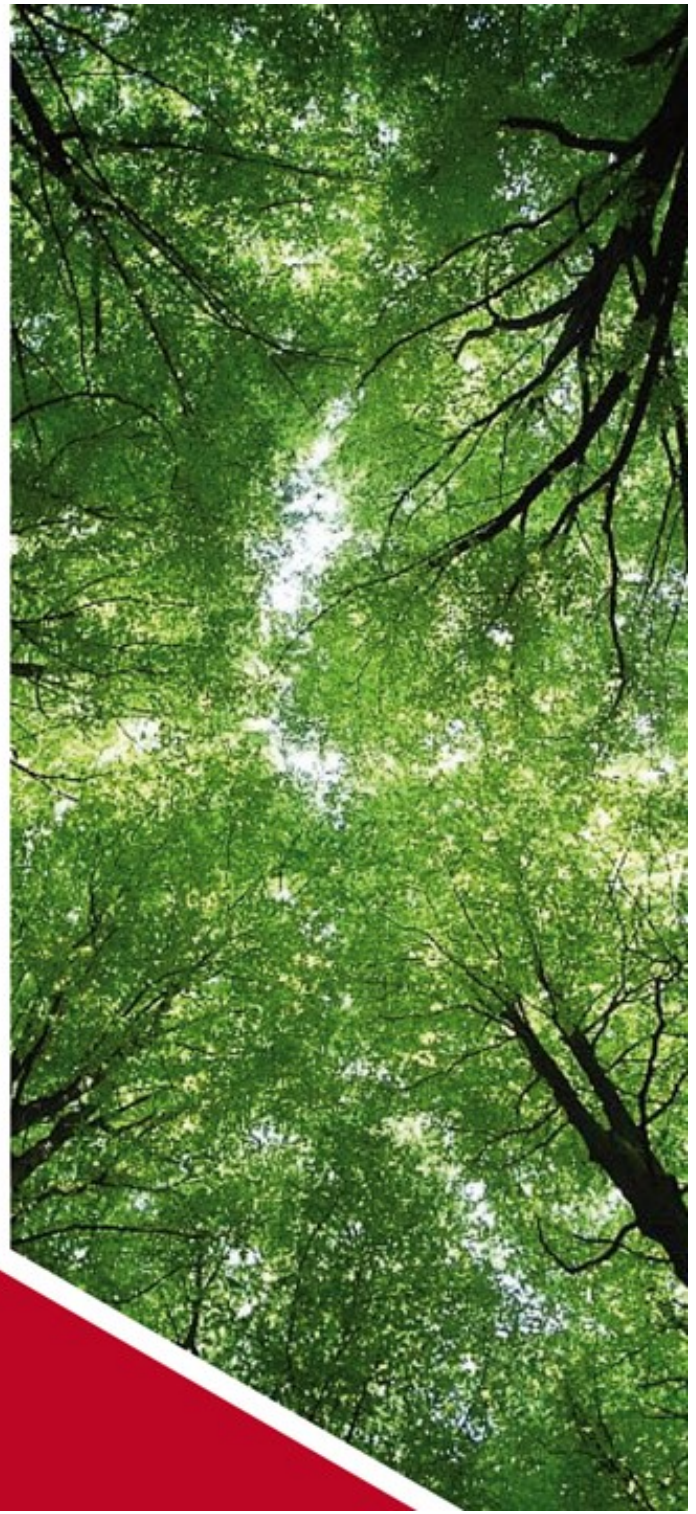
GLOBAL BIOENERGIES

The Isobutene process: short term opportunity and long term potential

Q2 2019



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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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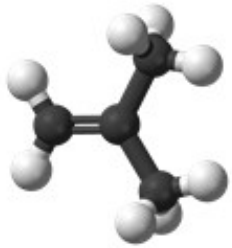
Mission

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 fuels and cosmetics

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

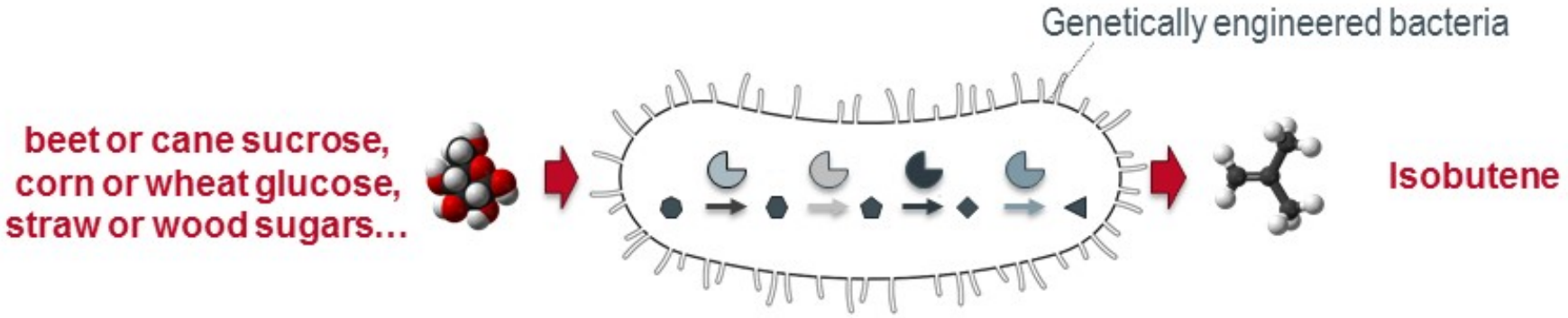
  → Isobutene is THE molecule with the largest high-premium market: tens of thousand tons in the cosmetics, sufficient for several plants

- 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 road and air transportation.

  → Biofuels market to continue its progression

Unique Science and strong IP

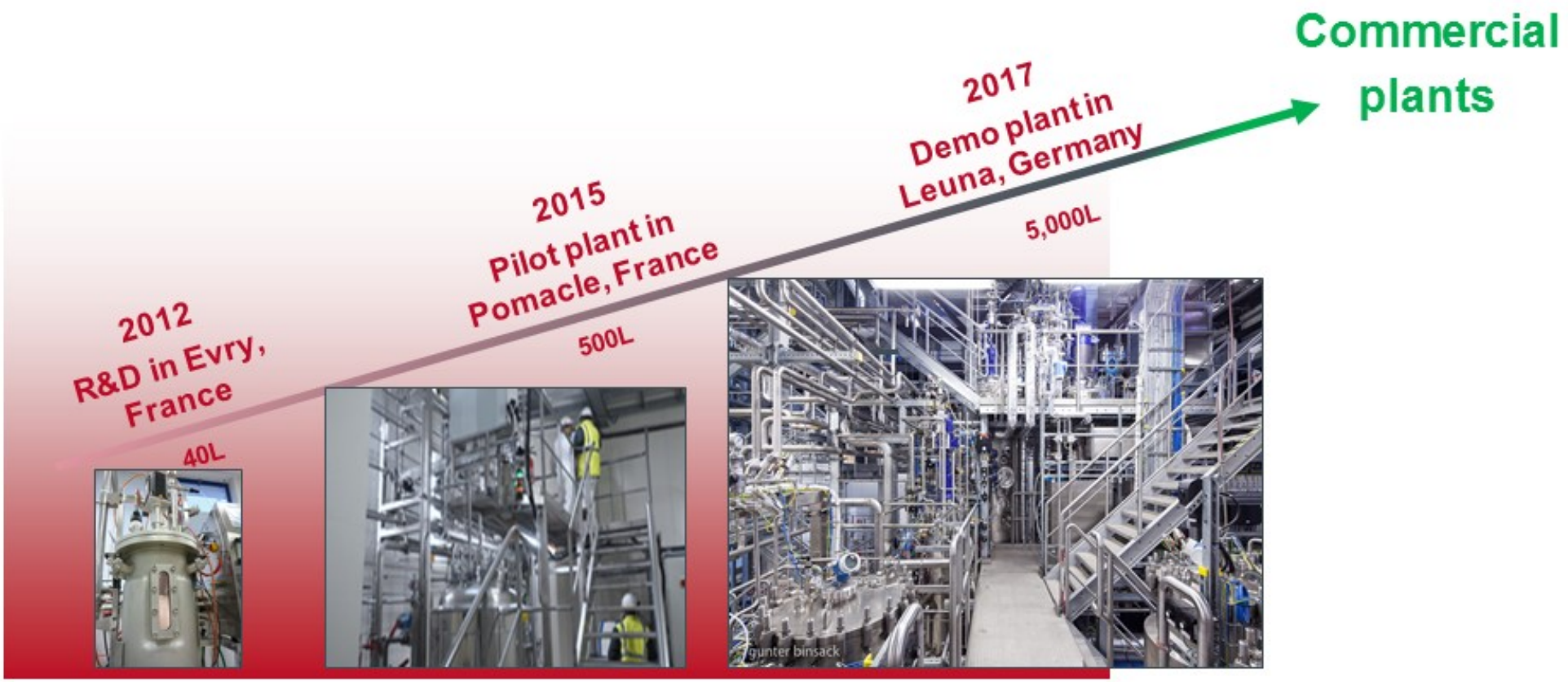
- We have engineered bacteria to convert renewable resources into isobutene, a gaseous 4-carbon building-block molecule traditionally derived from fossil oil (>15 million tons per year)



- 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



Our carbohydrate-to-hydrocarbon fermentation process

Industrial sugars

Our fermentation process

High value renewable isobutene

Well established chemical units

High premium cosmetics and specialty fuels

High performance renewable gasoline and jet fuel

Environmental impact

- Life cycle analysis indicates 69% reduction in CO_2 emissions when compared to oil-derived gasoline.

  → The process has the potential to reduce CO_2 emissions by up to 1 billion tons, representing several % of the global CO_2 figures

- Gasoline using isobutene-derived octane boosters produce far less particles

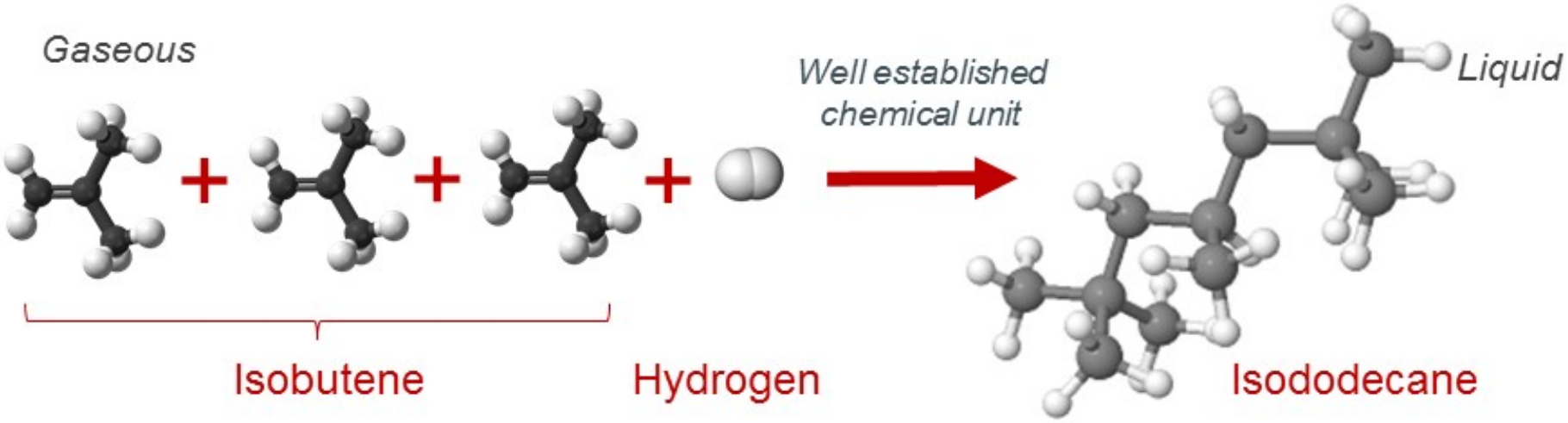
  → Incorporating 34% of isobutene derivatives reduce particles emissions by 60%

  → A solution for polluted cities, specially in Asia

What can we use isobutene for?

1. Conversion into isododecane
2. Conversion into isooctane
3. Conversion into ETBE
4. Direct sale for on purpose use

1. Isododecane (1/3) fact sheet



- Isododecane is widely used as an emollient in cosmetics.
- Isododecane is also one of the very few options for bio-jet fuel, already approved for blending up to 50% into fossil jet fuel.

Note: Isohexadecane (combination of 4 isobutene molecules) also applicable to both markets, with smaller volumes – included in the term "isododecane" in further slides.

1. Isododecane (2/3) market opportunity in the cosmetics

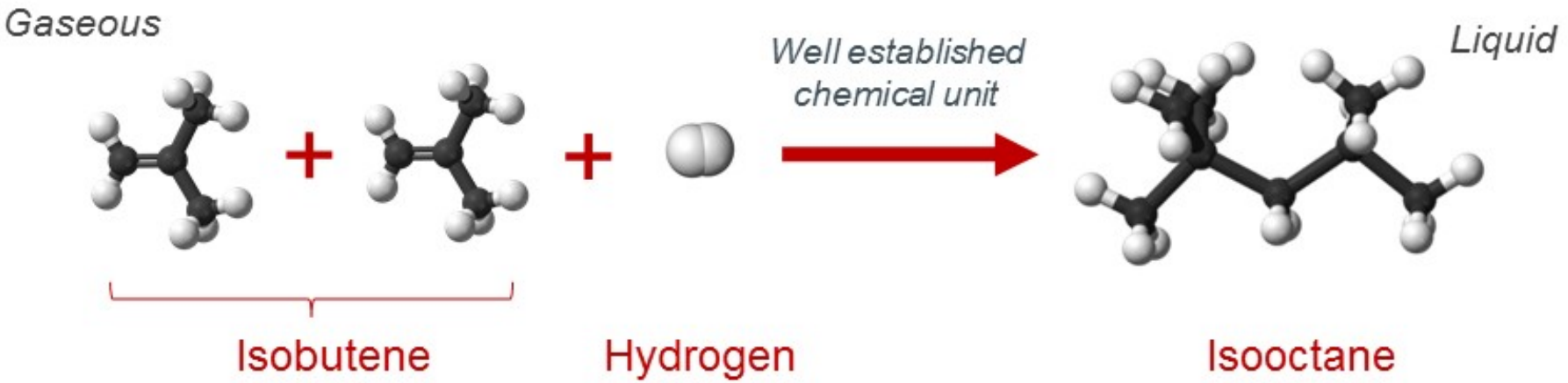
- Isododecane has an existing market in the cosmetics of ~20,000 tons/yr
- Current main emollient for cosmetics is being phased out
- Isododecane is the only substitute with comparable level of performance
- Cosmetic companies are looking for bio-based compounds to increase their level of naturality
- 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 10,000 tons/year with price between €4,000 and 10,000 per ton

1. Isododecane (3/3) market opportunity as 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
- Massive tax incentives soon expected
- Isododecane 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

2. Isooctane (1/2) fact sheet

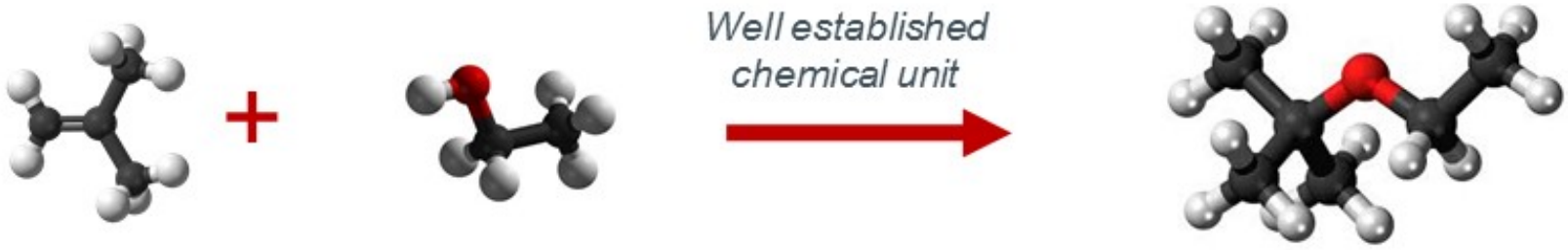


- Isooctane is the gold standard for gasoline engines (octane rating 100)
- It can be blended in fossil gasoline in high proportion, much higher than ethanol (blendwall at 10%)
- It has specific high premium markets in specialty fuels

2. Isooctane (2/2) market opportunity in specialty fuels

- Car racing
- Marine gasoline (outboard engines)
- Aviation gasoline (propeller engines)
- Off-road gasoline: forestry and gardening tools…
  - Need for low particles-emitting fuels to limit the exposure of workers
  - Isobutene derivatives are known to dramatically reduce the level of particles emitted
  - Impact on health and limited cost per worker and per day → large premium
- Letters Of Intent to acquire 5,500 tons per year of isooctane for specialty fuels, at a price between €3,000 and 8,000 per ton

3 .ETBE (1/2) fact sheet



Isobutene + Ethanol → ETBE

- ETBE is an octane booster additive reducing the level of ultra-thin particles at the exhaust pipe. Can be blended up to 22% in European gasoline.
- Presently, only the ethanol part is bio-based, i.e. one third of the molecule.
- We produce 100% bio-based ETBE, with the potential to increase the renewable fraction in gasoline up to 22%.
- Our 100% bio-based ETBE was added in 2018 in the French list of biofuels eligible to tax incentives.

3. ETBE (2/2)
opportunity for on-road gasoline

- Biofuel mandate in Europe for 7% by energy content in gasoline, ramping up to 10.6% by 2023
- 10.6% by energy means 15% ethanol by volume, well beyond the blendwall of 10% → need to find drop-in alternatives and/or move to flexfuel
- Very high tax incentive in several European countries including France
- Partnership with Audi since 2011 :
  - R&D
  - Engine and on-road testing done
  - Regulatory
- 3 Letters Of Intent from major retailers for a total of 32 to 39,000 tons of fully renewable ETBE per year

4. Liquified isobutene
Various market opportunities

Domestic gas

Butagaz

Paints

ARKEMA

Plastics and rubber

ARLANXEO

- Isobutene can easily be liquefied, stored, and shipped to address various markets:
  - Liquified isobutene can be added to butane and propane bottles for domestic and industrial use
  - It can be used in processes to manufacture methacrylic acid, a key component for paints
  - It can be polymerized into plastics and rubbers
- Specifications of our bio-isobutene validated in these markets together with industry leaders
- Several additional niche markets identified with high price premiums.

Moving to commercial scale exploitation

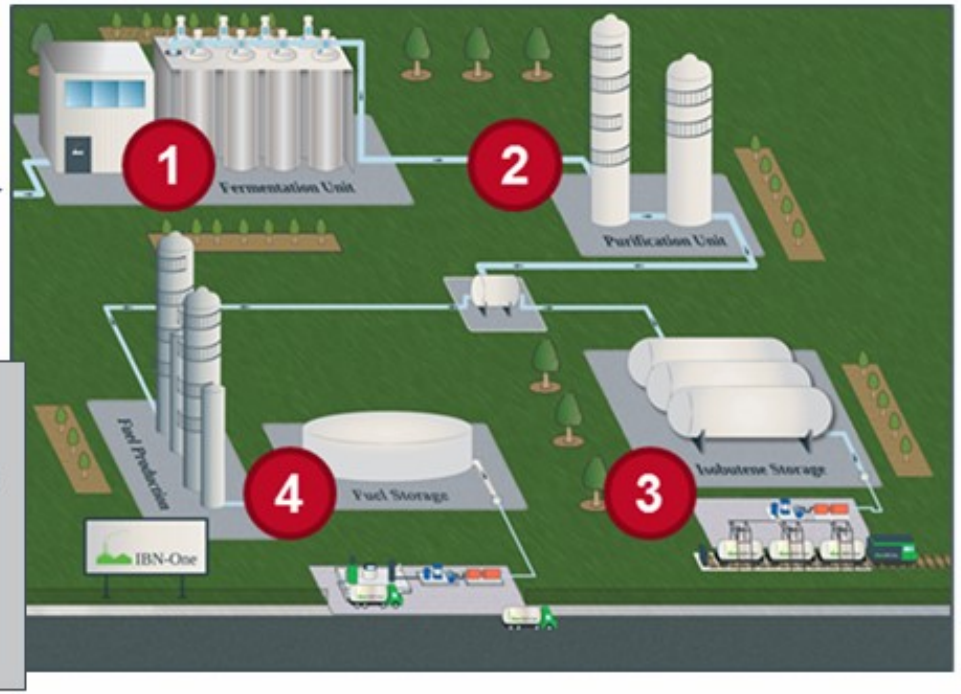
IBN-One, the first commercial plant project, is on its way and has the potential to become the most profitable plant in the field.

Global Bioenergies' main milestone is to bring it to life.

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 €1m 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 €120m + commissioning €20m
- Preliminary studies were targeting ETBE as the main output
- We are now moving to Cosmetics as main output in order to harness a higher value opportunity → additional engineering studies to be performed
- Markets also to be tested:
  - Isododecane for jet fuel
  - Isooctane for specialty fuels
  - ETBE to be blended in gasoline
  - Liquified isobutene for LPG and other uses

IBN-One

IBN-One: sensitivity analysis

Hypothesis for selling price in cosmetics: €6/kg

All scenarios made for IBN-One producing at maximum capacity (30,000 tons)

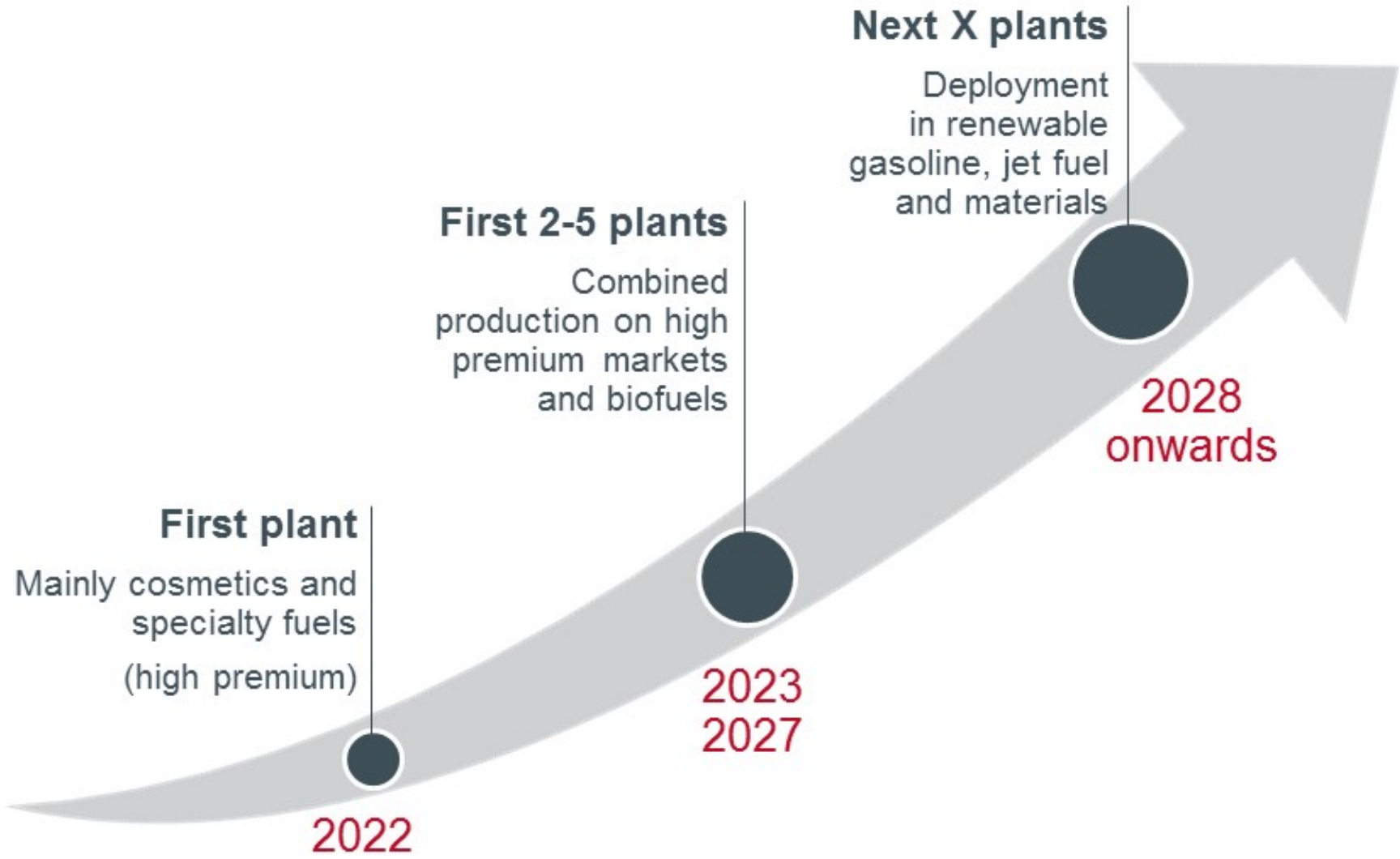
← Nominal case: 15kt cosmetics (i.e. 50% of the production):

- IRR of ~25%, much higher than the industry standards, sufficient to balance the first-of-its-kind risk
- IRR independent of oil price

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, with GBE retaining 25% of the equity, the licensing + dividend streams from the sole IBN-One plant will bring GBE breakeven.

Roadmap


Next X plants
Deployment in renewable gasoline, jet fuel and materials
2028 onwards
First 2-5 plants
Combined production on high premium markets and biofuels
2023 2027
First plant
Mainly cosmetics and specialty fuels
(high premium)
2022

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

	1G Food crops	2G Wood chips, straw, bagasse	3G Industrial waste gases
			
	Traditional feedstocks	**Advanced feedstocks**	**Emerging feedstocks**
	Sucrose: Beet, cane	Forestry: wood chips	Steel mill syngas
	Glucose: corn, wheat	Agri : wheat straw, corn stover…	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 €7m over 2016-21

European grants - €12m over 2017-22

Fundamental Global Bioenergies' value

- IBN-One project:
  - Partial ownership of the IBN-One case

    +
  - Value of the IBN-One royalty stream

- Longer term capacity to deploy the technology broadly:
  - Will progressively be revealed upon deals signed with third parties
  - Will depend on the evolution of market conditions (oil, sugar price, incentives for CO_2 reduction and air quality efforts…)

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. First commercial plant in sight. Will bring GBE breakeven. First-of-its kind risk balanced by high IRR.

4. Potential to broadly deploy the technology worldwide beyond first plant to reduce CO_2 emissions and improve air quality in cities.

5. Isobutene is the best case for industrial biology:
   - Large volume/large premium in the cosmetics, and
   - Huge potential for future deployment when the market is ready

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

Jean-Baptiste Barbaroux
Chief Corporate 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

Claudia Erning
VP Investor Relations

Former Head of ECM-Origination at Berenberg Bank

…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

Sébastien Groyer
Partner at Seventure Partners

Has participated in the investment and administration of about 20 innovative companies

Karine Lignel
Director at CM-CIC Investissement

A trained engineer active in Venture Capital since 2000

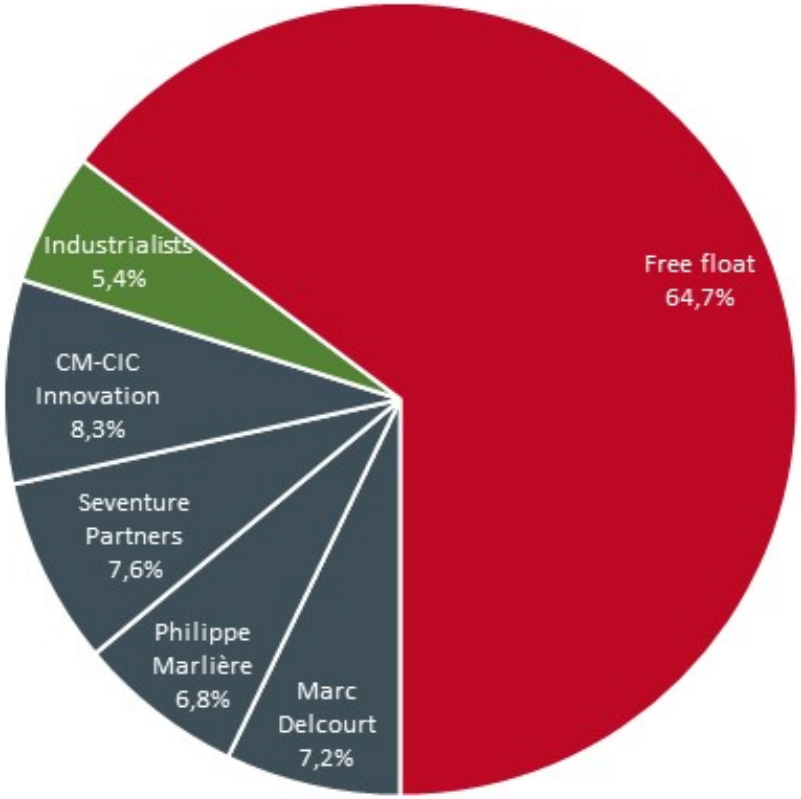
Alain Fanet

Entrepreneur and executive for more than 20 years

Pierre Lévi

Former CEO of Faurecia and Groupe Salins

Equity



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

Existing shares as at April 1st, 2019	5,079,455
+ Dilutive instruments (stock-options, warrants…)	+ 372,884
Fully diluted:	**= 5,452,339**