GLOBAL BIOENERGIES

The Isobutene process: short term opportunity and long term potential

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Eligible to SRI investments

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These factors include, among other things, commercial, technical and other risks e.g. associated with estimation of the price of carbohydrate resources, the meeting of development objectives and other investment considerations, as well as other matters not yet known to the Company or not currently considered material by the Company.

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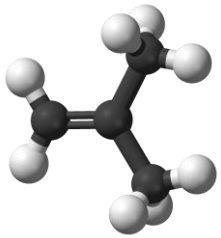
Mission

We prepare a more socially and environmentally responsible world for the next generation

Producing bio-isobutene



We have developed a unique, innovative process to convert renewable resources into isobutene, a platform molecule widely used in cosmetics, and also offering a clear opportunity for renewable jet fuel

Why Isobutene?

- On the short term, with oil price < $120/bbl, renewable products are more expensive than their oil-based equivalents.

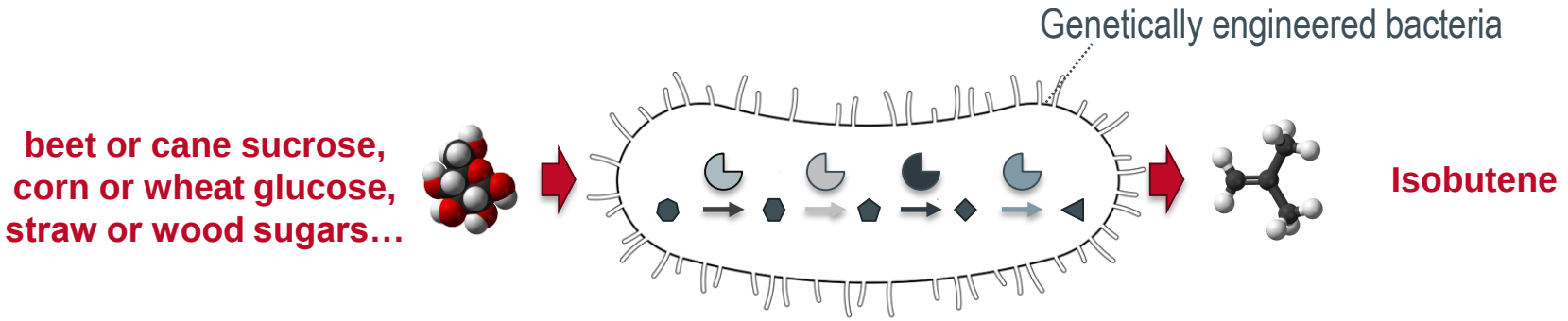
  → Need to target markets where bio-based products are sold with a high price premium

  → Isobutene is THE molecule with the largest high-premium market: tens of thousand tons in the cosmetics, sufficient for several plants

- On the longer term, with a higher oil price and/or increasing commitments from States to preserve the environment, bio-based isobutene could become core for sustainable air transportation.

Unique Science and strong IP

- We have engineered bacteria to convert renewable resources into isobutene, a gaseous 4-carbon building-block molecule traditionally derived from fossil oil (>15 million tons per year)



- No biological starting point because Isobutene is not produced in Nature → We created an artificial metabolic pathway, first ever. Huge technology barrier overcome.
- First ever fermentation process to a gas. Brings key benefits: abrogation of product-to-strain toxicity and simple purification scheme.
- Metabolic and chemical engineering breakthroughs covered by an IP fortress surrounding a know-how citadel.

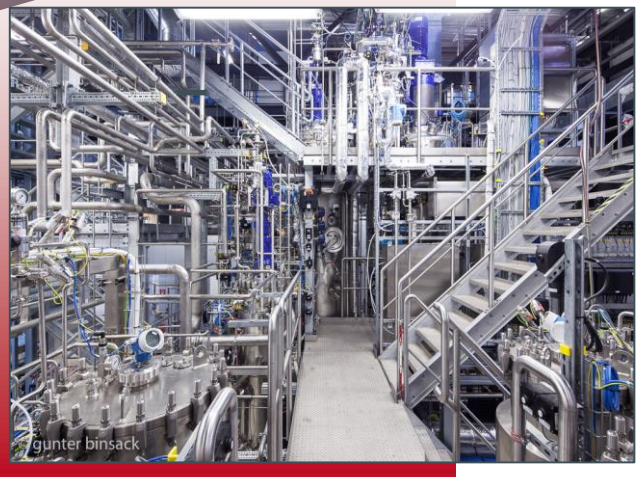
The technology is now mature

- 2018: Major breakthroughs achieved at lab-scale on yield and productivity
- Scale-up efforts in progress at pilot and demo scale

2012
R&D in Evry, France
40L

2015
Pilot plant in Pomacle, France
500L

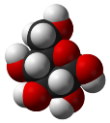
2017
Demo plant in Leuna, Germany
5,000L



Commercial plants

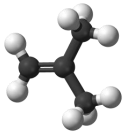
Two main opportunities

Industrial sugars



Our fermentation process

High value renewable isobutene

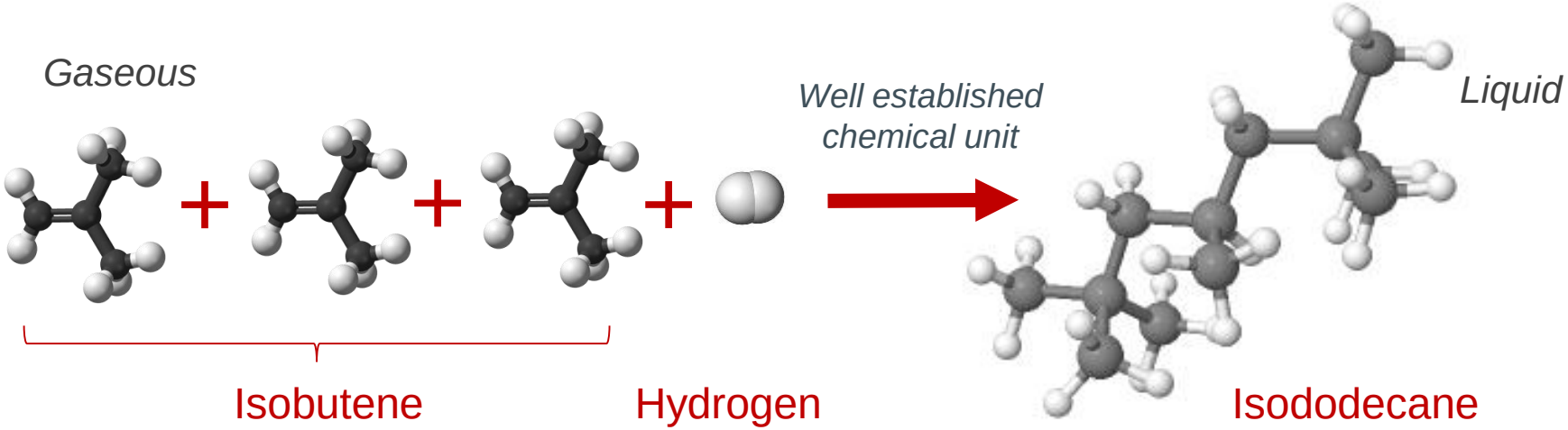


Well established chemical units

High performance cosmetics from natural origin

Renewable, sustainable jet fuel

Cosmetics (1/2)



- Isododecane and other isobutene derivatives are widely used as emollients in cosmetics.
- Combination of high performance AND natural origin
- Price much higher than the price in fuels

Cosmetics (2/2)

- Isobutene derivatives have an existing market in the cosmetics of ~20,000 tons/yr
- Current main emollient for cosmetics is being phased out
- Isobutene derivatives substitute with comparable level of performance
- Cosmetic companies are looking for bio-based compounds to increase their level of naturality
- Collaboration with L'ORÉAL PARIS since 2016
- Market for bio-based isododecane in the cosmetics expected to reach up to 100,000 tons/year within a few years
- Several Letters Of Intent executed with distributors and brand owners for a total of up to 15,000 tons/year with price between €4,000 and 10,000 per ton

Sustainable Jet Fuel

- Jet fuel is the most dynamic segment of the oil industry: +5% per year
- Market of 250 million tons fuel per year almost entirely based on fossil oil
- Only 4 different technologies provide biofuel batches for demonstration flights
- Norway has introduced a 0.5% mandate for Sustainable Aviation Fuel by 2020
- Roadmap for Europe under discussion
- Air shame spreading → need for action
- Massive tax incentives soon expected
- Isobutene derivatives already validated for blending up to 50% into jet fuel

- GBE manufacturing process to be registered using a fast-track process
- One Letter Of Intent executed for up to 10,000 tons/year at a price including a significant premium over fossil Jet Fuel

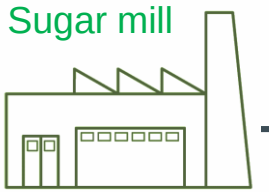
Moving to commercial scale exploitation

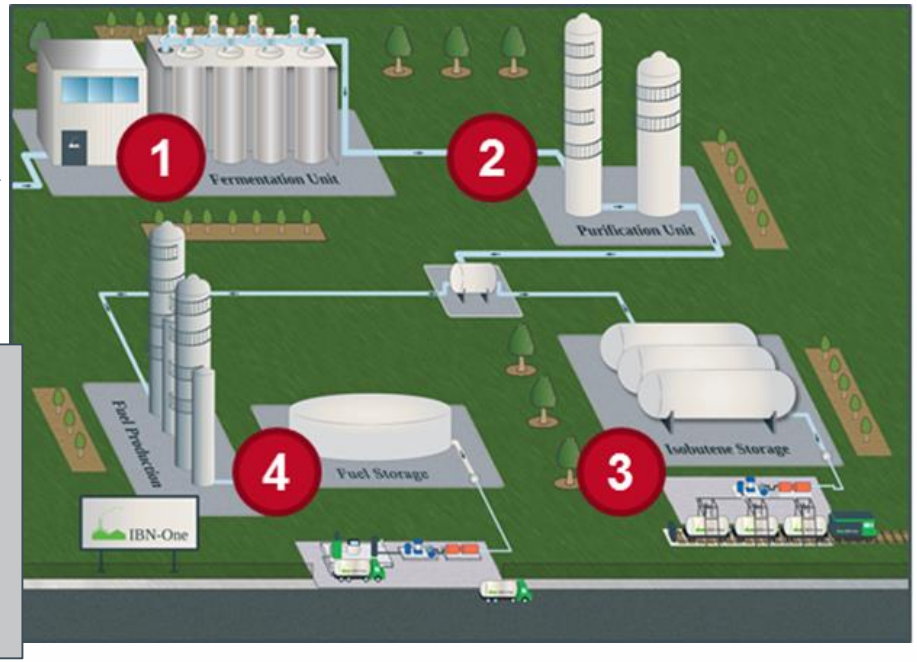
IBN-One, a Joint-Venture with sugar player Cristal Union, has the project to finance, build and operate the first plant

IBN-One
a Joint Venture with CRISTAL UNION

IBN-One: Rationale

Ownership at parity by Global Bioenergies and Cristal Union (#4 player in the European sugar industry - €2.5b in revenues)





1. **Production** – Industrial sucrose is converted into gaseous, low purity isobutene
2. **Purification** – isobutene is isolated from surrounding fermentation gases
3. **Shipping** – Liquid high purity isobutene (99.7%) is stored and shipped for chemical applications
4. **Conversion** – Part of the production is converted on site into cosmetics, bio-fuels and other derivatives

- High availability of sugar because of the end of the European quota system
  → Sugar players are looking for additional markets
- IBN-One's mission is to finance, build and operate the first commercial bio-isobutene plant, thus bridging industrial grade sugar and high-value new markets
- Capacity: 30,000 tons isobutene and derivatives

IBN-One
a Joint Venture with CRISTAL UNION

IBN-One: status update

- GBE and CU already invested €1.5m each in the project
- The French State (Investissements d'Avenir) provided complementary financing
- Engineering: preliminary studies by TechnipFMC and IPSB Ingénierie de Procédés Sucres et Biotechnologies
- CAPEX estimated at €140m
- Preliminary studies were targeting road fuel as the main output
- We are now moving to Cosmetics as main output in order to harness a higher value opportunity → additional engineering studies in progress
- IRR to reach 20% or even more
- Investment bank mandated to get the project financed by infrastructure investors by summer 2020

Business model

- Global Bioenergies' business model is based on licensing: upfront payment and royalties (5% of revenues).
- A business model based on building and operating plants would generate more value, but requires a large capacity to invest in CAPEX.
- Intermediate model: Joint-Ventures, where a part of equity will be retained by GBE and create a dividend stream additive to the royalty stream.
- In the nominal IBN-One case, and if GBE was retaining 25% of the equity, the licensing + dividend streams from the sole IBN-One plant could bring GBE breakeven.

Roadmap

First plant: IBN-One

Mainly cosmetics

Next 2-5 plants (in licensing/JV business model)

Combined cosmetics and jet fuel

Expected start-up of operations between 2023 and 2027

Next X plants (in licensing/JV business model)

Deployment in renewable jet fuel

Expected start-up of operations after 2027

2022: expected date for the start-up of operations, provided that the plant is financed in 2020, and assuming a construction duration of 2 years

Diversifying the feedstocks to reach lower costs and further improve environmental impact

	1G	2G	3G
	Food crops	Wood chips, straw, bagasse	Industrial waste gases
			
	Traditional feedstocks Sucrose: Beet, cane Glucose: corn, wheat	**Advanced feedstocks** Forestry: wood chips Agri : wheat straw, corn stover…	**Emerging feedstocks** Steel mill syngas Concentrated CO_2
Cost of resource			
GHG savings			
Potential partners	Major agricultural players	Forest operators	steel mills and eventually CO_2-emitting industries
	French reimbursable grant €7.4m over 2016-21	European grants - €12.6m over 2017-22	

- €5.7m directly to GBE / €2m already received
- €3.3m to IBN-One / €500k already received (accounted at 50% in consolidation).
- The rest will be received based on expenses + financial and technical milestones (€3.1m already validated and expected within weeks)

€9m already received by GBE. The rest will be received based on expenses and technical milestones

Executive summary

1. A unique Science, based on an innovative Synthetic Biology approach. Strong IP position.

2. The technology is at late development stage: High performances reached. Scale-up in progress.

3. Joint-Venture with Cristal Union with the objective to get the first plant financed, built and operated.

4. Potential to replicate the technology beyond first plant. Aim is bring to life one of the rare technologies for sustainable jet fuel

A seasoned management team…

Executive committee

Marc Delcourt
Chief Executive Officer

Samuel Dubruque
Chief Financial Officer

Macha Anissimova
Chief Scientific Officer

Frédéric Pâques
Chief Operating Officer

Bernard Chaud
Head of Industrial Strategy

Luc Mathis
Chief Business Officer

Frédéric Ollivier
Chief Technical Officer

Vice Presidents

Dr. Richard E. Bockrath
VP Chemical engineering

Former Technical Director at DuPont

Dr. Charles E. Nakamura
VP Metabolic engineering

25 years at DuPont.
Received ACS award in 2007

…backed by a hands-on Board of Directors

John Pierce
Chairman of the Board

Leading American figure of the industrial biology sector, former Chief Bioscientist of BP

Marc Delcourt
Co-founder and CEO

Entrepreneur with a scientific background. Has founded and managed industrial biotechs since 1997

Philippe Marlière
Co-founder

Visionary scientist. Has pioneered the translation of biology into industrial applications

Karine Lignel
Director at CM-CIC Investissement

A trained engineer active in Venture Capital since 2000

Alain Fanet

Entrepreneur and for more than executive 20 years

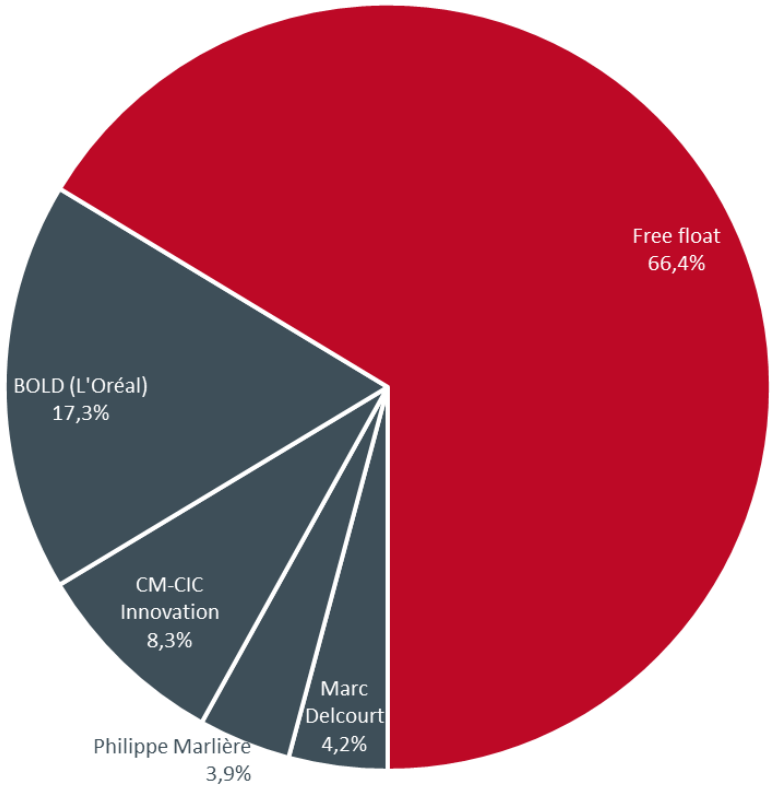
Pierre Lévi

Former CEO of Faurecia and Groupe Salins

Muriel Atias
Chief Investment Officer at BOLD

Observer

Equity and finances



Average daily liquidity	
2012	€16k
2013	€32k
2014	€77k
2015	€96k
2016	€90k
2017	€120k
2018	€137k
2019 YTD	€61k

Existing shares as at July 1st, 2019	8,718,930
+ Dilutive instruments (stock-options, warrants…)	+ 372,884
Fully diluted:	**= 9,091,814**