



GLOBAL BIOENERGIES

*Becoming a pillar of the
energy and environmental
transition*

February 2017

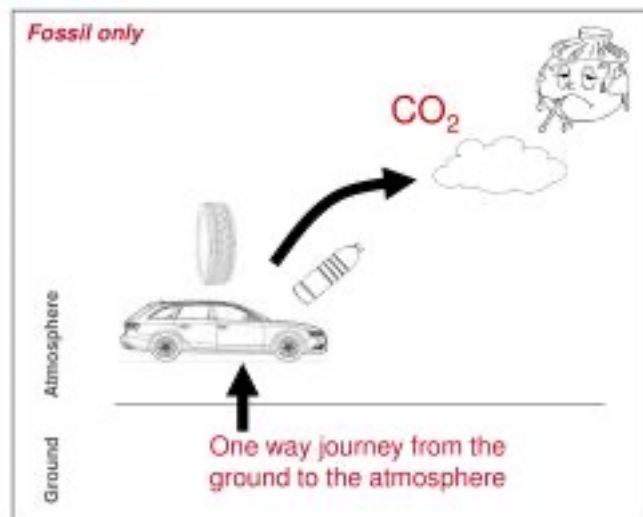


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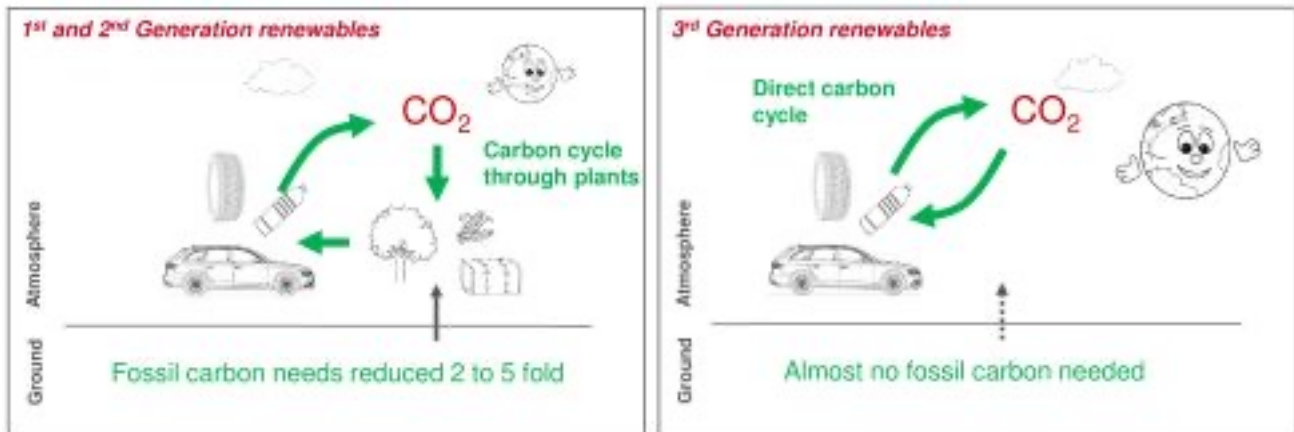
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Using fossil resources releases CO₂ in the atmosphere



- ▶ Our planet is warming because of CO₂, the main green-house-gas
- ▶ Need for the deployment of sustainable and environment-friendly solutions

Introducing carbon cycles



- ▶ 1st and 2nd Generation biofuels and biomaterials will help on the short term to reduce human carbon footprint.
- ▶ Using carbon emissions from various industries, and eventually atmospheric CO₂, shorter and more efficient carbon cycle will provide long term solutions.

Global Bioenergies develops solutions to produce 1st, 2nd, and 3rd generation biofuels and biomaterials, in order to reorganize the carbon cycles in fuels, plastics, and fine chemicals.

As a first and main target, Global Bioenergies intends to convert various resources into isobutene, a key platform molecule today massively derived from oil.

1. What we do

2. Bio-gasoline

3. Other markets for bio-Isobutene

4. Road to profitability

5. Team

6. Financials

A simple and robust proprietary technology



Renewable resources



1 Fermentation

Breakthrough technology: direct fermentation to a gas

- ▶ Exclusive rights on 32 patent families on bacteria engineered to produce isobutene
- ▶ Pioneering the fermentation of a gas –several key advantages



2 Purification

Combination of proven petrochemical modules

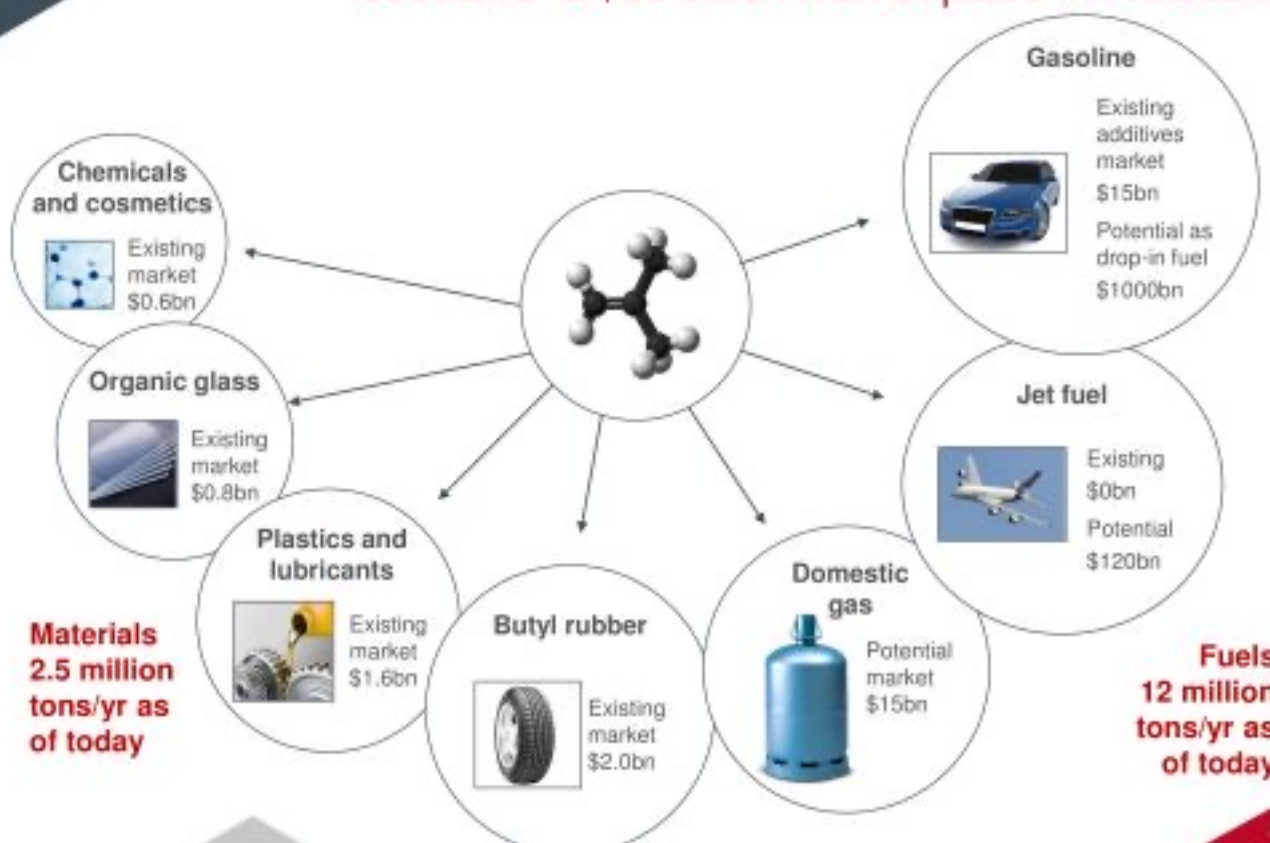
- ▶ Simple
- ▶ Robust
- ▶ Cost efficient



Isobutene

Illustrations are not representative of current Global Bioenergies' installations

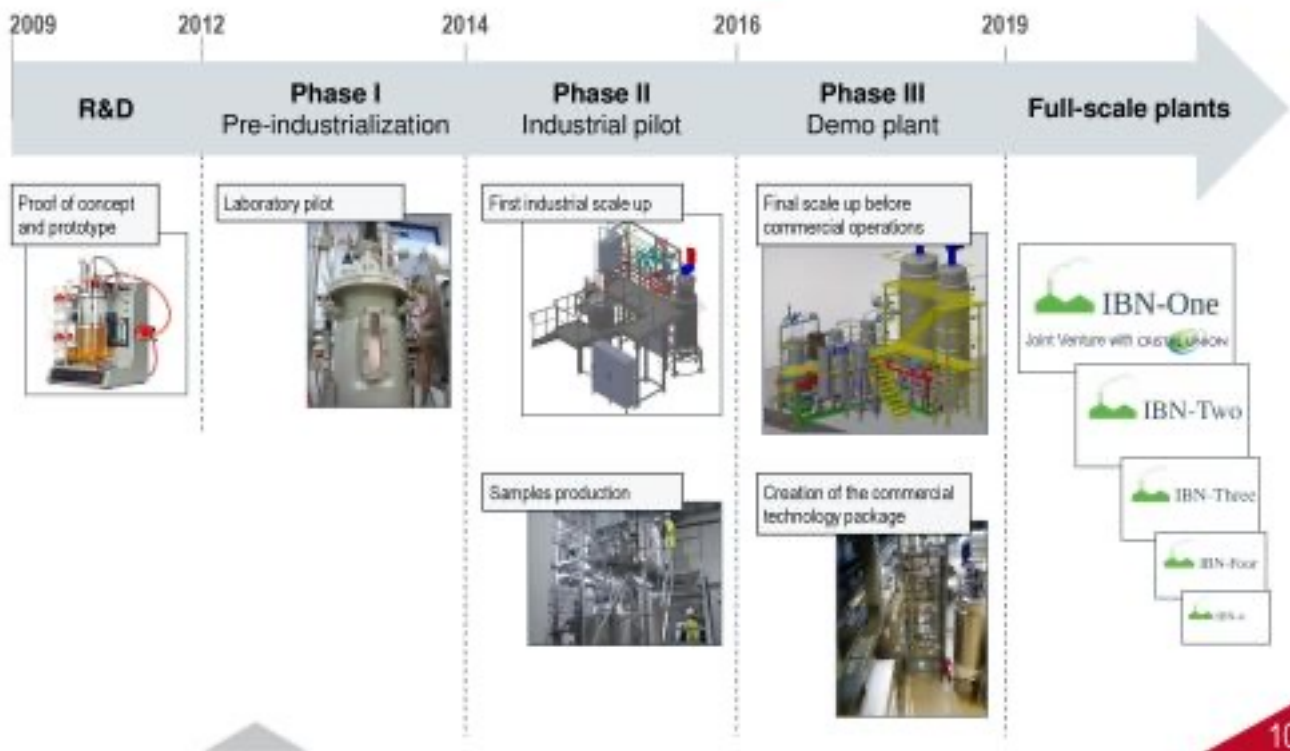
Isobutene: a \$20 billion market platform molecule



Various resources



A technology approaching commercial maturity using 1st Generation resources



Demonstration plant - Leuna, Germany

► The demo plant a glance

- Capacity: 100 tons/yr
- CAPEX: €10m
- €5.7m public financing 
- €4.4m bank loan 
- Operated by  **Fraunhofer**
IPT
- Startup sequence started December 2016



► 2017 Objectives

- Demonstrate process on 1st generation industrial sugars
- Deliver ton scale batches for market development
- Reach near commercial performances by end of year
- Provide data for engineering of 1st commercial plant
- Start testing 2nd generation sugars



2nd Generation: Forestry and agro-residues

► Drivers

- Not in competition with food production, prices not correlated to world sugar market
- Integrated biorefineries value all components of plants aiming for 50% lower sugars costs
- Improved environmental impact

► Challenges

- Technologies for producing 2G sugars currently at demo scale - remain to be commercially proven
- Challenging fermentation due to heterogeneous feedstock composition

► Agricultural residues

- Wheat straw, corn stover, sugar cane bagasse...
- Geographies concerned cover all major agricultural producing regions
- Lab and pilot validations already obtained for converting wheat straw into isobutene



► Forestry

- Wood from sustainably managed forests and milling residues
- Primary geographies concerned: Scandinavia, Canada, Southern USA
- GBE part of Swedish consortium



3rd Generation: Gaseous carbon and industrial emissions

► Drivers

- CO₂, CO and Syngas are major green house gases.
- Present as wastes at high concentrations in effluents of numerous industries (concrete plants, power stations, steel mills...). Low or negative value feedstocks.
- Their use as a resource for fermentation would enable both value creation and carbon capture.
- New scope of prospects: heavy industries/non agricultural regions
- As a first step, focus on syngas emitted by steel mills

► Challenge: isobutene-producing microbe and process must be developed

► Global Bioenergies positions itself as a technology integrator and developer

- Collaboration with [LanzaTech](#), the global leader in the field
- Acquisition of [Syngip](#)
 - 8 employees fully dedicated to a 3rd generation Isobutene project
 - A dedicated microbe + genetic tools + know-how in gaseous carbon bioprocessing

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Bio-gasoline potential at a glance



In order to go beyond the 10% ethanol blend wall, Europe and the USA will need to massively adopt drop-in gasoline

Market penetration

From 50-60\$
with tax incentives



From 120-130\$
without tax incentives

► Unmet mandates around the world are numerous opportunities for deployment

- China: 15% by 2020
- Norway: 20% by 2020
- India: 20% by 2017
- Indonesia: 15% since 2015
- Finland: 40% by 2030

Bio-gasoline vs electric mobility

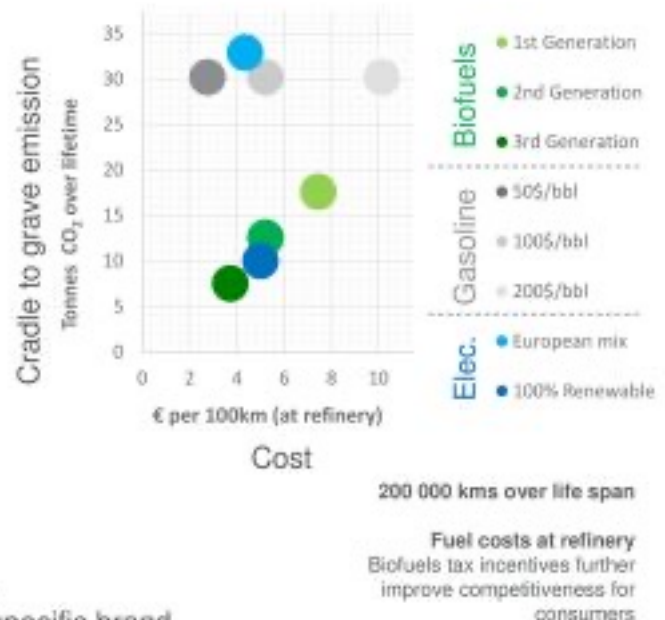
► **Biofuels have a higher potential than electric cars for cost and environment profile**

► **Biofuels are not promoted as much because**

- Food vs Fuel debate
- Biofuels power traditional cars, while electric cars are specific and hype


► **Solutions**

- Diversify away from edible crops
- Co-market the technology together with a car manufacturer through a specific brand



Source: Global Bioenergies

Global Bioenergies' Bio-gasoline project

- ▶ Two 100% bio-products for gasoline cars can be derived from 1st, 2nd and ultimately 3rd generation Isobutene
 - **Isooctane**
 - Drop-in, oxyfree, low volatility, 100 octane, clean burning : low particles, NOx and SOx
 - Blends up to 40% within regulation and technical potential up to 100% pure.
 - **ETBE**
 - Drop-in, high octane
 - Blends up to 28% within regulation
- ▶ Partnership with 
 - Global Bioenergies is part of AUDI's e-fuels strategy for renewable, low impact fuels
 - e-fuels to be a key tool in decreasing AUDI's fleet environmental impact
 - Audi to be the first car manufacturer to offer 100% renewable fuel driving to customers via system of offsets (specific models ex. g-tron)
 - Offset model requires 'drop-in', ready-to-blend fuel
 - Partnership to develop isobutene-derived isooctane for e-gasoline segment

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LPG: the new frontier for renewables in domestic and automotive sectors

▶ **Global LPG (domestic and automotive): 150 million tons**
(1,500 plants of 100,000 tons each)

- Low fossil production costs make competition difficult for renewables
- Market penetration would be possible with extension of tax incentives



- ▶ Isobutene use for blending in domestic gas bottles validated by French LPG industry
- ▶ Global Bioenergies Isobutene is the only technology available for butane/propane

▶ Partnership with  **Butagaz**

- Leading French brand distributing gas in bottles and tanks
- Aim to incorporate batches of bio-isobutene produced at Global Bioenergies' demo plant as early as 2017
- Option to purchase bio-isobutene from IBN-One, the first commercial plant to be built in France



Jetfuel : large potential subject to higher oil prices or extended renewable mandates

▶ **Jetfuel market: 120 million tons**

(1,200 plants of 100,000 tons each)

- Bio-jetfuel not existing commercially at present
- High technical and regulatory constraints

▶ **Limited competition**

- **Isobutene** → **Jetfuel (Global Bioenergies)**
- Palm oil hydrogenation (Neste)
- Farnesane (Amyris)
- Alcohol to Jet (Gevo)
- Fischer-Tropsch (Fulcrum)



▶ **Perspectives**

Strong will from the aviation industry expected to turn into mandates and tax incentives in the mid-term

Chemistry and Materials

Applications

| |
|--|
| <p>Butyl rubber</p> <p>1.0 Mt</p>  |
| <p>Lubricants and additives</p> <p>0.8 Mt</p>  |
| <p>Organic glass (Plexiglass®)</p> <p>0.4 Mt</p>  |
| <p>Specialty chemicals (paints, cosmetics...)</p> <p>0.3 Mt</p>  |

Mt: million tons

- ▶ **Global high purity Isobutene market 2.5 million tons** (25 plants of 100,000 tons each)
- ▶ Market accessible without premium from ~\$80 per barrel
- ▶ A vast, diversified panel of applications from rubbers to cosmetics.
- ▶ Numerous consumer end-uses would enable large commercial premium for renewability, resulting in large operating margins
- ▶ Market growth: +4% CAGR expected between 2016 and 2024 for traditional market. Further growth potential as bio-based chemicals.
- ▶ A number of samples tests underway by prospects and already several applications validated.

Sources: Argus DeWitt, IHS, SRI, Grand View Research, Global Bioenergies

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Business model at a glance

- ▶ **Model:** technology licensing
- ▶ **Technology:** renewable isobutene
- ▶ **Market sectors:** chemicals, materials and biofuels
- ▶ **Target revenues:** \$1million upfront and \$1million annual royalties per 10,000 tons capacity sold (royalties are function of market conditions)
- ▶ **Sales potential:** several hundred plants globally
- ▶ **Sales needs:** handful of plants to become profitable
- ▶ **Current status:** one concrete plant project in France, several further projects at earlier stages

First commercial plant project – France

- ▶ 50/50 JV between Global Bioenergies and Cristal Union
- ▶ Estimated CAPEX 115 million euros
- ▶ First commercial agreements with
 - ▶ **ASPEN** to supply specialty fuels market
 - ▶ **Butagaz** to supply domestic gas sector
- ▶ Collaboration with **L'ORÉAL** to evaluate opportunities in cosmetic sector
- ▶ €3.3 million from ADEME and *Investissements d'Avenir* program to support engineering, environmental studies and commercial development activities
- ▶ Target schedule
 - Engineering and construction to be completed in 2019
 - Commissioning and start of commercial operations in 2019 – 2020



- 1 Production** - 200Kt industrial sucrose are converted into 50Kt 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 bio-fuels

Collaborations with industrialists

Since 2012



Audi
Leading German car manufacturer

Collaboration on 'e-gasoline' development

Since 2013



ARKEMA
France's #1 chemicals company

Collaboration on methacrylic acid

Since 2016



L'ORÉAL
World's #1 cosmetics company

Collaboration on cosmetic applications of Isobutene

Since 2011



CRISTAL UNION
France's #2 sugar and ethanol producer

Shareholder and Partner in IBN-One JV

Since 2016



CLARIANT
Developer of Sunliquid® technology

Collaboration on wheat straw derived sugars

Since 2016





SVEASKOG Swedish #1 forestry company

Green Swedish #1 oil company

SEKAB Swedish Biorefinery

Collaboration on wood-derived biofuels

Since 2017



Butagaz
Leading French gas provider

Commercial agreement on domestic gas applications

Since 2016



ASPEN
Leader in specialty fuels

Commercial agreement on isooctane for small engines

Applications tests underway at numerous industrialists including



ARLANXEO World's #1 Butyl rubber manufacturer



CLARIANT European leader in specialty chemicals

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Management team

Coordination Committee



Marc Delcourt
Chief Executive Officer



Francois-Henri Reynaud
Chief Financial Officer



Macha Anissimova
Chief Scientific Officer



Frédéric Pâques
Chief Operations Officer



Thomas Buhl
Head of Business Development



Bernard Chaud
Head of Industrial Strategy



Jean-Baptiste Barbaroux
Head of Corporate Development

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



James Iademarco
VP Business Development
Former VP Bio-based chemicals at Royal DSM

Board of Directors

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-fonder and CEO

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



Philippe Marlière – Co-founder and President of the SAB

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



Sébastien Groyer – Partner at Seventure Partners

Has participated in the investment, administration, market launch or takeover of about 20 innovative companies



Karine Lignel – Director at CM-CIC Investissement

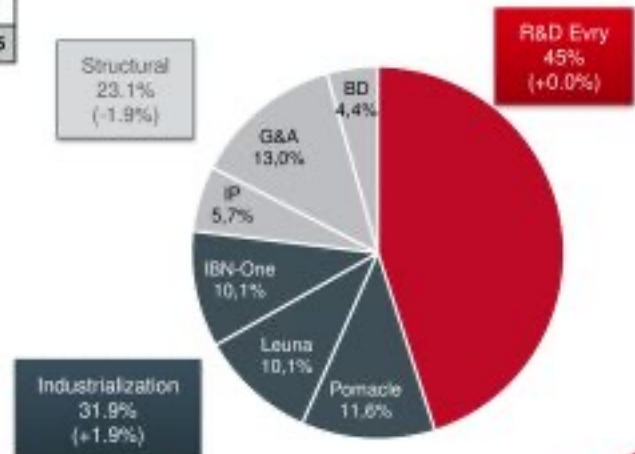
A trained engineer active in Venture Capital since 2000

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Group P&L

| In € thousand - audited | du 01/01/16 au 30/06/16 6 mois | 01/01/15 to 31/12/15 12 months |
|--------------------------------|--------------------------------------|--------------------------------------|
| Operating income | 757 | 2 228 |
| Operating expenses | 7 200 | 14 240 |
| Operating profit (loss) | -6 433 | -12 013 |
| Financial income | -245 | -258 |
| Exceptional profit (loss) | -32 | -109 |
| Income tax | NA | -1 985 |
| Net profit (loss) | -6 709 | -10 395 |

Details of operating charges as at 30/06/2016

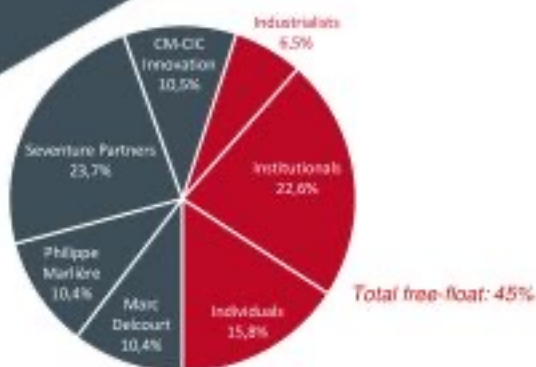


Group Balance Sheet

| <i>Assets (€ thousand)</i> | <i>30/06/16</i> | <i>31/12/15</i> | <i>Liabilities (€ thousands)</i> | <i>30/06/16</i> | <i>31/12/15</i> |
|--|-----------------|-----------------|-------------------------------------|-----------------|-----------------|
| Intangible assets | 91 | 106 | Capital | 159 | 142 |
| Assets | 10,202 | 7,230 | Share Premium | 45,541 | 37,817 |
| Financial assets | 144 | 142 | Retained earnings | (30,066) | (19,665) |
| | | | Profit (loss) | (6,709) | (10,395) |
| | | | Equipment subsidies | 156 | 0 |
| NON-CURRENT ASSETS | 10,437 | 7,478 | EQUITY | 9,081 | 7,899 |
| | | | PROVISIONS | 40 | 30 |
| Inventories, receivables, prepaid expenses | 2,376 | 4,313 | Conditional advances and loans | 9,830 | 10,440 |
| Cash | 8,107 | 10,418 | Trade payables and related accounts | 2,497 | 3,181 |
| | | | Other debts | 473 | 660 |
| CURRENT ASSETS | 11,483 | 14,731 | PAYABLES | 12,799 | 14,281 |
| TOTAL ASSETS | 21,920 | 22,209 | TOTAL LIABILITIES | 21,920 | 22,209 |

Cash in hand as of 30/06/16: €9.1m (audited)

Equity



Existing shares as at 09/02/17: 3 444 693
 Dilutive instruments (stock-options, Bracknor...): 522 607
Fully diluted: 3 967 300

Financial analysts

| | |
|---------------------------|------------------|
| Gilbert Dupont (Paris) | Edison (Londres) |
| ODDO (Paris) | Baader (Munich) |
| Invest Securities (Paris) | |

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 NYSE
 ALTERNEXT

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Average daily liquidity

| | |
|----------|--------|
| 2012 | €16 K |
| 2013 | €32 K |
| 2014 | €77 K |
| 2015 | €96 K |
| 2016 | €90 K |
| 2017 YTD | €157 K |



An intense newsflow expected in the short term

- 1** Leuna Demo plant
 - Start-up of large scale production
 - Production of a first large batch of e-gasoline for Audi, first cars on the roads
 - Off-take from various industrialists
- 2** IBN-One
 - Financing to run the basic engineering phase
 - First off-take agreements
- 3** 2nd Generation: progress on collaborations and future perspectives
- 4** 3rd Generation: Successes at new subsidiary Syngip
- 5** Further commercial agreements with industrial leaders

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