



Michelin, IFP Energies nouvelles, and Axens give a new dimension to the BioButterfly project

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

Launched in late 2012, the BioButterfly project aims to produce butadiene from ethanol from biomass (plants) in order to produce innovative synthetic rubbers that are more environmentally friendly.

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 twelve million tonnes of butadiene every year of which about 40% is used to make tyres.

Construction of this industrial prototype will start in late 2019 and is expected to be completed in late 2020 on Michelin's site in Bassens, near Bordeaux, where Michelin is already using butadiene from petroleum to manufacture its synthetic rubbers intended, in particular, for the European market. The BioButterfly project represents a total investment of €70 million and will create around twenty jobs on the site.

From the production of just a few grams ... up to 100,000 tonnes

After several years of laboratory tests (manufacture of a few grams) followed by the development of pilots at IFPEN-Lyon (manufacture of hundreds of grams), the industrial prototype must now validate the complete chain of steps in the manufacturing process to prove its technological and economic viability for mass production (between 20 and 30 tonnes/year). This is the last phase before industrial implementation of the process (100,000 tonnes/year) to be marketed by Axens.

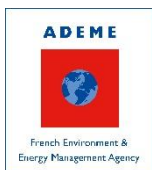
The plant will test the use of ethanol from all kinds of biomass, including 2G ethanol (2nd generation, non-competing with food) made from forest or agricultural residues (straw, woodchips, etc.). It will validate the process developed by IFPEN which will eventually be included in the portfolio of green technologies marketed by Axens. This production pathway will also enable Michelin to better secure its access to butadiene while supporting its goal of sustainable mobility.

This decision gives a new dimension to the BioButterfly project supported by Ademe (French Agency for Environment and Energy Management) under the Investments for the Future Programme. It illustrates the willingness of partners to reduce the industry's environmental footprint by fostering the development of a bio-sourced synthetic rubber industrial sector and reaffirms their commitment to a new research and innovation sector serving a more sustainable industry.

Florent Menegaux (CEO of Michelin) - *'Taking the environmental impact of its activities into consideration is part of the Michelin Group's identity as a forerunner and leader of sustainable mobility. By 2050, 80% of raw material used in our tyres will be sustainable. We expect bio-butadiene to represent approximately 20% of this objective.'*

Didier Houssin (Chairman of IFPEN) - *'IFPEN develops innovative technologies in the field of bio-sourced products and biofuels. With BioButterfly, our research contributes to creating a new energy transition industrial sector.'*

Jean Sentenac (Chairman and CEO of Axens) - *'With this project, Axens, already a worldly recognized provider of technologies for the production of the main petrochemical building blocks, will expand its offer to the market to the bio-sourced chemistry.'*



BioButterfly is a project supported by Ademe (French Agency for Environment and Energy Management) under the Investments for the Future Programme.

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 tyres 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 also develops high-tech materials for many fields. Based in Clermont-Ferrand, Michelin is present in 170 countries, employs over 125,000 people, and runs 67 tyre factories which, together, produced around 190 million tyres in 2018. (www.michelin.com) Press contact: Corinne Meutey 01 78 76 45 27, 06 08 00 13 85

About IFPEN



IFP Energies nouvelles (IFPEN) is a major research and training player in the fields of energy, transport, and the environment. From research to industry, technological innovation is central to all its activities and based on three strategic priorities: sustainable mobility, renewable energies, and responsible oil and gas. Press Contact: Anne-Laure de Marignan: +33 (0)1 47 52 62 07, presse@ifpen.fr

About Axens



Axens (www.axens.net) Axens is a group that 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 as well as for gas treatment and conversion options. 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 & business services. Axens is a subsidiary of the IFP Energies nouvelles Group. Press contact: Corinne Garriga +33 (0)1 47 14 25 14, corinne.garriga@axens.net