- Cleaners
- Absorbants
Biobased Synthetic PCMO
Providing Fully Formulated PCMO R&D Assistance

• API SN-RC certification on a 5W-20 and 5W-30 motor oil
• 5W-20 and 5W-30 grades represent 79% of all motor oil sold in the U.S.
• “SN-RC” is the highest performance standard issued by the API
• Meets the International Lubricant Specification Advisory Committee (ILSAC) GF-5 performance standard
• Available for Sampling as of 8/1/2019
• Available for sales through Amazon as of 9/1/2019.
**Enhanced Engine Cleanliness**

- 150,000 mile (241,402 km) taxi cab field trial under severe stop and go conditions in Las Vegas Nevada, USA
- Engines run on Estolide-based formulations under severe stop and go conditions had far less varnish
Conclusions

- Making the determination to change to environmentally considerate lubricants one should consider many factors
- A biolube can be more expensive initially but can save money in the long term
- Biolube have been proven in the field and can perform as well as petroleum
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Biobased Products for Fleets

Presented by Chris V. Case

Facilities and Fleet Manager, Retired
Consultant, United Soybean Board
What Is the United Soybean Board?

- Established in 1991
- Funded by Soybean Farmers
- Represents over 681,000 soybean producers
- Supports development of biobased products
- Governing Board - 73 Volunteer Farmer-Leaders
- Supports Soy Marketing, Research and Commercialization
What Are Biobased Products?

- Products made from biological materials, including renewable agricultural, forestry, and marine materials.
- Soybeans are one source of these materials; others are corn, sugar cane, plant residues, wood, etc.
Did You Know?

- Vegetable Oils have better lubricating qualities than petroleum oils.

- Vegetable Oils have greater solvency than petroleum oils.

- Vegetable Oils are more readily biodegradable than petroleum oils.
Biobased Products made from Vegetable Oils are:

Equal to, and in many applications, better performing than petroleum based products
Biobased Products made from Vegetable Oils are:

When compared to commonly used shop products, are typically safer for employees to use than petroleum based products.
Biobased Products made from Vegetable Oils are:

Typically found to be more readily biodegradable and less toxic to the environment than petroleum based products.
Who Uses Them?

In use at Pictured Rocks National Lakeshore since 1998 when “Demonstrating” the use of biobased products in Maintenance and Fleet Operations began
Bio-Diesel (B-20)

Diesel Trucks and Heavy Equipment
Reduced Particulates and GHG emissions

Including Successful Cold Weather Testing
Soy Hydraulic Fluid

- Dump Trucks
- Snow Plows
- Backhoe/Loaders
- Vehicle Lifts

Less “intense Clean-up in event of a spill/release
Soy Trans-hydraulic Fluid

- Backhoe/Grader and Crawler/Dozer
- Utility Tractors
Soy Trans-hydrostatic Fluid

Tractor/Mowers

Protect your grounds areas in event of spills/leaks
Soy 2-Cycle Engine Oil

- Mower/Trimmers
- Snowmobiles
- Chainsaws
Soy 2-Cycle Engine Oil

Patrol Boat Outboard Motors

It’s like dumping motor oil directly into the Lake
Chain oil goes directly from the chain into the environment!
Soy #2 Chassis Lubricant
Soy Parts Washing Fluid

- 300 degree flash point
- Low VOC and health hazard
- Performance equal to petroleum solvents
Soy Penetrating Lubricant

- Penetrates threads
- High flash point
- Low evaporation
- Residual lubrication
- Water displacing
Soy Crankcase Oil

For more than 12 years Pictured Rocks National Lakeshore successfully demonstrated the year-round use of soy-biobased engine oil in Diesel and Gas engine vehicles.
Soy Cleaners and Solvents

A wide variety of soy-biobased cleaning products are also available.
Biobase a “Green” Vehicle

The NY/NJ Port Authority and Logan Airport have completely “greened” equipment by replacing all fluids and lubricants in selected equipment with biobased products including engine oil.
Soy Oil Now in Goodyear Tires

- Replaces 60% of Petroleum Oil in Tire
- Better Flexibility & Traction at Low Temperatures
- Improves Manufacturing Efficiency & Energy Use
Consider the Benefits of Biobased Products

- Proven Performance
- Improved Employee Health and Safety
- Increased Environmental Stewardship

All Reasons to Try Biobased Products in Your Fleet
How to Find Biobased Products

USB Website

www.soybiobased.org
Thank You For Your Efforts
How can the USB and I help?

Chris V. Case
Biobased Coach

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(906) 553-2511
Visit motoroil.biosynthetic.com/ for more information and place your order!

Available in 5W20 or 5W30

Use coupon code SSCC20 for 20% off your 6 pack!
Questions? Contact Us!

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