

2012 – LANXESS Year of Green Mobility

Throughout the world, more and more people seek increased mobility. The only way to counter the resulting burden on the environment is to come up with new, sustainable solutions. As a technology leader in specialty chemicals, we develop applications that can make mobility more environmentally compatible.

One of our most important green mobility products is white at the start of its life cycle: synthetic high-performance rubber. This product is the main component in modern green tires, simultaneously reducing their rolling resistance, increasing their durability and improving their braking behavior.

However, our portfolio includes many other innovative solutions for green mobility. Our high-tech plastics, for example, reduce the weight of components for cars and other vehicles, cutting their fuel consumption without compromising safety performance. And our stabilizers make it possible to produce fuels from renewable raw materials.

A driving force for new ideas

David Hardy, Technical Marketing Manager for the Performance Butadiene Rubbers business unit, discusses the further potential of our rubber grades for green tires with high-viscosity technology expert Dr. Jochen Kroll, polymer chemist Dr. Christopher Kohl and organic synthesis specialist Dr. Nadine Vogl, who work in the LANXESS Innovation & Technology Group Function.

We generate ideas and development projects through close collaboration between our business units – their Technical Marketing Managers serving as the direct interface with the market – and Innovation & Technology. This group function, established in 2009, pools our expertise and drives innovation projects to safeguard the company's long-term success.

This is also where the development of our high-performance rubbers for green tires started. Our scientists' expertise enabled us to balance the conflicting tire properties defined in the "magic triangle" of tire technology, combining low rolling resistance, good wet grip and durability.

This work demonstrates our commitment to addressing the major technical challenge of making mobility environmentally friendly. In light of the steadily growing number of vehicles worldwide and the associated environmental impact, it is one of the most important tasks facing society.

Our ideas and developments are protected by patents wherever this is possible and expedient. In the course of 2012, we submitted 90 priority applications worldwide. As of December 31, 2012, the full LANXESS patent portfolio included approximately 1,100 patent families covering around 7,600 individual property rights.



Molecular
Lighted Nd-PBR

Effect of LANXESS high-end rubbers in

General
Purpose
Rubber

Rolling resistance
reduction

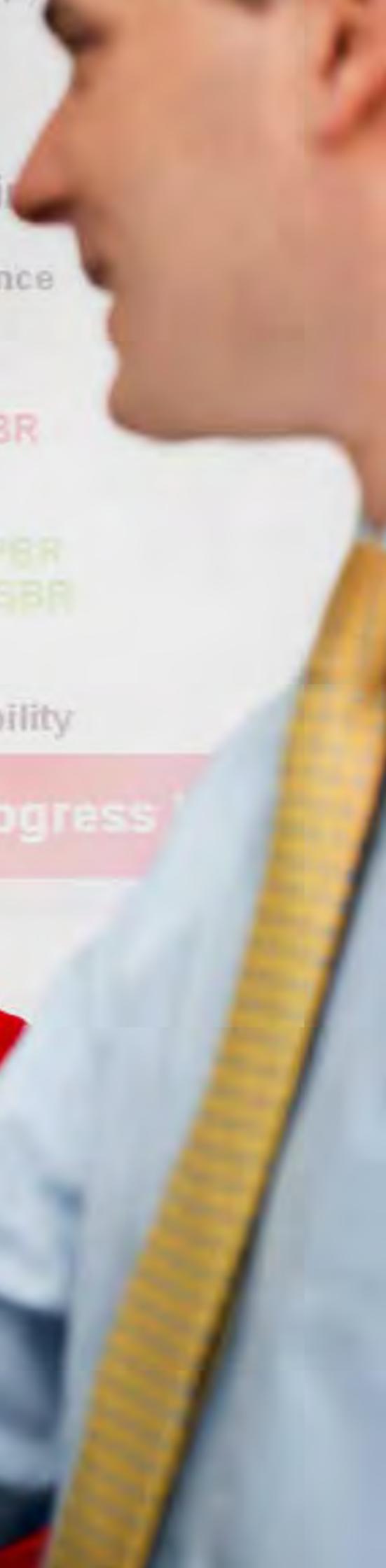


Nd-PBR

IM-PBR
S-SBR

Durability

total tec progress







Trying out ideas in the test tube

Xia Dong prepares a new rubber compound in the LANXESS laboratory in Leverkusen. She is studying polymer processing at the Qingdao University of Science and Technology in China and, together with her fellow student Genhai Liu, won the LANXESS Student Rubber Award in 2012. We rewarded her outstanding performance with a four-week internship at our Technical Rubber Products business unit. LANXESS has been cooperating closely with Qingdao University since 2007.

Most of our basic research is conducted in collaboration with universities and research institutes. Generating knowledge in this way is not only far more efficient and cost-effective than maintaining our own resources; it also gives young scientists the opportunity to acquire practical experience with a global enterprise. In 2012, we had a total of 203 (2011: 145) major research and development alliances, 78 (2011: 50) of which were with universities, 66 (2011: 55) with suppliers or customers, and 59 (2011: 40) with research institutes. Advanced scientific work is done by our larger research and development units at the sites in Leverkusen, Krefeld-Uerdingen and Dormagen, Germany; London, Canada; and Qingdao and Wuxi, China. There we develop and test high-performance rubber products for energy-saving green tires, for example.

Our total research and development expenses in 2012 increased by 33 percent on the prior year to €192 million, or 2.1 percent of sales (2011: €144 million, or 1.6 percent of sales).

CORPORATE
RESPONSIBILITY

2 3 4

CCD-System

A close-up photograph of a person's hand adjusting a component within a CCD-System machine. The machine is illuminated with a warm, yellowish light. The hand is positioned in the foreground, reaching into the machine's interior. The machine's frame is black with a prominent white label that reads "CCD-System" in bold, black letters. Above the label, the numbers "2", "3", and "4" are visible, likely indicating different stages or components of the system. The background shows a series of vertical, ribbed structures, possibly part of a conveyor belt or a sorting mechanism. The overall scene suggests a technical or industrial setting, possibly related to quality control or manufacturing.



Stringent testing

Karl-Josef Stühler, Head of Rheology at the LANXESS Technical Service Center in Leverkusen, prepares a rubber test strip. He was involved in developing the tear analyzer, which is used to test the tensile strength of rubber samples. This apparatus is now in use around the world.

We apply more than 400 different methods, including mechanical, dynamic mechanical and extremal tests, to evaluate our rubber products and their properties. Our testing facilities in Germany, the Netherlands, China and Canada produced around 11,000 rubber compounds in 2012, each of which was extensively tested. Our physicists and chemists are also working systematically to optimize existing tests and develop new methods.

Our customers benefit particularly from our considerable testing expertise. This year, we introduced a concept tire we developed in-house on the basis of our synthetic rubbers. This tire was one of the first to be awarded a double-A rating for fuel efficiency and wet grip in accordance with the new E.U. tire labeling regulation. Thanks to our expertise in assessing the impact of different grades of synthetic rubber on the running properties of tires, which we acquired during the development process, we will in future be able to offer materials that have been pre-evaluated in stringent tests. This represents real added value for our customers because it will enable them to shorten the time to market for new tires and strengthen their competitive position.

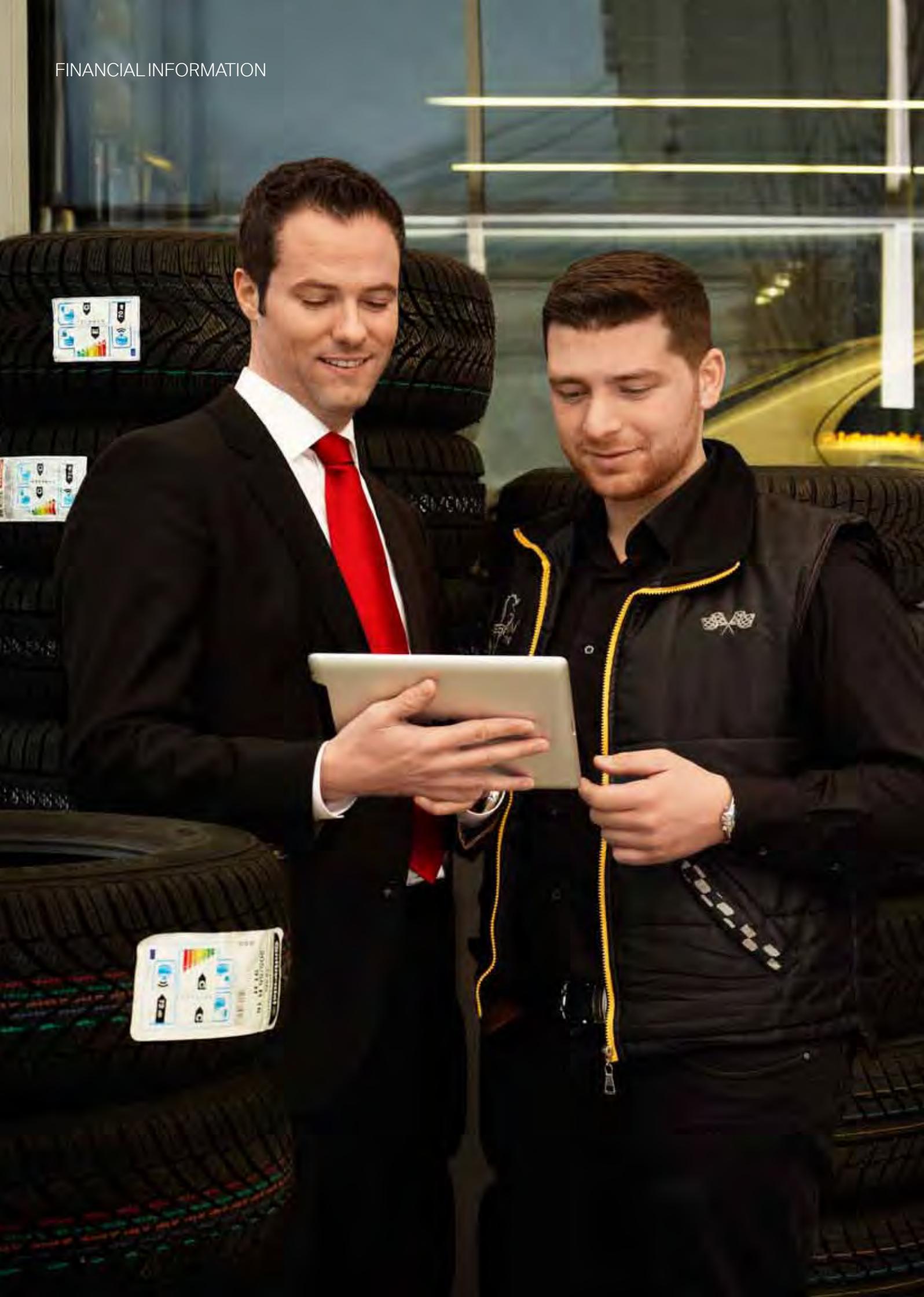
Quality on a world scale

Peter Förster, foreman and HSE officer at our Performance Butadiene Rubbers facility in Dormagen, Germany, supervises the production process for the high-performance rubber used in green tires. Dormagen is the third-largest LANXESS production site in Germany and one of the most important sites for synthetic rubber worldwide.

We also produce the high-performance rubbers that are essential for the manufacture of green tires in Port Jérôme, France; Orange, United States; and Cabo de Santo Agostinho, Brazil. In September 2012, we laid the foundation stone for a new production facility for neodymium-based performance butadiene rubber (Nd-PBR) in Singapore. Costing around €200 million, this facility will be the largest of its kind in the world with an annual capacity of 140,000 tons. It is scheduled to come on stream in the first half of 2015 and will serve the Asian market in particular. We will then be the only supplier to have a high-performance production facility in each of the key sales regions.

LANXESS is already the global market leader for the synthetic high-performance rubber Nd-PBR, which is used in green tires. With annual growth rates of around 10 percent, this is the fastest-growing segment of the world tire industry. Increasing demand for green tires is being driven by the mobility megatrend, especially in Asia and Latin America. Experts forecast that the number of cars in use worldwide will increase by more than 60 percent in the next 15 years. We expect more than 2 billion tires to leave the production lines in 2017 – some 28 percent more than today. Over the same period, the proportion of green tires is likely to increase from around 35 percent at present to just under 50 percent.





Destination: the global market

Markus Brückner, our Public Affairs Manager, explains the LANXESS fuel savings app to Ibrahim Erdogan of Reifen4.me. This app allows drivers to quickly and easily calculate how much money and CO₂ they can save by using green tires. It has been tested and certified by the TÜV Rheinland inspection agency. Around 180,000 users have already accessed the app on the Internet or downloaded it (<http://app.green-mobility.de>).

A study conducted by the Technical University of Munich on behalf of LANXESS found that, thanks to a reduction in fuel consumption coupled with only slightly higher costs, the switch to green tires is amortized far more quickly than, for example, changing to a start-stop system or a hybrid engine. Drivers also achieve a higher CO₂ reduction for each additionally invested euro than for other green investments. If all the vehicles in the world were fitted with these modern high-performance tires, annual fuel savings of some 20 billion liters could be achieved and CO₂ emissions reduced by around 50 million tons each year.

The E.U. tire label introduced in November 2012 also makes it easier to choose the right tires. The label classifies the rolling resistance (fuel consumption) and wet grip (safety) of new tires using a scale ranging from A (best performance) to G. It also indicates the level of rolling noise. The E.U. model gives green tires a particularly good rating and is familiar to consumers from the similar system used for refrigerators and washing machines. Outside the European Union, tire labeling is also compulsory in South Korea. Some countries have so far opted for voluntary labeling, while others are currently debating or planning mandatory requirements.

