Growing the Future Bioeconomy

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July 2014
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The Industrial Bioscience Company

✓ Proven technology, multiple molecules
✓ Operating at industrial manufacturing scale
✓ Differentiated & proven business model

KEY COMPANY HIGHLIGHTS

• Founded in 2003 by post-doctoral fellows from the University of California, Berkeley.
• Headquartered in the San Francisco Bay Area and with operations in Brazil
• 395 full-time employees (27% of US employees are PhDs)
• Over 135 issued patents and nearly 300 pending applications

LEADING INVESTORS
What We Do

Target Market Characteristics

Build Strains
- Millions strains per month

Test Strains and Processes
- 120,000 strains per month
- 60 strains per month
- 2 strains per month

Manufacture
- 2 to 4 strains per year

Price & Supply Volatility

Cosmetics
- Cosmetic Emollients

Aromas
- Flavors & Fragrances

Perf. Materials
- Polymers
- Solvents and Fluids

Fuels
- Diesel
- Jet Fuel

Lubricants
- Base Oils
- Finished Lubricants

LEADING COLLABORATION PARTNERS

Target Market Characteristics

- Cosmetic Emollients
- Flavors & Fragrances
- Polymers
- Solvents and Fluids
- Diesel
- Jet Fuel
- Base Oils
- Finished Lubricants

Consumer Demand for Naturals

- Need for Higher Performance at Competitive Price

- Price & Supply Volatility

- Cosmetic Emollients
- Flavors & Fragrances
- Polymers
- Solvents and Fluids
- Diesel
- Jet Fuel
- Base Oils
- Finished Lubricants
Industry Leading Product Portfolio

**CONSUMER CARE**
- COSMETICS
  - squalane
  - hemi squalane
  - fragrance oils

**AROMAS**
- polymers
- solvents
- adhesives & coatings

**PERFORMANCE MATERIALS**
- diesel
- jet

**RENEWABLE MOBILITY**
- engine
- transformer
- hydraulic

**LUBRICANTS**
- jet
- transformer
- hydraulic

**Brands**
- SEPPIC
- NIKKOL
- SAFICALCAN
- Dowell C&I
- Laserson
- Takasago
- Givaudan
- IFF
- Firmenich
- Kuraray
- Michelin
- Novvi
- Total
- Cosan
Current Addressable Markets

- Emollients, Moisturizers, Film Formers: $4B
- F&F Ingredients: $9B
- Elastomers and Synthetic Rubbers & Plastic Additives: $18B
- Auto & Industrial Lubricants: $40B
- Bulk Polymers, Coatings, Adhesives and Polyolefins: $123B
- Jet Fuel: $212B
- Diesel Fuel: $1.6T

Over $100 Billion Addressable Market at Current Commercial Performance

$1 Trillion + Total Addressable Market Ahead
Amyris Living Factories

SUGARCANE

ETHANOL

phosphoenol-pyruvate
pyruvate
acetaldehyde

Acetyl CoA

Isoprenoid Synthesis
IPP/DMAPP
GPP
FPP

monoterpenes
sesquiterpenes

FARNESENE
FRAGRANCE OILS
VITAMINS
PHARMACEUTICALS

YEAST CELL
“Baker’s Yeast”
Saccharomyces cerevisiae

ISOPRENE

Amyris Living Factories

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The Global Aviation Industry’s Goals

Amyris & TOTAL fully support the global climate action targets of the aviation industry. We are helping achieve these goals with the launch of our renewable jet fuel.
AMYRIS FUELS STRATEGY

MARKET
World market for diesel and jet fuel is over $1.5 trillion currently, with considerable growth in emerging markets as consumption and mobility increase.

OPPORTUNITY
Increasing pressure for cleaner-burning renewable fuels creates opportunity for introducing drop-in fuels, initially in niche markets.

SOLUTION
Amyris Diesel and Jet fuels are designed to be drop-in, cost competitive replacements for fossil fuels, compatible with existing engines yet with superior performance.

EXECUTION
- Tests carried out by Mercedes-Benz, MAN, Cummins show a significant reduction in the emissions of particulate matter and oxides of nitrogen (NOx) with as little as 10% blends of Amyris Diesel. About 400 public transit buses use Diesel de Cana® in Brazil everyday.
- Following multiple successful demonstration flights and testing, our jet fuel received ASTM certification in June. Commercial flights beginning now.
Amyris has amended its standard for jet fuel to permit 10% blends of our renewable farnesane in Jet A/A1.

Lifecycle analysis indicated our renewable jet fuel can reduce emissions by over 80% when compared with conventional jet fuel.

Amyris has jet-grade farnesane ready for delivery and is in discussions with multiple airlines for long-term supply agreements.
Environmental Benefits

Amyris – Total Renewable Jet Fuel produced from sugarcane reduces GHG emissions by 80% thanks to its superior land use efficiency.

And with cellulosic sugars, we will produce even more renewable farnesane per hectare of land, further reducing emissions.

That’s a sustainable path.

NOTE: Amyris Biofene at target yield production
The New Standard for Renewable Jet Fuel

- Environmental Benefits for the Airline Industry
- Validated Drop-in Properties
- Proven Performance
- Superior Land-use Efficiency
- Viable Economic Business Model
FEEDSTOCK
Sugarcane

- Brazil is the world’s largest cane producer, twice #2 India
- Brazil’s South-Central region accounts for 90% of country’s cane harvest
- Brazil’s sugarcane sugar yields have grown at 3% CAGR since late 1970s
Lignocellulosic Conversion

National Advanced Biofuels Consortium
Conversion of Cellulosic Sugars into Diesel
*Amyris-led process strategy*

Feedstock Supply  Pretreatment & Hydrolysis  Clarification & Concentration  TEA LCA  Fermentation of C5 & C6 Sugars  Farnesene Recovery & purification  Product Finishing & Blending

Institutes and Partners:
- Iowa State University
- Washington State University
- PALL
- Argonne National Laboratory
- NREL
- Amyris
- TESORO
- Catchlight Energy

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Cellulosic Diesel Pilot Runs Completed

3/4” Hammer Milled Corn Stover

Dilute Acid Pretreatment; Enzymatic Hydrolysis

Solids Clarification (Cross-flow filtration)

300 L fermentation

Vacuum-assisted Concentration

Image courtesy of Idaho National Laboratory (INL) Bioenergy Program (www.inl.gov/bioenergy) (corn stover image); Other images courtesy of NREL (http://www.nrel.gov/biomass/integrated_biorefinery_research_facility.html)
Amyris Yeast Consumes >98% of the Xylose

- Final C5/C6 farnesene strain consumes >98% of the xylose
  - Strain co-consumes glucose and xylose in the aerobic fermentation
  - First use of a xylose isomerase at Amyris
  - 5 FTE’s and 9 months

Next Steps

1. Identify toxicity of concentrated hydrolysates
2. Explore new feedstocks/pretreatments
3. Focus on techno-economics, deployment strategies

0.5 L Fermentations, defined minimal media, 300 g/L glucose + 150 g/L xylose
CONCLUSION
Enabling the Bioeconomy

- Leader in industrial bioscience, transforming how materials are made across all sectors and the technology enabling sustainable growth for the world’s leading brands.
- Successfully scaled its biotechnology platform at its own industrial scale plant using sugarcane and ready for cellulosic sugars.
- Strong pipeline that supports long-term profitability and growth built on commercialization of first three molecules.
## Renewable Jet Fuel Properties

<table>
<thead>
<tr>
<th>Product</th>
<th>Amyris-Total Jet</th>
<th>Kerosene Jet A1¹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fuel Origin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renewable Farnesane</td>
<td>Biomass from Sugarcane</td>
<td>Fossil</td>
</tr>
<tr>
<td><strong>Key Properties</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash Point, °C</td>
<td>&gt;100</td>
<td>40.5 to 46.0</td>
</tr>
<tr>
<td>Net heat of Combustion, MJ/kg</td>
<td>&gt; 43.50</td>
<td>43.073 to 43.445</td>
</tr>
<tr>
<td>Particulate Emissions</td>
<td>Reduction Potential¹</td>
<td>No reduction potential foreseen</td>
</tr>
<tr>
<td>Freezing Point, °C</td>
<td>&lt;= -100</td>
<td>-89.4 to -49</td>
</tr>
</tbody>
</table>

Farnesane is a pure drop-in long-chain hydrocarbon molecule with category defining attributes in the renewable jet fuel segment, such as heat of combustion and freezing point.

¹ Lufthansa report, Engine Emission Ground-Tests with Jet A-1 / Farnesane Blends
² Method ASTM D7193 (automatic freezing point)
Farnesane Aviation Grade Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>SIK</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hydrocarbon Composition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturated Hydrocarbons, mass %</td>
<td>Min</td>
<td>98</td>
</tr>
<tr>
<td>Farnesane, mass %</td>
<td>Min</td>
<td>97</td>
</tr>
<tr>
<td>Hexahydroxyfarnesol, mass %</td>
<td>Max</td>
<td>1.5</td>
</tr>
<tr>
<td>Olefins, mgBr₂/100 g</td>
<td>Max</td>
<td>300</td>
</tr>
<tr>
<td>Aromatics, mass %</td>
<td>Max</td>
<td>0.1</td>
</tr>
<tr>
<td>Carbon and Hydrogen, mass %</td>
<td>Min</td>
<td>99.5</td>
</tr>
<tr>
<td><strong>Non-hydrocarbon Composition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen, mg/kg</td>
<td>Max</td>
<td>2</td>
</tr>
<tr>
<td>Water, mg/kg</td>
<td>Max</td>
<td>75</td>
</tr>
<tr>
<td>Sulfur, mg/kg</td>
<td>Max</td>
<td>2</td>
</tr>
<tr>
<td>Metals (ppm)</td>
<td>Max</td>
<td>0.1 per metal</td>
</tr>
<tr>
<td>Halogens (Cl, Br, I, F), mg/kg</td>
<td>Max</td>
<td>1 per halogen</td>
</tr>
</tbody>
</table>

- Farnesane aviation grade is a pure hydrocarbon grade
- Farnesane aviation grade meets compositional specifications of SPK (Table A1.2, ASTM D7566)
- Analytical GC-FID method has been developed to measure and control the purity of farnesane aviation grade (to be converted in an ASTM method)
Economic Viability

- Operation at full scale (plant operation)
- Increase plant capacity as technology increases productivity
- Integrated production model
- Transformation efficiency
- Integrated feedstock supply
- Access to cellulosic feedstock

Today mid term

Crude @ 150$/BBL

Crude @ 80$/BBL (ex)

Feedstock and other variable costs
Fixed costs and CapEx amortization