



Michelin, IFPEN and Axens inaugurate the first industrial-scale demonstrator of a plant producing butadiene from bioethanol in France.

Bassens, January 19 2024

- **Producing bio-based butadiene from bioethanol is becoming a reality.**
- **Further proof of the 3 partners' commitment to producing renewable butadiene.**
- **A major step towards accelerating the development of the bio-based butadiene sector and paving the way to commercializing the technology.**

Today, Michelin, IFPEN and Axens inaugurated the first industrial-scale demonstrator of a plant producing bio-based butadiene in France, at Michelin's site in Bassens near Bordeaux. The demonstrator was built within the framework of the BioButterfly project, involving the three partners, and supported by ADEME (French Agency for Environment and Energy Management) with the aim of developing and commercializing butadiene from ethanol derived from biomass (plants), to replace butadiene from petrochemicals. BioButterfly has reached a significant step in creating a bio-based synthetic elastomer industry.

A major step towards accelerating the development of the bio-based butadiene sector

Butadiene, a C4 diolefin, is an important chemical intermediate in the production of numerous polymers used for many applications: 40% of butadiene is used to produce elastomers for the tire market. The other 60% is primarily used to produce varnish, resin, ABS plastic, nylon for automobile applications, textiles and in construction. These applications offer additional potential markets for bio-based butadiene.

After launching in July 2023, the industrial-scale demonstrator must validate each stage in the manufacturing process of bio-based butadiene. In this way it is proving its technological and economic viability, with a production capacity of between 20 and 30 metric tons per year – a scale which will enable rapid industrial development.

This demonstration stage is providing a pathway to global commercialization of this new process – which will enable the production of innovative synthetic rubbers, without fossil-based resources – and the development of a new bio-based butadiene sector. Axens' commercialization of this technology will be a crucial step in ensuring significant volumes of renewable butadiene.

The Michelin Group, IFPEN and Axens' renewed commitment

The inauguration of this demonstrator illustrates the willingness of the 3 partners to foster the development of a French bio-based synthetic elastomer sector, to support a more sustainable industry.

“For Michelin, which currently uses butadiene from petroleum to manufacture its synthetic rubbers, this technology is a wonderful opportunity to help reach the objective of using 100% renewed or recycled materials in its tires by 2050. The Group also wishes to assist the development of a renewable butadiene production sector, in line with Michelin’s central ambitions in terms of circularity and renewed or recycled materials,” declared Eric-Philippe Vinesse, EVP Research & Development and member of the Group’s Executive Committee.

“The demonstrator marks an important milestone in the industrialization of the production process of bio-based butadiene after more than 10 years of research and innovation conducted with our partners. Our commitment to BioButterfly exemplifies our willingness to meet the expectations of manufacturers and of society in the field of bio-based chemistry,” declared Catherine Rivière, Assistant General Manager at IFP Energies Nouvelles.

Jean Sentenac, CEO of Axens explained, “With this partnership and demonstrator, Axens is illustrating its commitment to manufacturers seeking bio-based solutions. Thanks to the talent, the expertise of our team and our partners, the use of bio-based butadiene will become a reality for many industrial players looking for renewable materials. Along with recycling, it is one of the major future challenges which we are pleased to contribute to by disseminating and integrating innovative and reliable technological solutions such as Biobutterfly.”

Michelin is working with its partners to build new, virtuous ecosystems and to develop synergy between various players in the value chain to operate, finance and boost the production of renewable butadiene. Over time, these ecosystems will bring about the construction of several plants worldwide to meet growing demand for sustainable and bio-based finished goods.

To date, the BioButterfly project represents a total investment of more than €80 million (of which €14.7 million of support by ADEME (French Agency for Environment and Energy Management) under the Investments for the Future Program). The project also received support from the Nouvelle Aquitaine region and the Bordeaux Urban Community. It has so far created around twenty jobs at Michelin’s site in Bassens.

What is butadiene?

Currently produced from oil, butadiene is a compound used, among other things, for the manufacture of synthetic rubber.

Worldwide, manufacturers consume over 12 million metric tons of butadiene per year, of which about 40% is used to make tires.

link to the visuals: <https://we.tl/t-qkgtyP38vm>

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About Michelin

Michelin's ambition is to improve the mobility of its customers, in a manner that is sustainable. As a leader in the mobility sector, Michelin designs, manufactures, and distributes the tires most suited to customer needs and usages, along with services and solutions to improve transport efficiency. Michelin also proposes solutions for a unique mobility experience for its customers. Michelin develops high-tech materials for many fields. Based in Clermont-Ferrand, Michelin is present in 175 countries, employs 132,200 people and runs 67 tire production facilities which together produced around 167 million tires in 2022. (www.michelin.com)

About IFPEN

IFP Energies Nouvelles (IFPEN) is a major research and training player in the fields of energy, transport, and the environment. From scientific concepts in fundamental research to applied research technological solutions, innovation lies at the heart of all its activities, which are based on four strategic priorities: climate, environment and the circular economy; renewable energies; sustainable mobility and responsible hydrocarbons. (<https://www.ifpenergiesnouvelles.fr/>)

About Axens

The Axens Group provides a complete range of solutions for the conversion of oil and biomass to cleaner fuels, for the production and purification of major petrochemical intermediates, chemical and plastic recycling, as well as for natural gas treatment and conversion options, water treatment and carbon capture. Its offer includes technologies, equipment, furnaces, modular units, catalysts, adsorbents, and related services. Axens is ideally positioned to cover the entire value chain, from feasibility study to unit start-up and follow-up throughout the entire unit cycle life. This unique position ensures the highest level of performance with a reduced environmental footprint. Axens global offer is based on: highly trained human resources, modern production facilities and an extended global network for industrial and technical support and business services. Axens is a subsidiary of the IFP Group. (www.axens.net)