COMPANY PROFILE

Biosynthetic Technologies

Manufactures biosynthetic base oils for lubricant applications

WHAT YOU NEED TO KNOW

- Continuous flow technology to modify the structure of oleic acids via a catalyst-driven chemical reaction to produce biosynthetic base oils; primary product is its Biosynthetic Oil, which is used to displace petroleum synthetic oils used in motor oils and industrial lubricants
- Operates from 25,000 gallon/year demonstration facility in Baton Rouge, LA
- Received commitment for $115 million government loan guarantee at the beginning of 2016 for its first 20 million gallon/year commercial facility; requires an additional $35 million to achieve the necessary $150 million to begin construction, which it targets to begin in Q4 2016
- Partners include Albermarle, Jacob's Engineering, and Infineum; investors include BP, Evonik, Monsanto, and Sime Darby
- States a viscosity index of 165, an oxidative stability of 1600, a lower evaporation rate, and improved lubricity compared to incumbent petroleum base oils
- Clients interested in the synthetic lubricants sector should look to engage with Biosynthetic Technologies, as company is in a strong position within the lubricant base oil market

LUX TAKE

STRONG POSITIVE

POSITIVE

WAIT AND SEE

CAUTION

STRONG CAUTION

STAGE OF DEVELOPMENT

Development

AT-A-GLANCE

http://biosynthetic.com/

Address: 17571 Von Karman Avenue Irvine, CA 92614

Country: United States

Coverage Area: Bio-based Materials and Chemicals

Categories: Bio-oil and bio-oil derivative products; Bio-oil feedstocks; Improvement BBMC products; Drop-in BBMC products

Year Founded: 2009

Business Model: Sells product

Employees: 15

Cash: $3,000,000*

Profitable: No

Revenue: $0*

* Indicates Lux Research estimated value

Scorecard

TECHNOLOGY/SOLUTION VALUE	4	Claims performance improvements compared to petroleum-based lubricants and motor oils, and boasts advantages, such as increased oxidative stability, low volatility, high viscosity index; also claims to lower cost of production compared to incumbents
ADDRESSABLE MARKET SIZE	4	Base oil market represents a single-digit billion-dollar market; position as manufacturer and seller of base oils maximizes potential market share
COMPETITIVE LANDSCAPE	3	Well placed within competitive landscape; faces direct competition from bio-based lubricant producers like Bioblend Renewable Resources and Environmental Lubricants Manufacturing; also faces incumbent producers, such as Total
BARRIERS TO GROWTH	3	Raising the remaining $35 million required to construct its commercial facility from existing shareholders to achieve the necessary $150 million by Q3 2016 milestone may be challenging
IP POSITION	4	Strong IP position with 34 patents issued within the U.S., 16 patents issued internationally; roughly 50 patent applications currently pending; company owns any IP that comes from its relationship with Albermarle; IP covers molecular structure, and manufa
REGULATORY FACTORS	5	EPA regulations in North America should help market adoption of company's lubricant products
MANAGEMENT TEAM	4	Strong management team with extensive experience in business management, strategy and finance, sales and marketing, biochemistry, engineering, lubricants, in addition to prior experience in previous start-up companies
PARTNERSHIPS	4	Partners include Albermarle, Jacob's Engineering, and Infineum; claims to work with three out of the top four motor oil producers within the U.S.; investors includes BP, Evonik, Monsanto, and Sime Darby
MOMENTUM	3	Recieved $115 million government loan guarantee at the beginning of 2016 for construction of its first commercial facility; no other recent announcements
OTHER	4	Allen stated that the company has raised over $50 million since its inception; he claimed its Series A, B, C, and angel investment rounds of funding were all oversubscribed

Key Metrics

METRIC	CATEGORY	VALUE	COMMENT	DATE
Capacity		25,000gal/yr	Company continues to operate from its 25,000 gallon/year demonstration facility in Baton Rouge, LA, with partner Albemarle	April 13, 2016
Cost		$10-$14/gal*	Company states a cost of production of between $5/gallon and $7/gallon at commercial scale; Lux estimates the current cost of production at demonstration scale to be double this	April 13, 2016

* Indicates Lux Research estimated value

History

Biosynthetic Technologies formed in 2009, but its technology was originally developed at the U.S. Department of Agriculture (USDA). Biosynthetic Technologies is the exclusive licensee of this USDA patented technology, and continues to have an R&D relationship with the USDA. Sime Darby, BP, Monsanto, and Evonik are all shareholders in the company.

Technology

Biosynthetic Technologies core technology remains unchanged from when we last spoke (see the October 29, 2014 LRMCJ). The company utilizes continuous flow technology to modify the structure of oleic acids. Biosynthetic Technologies introduces the catalyst into the feedstock after removing the glycerin from the fatty acids and restructures the molecule into an estolide (an entirely new molecule, with structure patented by the USDA) with the fatty acids linked together at the sites of unsaturation. Any un-reacted fatty acids, as well as the catalyst, are recycled back into the system. This ensures 100% of the fatty acids become finished product, and there is little to no loss of catalyst according to Allen. The molecules then undergo esterification to remove any acidity present. The company carries out a final hydrogenation step to remove the remaining double bonds and to ensure that the end product is a fully saturated molecule.

The company uses a variety of feedstocks such as canola oil, soybean oil, algal oil, animal tallow, and palm oil, with the type of feedstock used depending on the geographic location of production. Biosynthetic Technologies uses soybean oil in the U.S., rapeseed oil in Europe, and palm oil in Asia. Allen stated that feedstocks can be interchanged without impacting the end product.

Biosynthetic Technologies' primary end product is its Biosynthetic Oil. The performance of the company's base oils is as good as, or better than incumbent base oils according to Allen. The company claims a viscosity index of 165, an oxidative stability of 1600, a lower evaporation rate, improved lubricity, as well as increasing fuel economy by 3%. Allen stated that the company targets a cost of production of between $5/gallon and $7/gallon at commercial scale. He further noted that the associated feedstock cost accounts for approximately 80% of the cost of production. Biosynthetic Technologies states a selling price of between $10/gallon and $16/gallon for its base oils.

Strategy And Markets

Biosynthetic Technologies positions itself as a manufacturer and seller of base oils for the motor oil and industrial lubricant markets. It provides samples to over 100 customers representing "80% of the largest industrial lubricant companies in North America and Europe," according to Allen, and works with large distributors in Japan. The company works with Infineum on the certification of its Biosynthetic Oils as an ingredient of motor oils with automakers, and claims to work with "three out of the top four" motor oil producers within the U.S.

Allen also noted that while the company's core focus is on the commercialization of its Biosynthetic Oils, it is launching its Cocoestolide product targeting applications within the personal care market. He claimed Biosynthetic Technologies has received interest from personal care companies that have tested this product as a cosmetic ingredient.

Allen said the company continues to operate from its 25,000 gallon/year demonstration facility in Baton Rouge, LA, with partner Albemarle, in preparation for expansion to its 20 million gallon commercial scale facility in 2018. Biosynthetic Technologies requires $150 million to construct and bring this commercial facility online, and was approved for a government loan of $115 million from the "Biorefinery Manufacturing Assistance Program" at the beginning of 2016. The company will look to raise additional funding from existing shareholders to achieve the necessary $150 million, and aims to begin a 20-month construction in Q3 2016, with full-scale production beginning in 2018. Biosynthetic Technologies works with Jacobs Engineering for the engineering and construction of this facility, which according to Allen will be located on the Gulf Coast.

Allen also mentioned that the company is considering constructing a facility in Malaysia due to the abundance of low-cost feedstock, and strong tax incentives offered there. Biosynthetic Technologies has already identified a location for this facility, and has received a 15 tax holiday from the Malaysian government (subject to the commencement of construction).

Key Issues

COMPANY NEEDS TO CONTINUE TO LEVERAGE IMPROVED PERFORMANCE OVER JUST BEING GREEN

What they said

Allen stated that roughly two thirds of Biosynthetic Technologies' clients are interested in the performance of its base oils, rather than on the green aspect of the products.

What we think

Biosynthetic Technologies is in a strong position within the bio-based lubricant space, and following its $115 million loan from the U.S. government, it is poised to begin commercial-scale production of its Biosynthetic Oil and Cocoestolide products. However, it is important to remember that the company still needs to raise $35 million to achieve the $150 million necessary to begin construction of its commercial facility. It will also need to raise the working capital to fund the company during construction. In the current climate of low oil prices, and with the availability of cheap incumbents on the market at this time, raising such an amount will be no easy feat.

With that in mind, Biosynthetic Technologies needs to continue to leverage its improved performance characteristics compared to incumbents. The company claims a viscosity index of 165, an oxidative stability of 1600, a lower evaporation rate, and improved lubricity compared to incumbents, as well as increasing fuel economy by 3%. Biosynthetic should look to emphasize such value to potential investors, and avoid pigeonholing itself as "just" a bio-based alternative to an existing product. In doing so, Biosynthetic Technologies will be in a good position to attract the capital it needs to construct and operate its commercial facility.

Key Relationships

PARTNER	TYPE	IMPORTANCE	COMMENT

Infineum	Development partner	minor
United States Department of Agriculture (USDA)	Technology partner	minor
Jacobs Engineering	Development partner	major
Sime Darby	Investor	major
British Petroleum (BP)	Investor	major
Monsanto	Investor	major
Evonik	Investor	major
Albemarle	Technology partner	major

Competitors

DIRECT COMPETITORS

Elevance Renewable Sciences
Environmental Lubricants Manufacturing
Total
BioBlend Renewable Resources

INDIRECT COMPETITORS

Green Earth Technologies
GreenMantra
Novamont

Also mentioned in

DATE	TYPE	TITLE
August 6, 2014	Analyst Insight	Evonik invests in Biosynthetic Technologies, as confidence in biolubricants increases
August 6, 2014	Analyst Insight	Evonik invests in Biosynthetic Technologies, as confidence in biolubricants increases
September 4, 2013	Analyst Insight	The retrofit model employed again as Blue Marble Biomaterials buys site for next biorefinery

Coverage history

DATE	TITLE	INTERVIEWEE(S)
April 13, 2016	Biosynthetic Technologies	Allen Barbieri (CEO)
October 29, 2014	Biosynthetic Technologies	Allen Barbieri (CEO)
July 24, 2013	Biosynthetic Technologies	Allen Barbieri (CEO)
July 11, 2012	LubriGreen BioSynthetics	