‘Green Tires’ Fact Book

Corporate Communications

Agenda

1. **LANXESS – committed to global megatrends**
2. The need for CO_2 emission reduction – EU leading the way
3. The ecological benefits of ‘Green Tires’
4. ‘Green Tires’ meeting consumer expectations
5. A global market for ‘Green Tires’ is emerging
6. LANXESS – a key enabler of ‘Green Tires’

LANXESS – a global player in the specialty chemical industry

Specialty chemical company

- Spun-off from Bayer in 2004
- Focuses on: Plastics, Rubber, Specialty chemicals, Intermediates

Global success story

- Around 15,800 employees in 30 countries
- 46 production sites worldwide
- 2010 sales of EUR 7.1 billion

Strategy of targeted innovation

- Vital role in LANXESS' growth
- Focus on process and product innovation

LANXESS is Energizing Chemistry

Premium quality

- Premium specialty chemicals company
- More than 5,000 products for a diverse range of applications
- High quality solutions enabling our customers to successfully meet current and future challenges

Technical expertise

- State-of-the-art materials, services and solutions that meet the most exacting demands
- Creating significant value for our customers' businesses, the environment and our company, all at the same time

LANXESS – global mission

Sustainability

- Highly committed to sustainable development
- Creation of green solutions for the challenges of global megatrends
- Development of environmentally-friendly technologies, resource-efficient processes and next-generation products

Innovation

- Targeted innovation efforts to meet specific and concrete customer needs
- Pragmatic corporate culture drives product, process and outside-the-box innovations
- Highly effective innovation network, combining global reach with local expertise

LANXESS capitalizing on global megatrends

Mobility

Agriculture

Urbanization

Water

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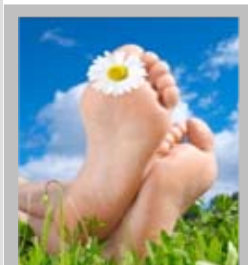
Future challenges drive the need for sustainable mobility

Environment

- Climate protection
- Impact of climate change is noticeable

Economics

- Shortage of resources
- Rising prices for fossil fuels



Consumer

- Trend toward a sustainable lifestyle
- Societal demand for environmental stewardship

Growing mobility

- Especially among the growing middle class in emerging countries

Urbanization

- Over half the world's population will live in cities by 2030
- Greater traffic density leads to increased noise emission

Politics

- More stringent legislation
  - to protect the environment
  - to reduce emissions and fossil fuel dependency

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LANXESS solutions help people and goods travel quickly, cleanly and safely

Examples

Lightweight construction	▪ LANXESS high-tech plastics make vehicles lighter, safer and more comfortable	
‘Green Tires’	▪ LANXESS synthetic rubber blends and additives are key ingredients that allow modern tires to improve performance, save fuel, enhance safety and last longer	
Bio-based raw materials	▪ Investment into Gevo, a leading renewable chemicals and advanced biofuels company, supports the development of bio-based alternatives to petrochemical-based materials	SUSTAINABILITY BY LANXESS BIOSOURCE

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Tackling the global climate challenge

Worldwide efforts to reduce CO_2 emissions

Focused country initiatives to reduce energy consumption in key sectors

Construction	Manufacturing	Energy conversion	Mobility
			

Adoption of regulations and establishment of minimum energy efficiency standards

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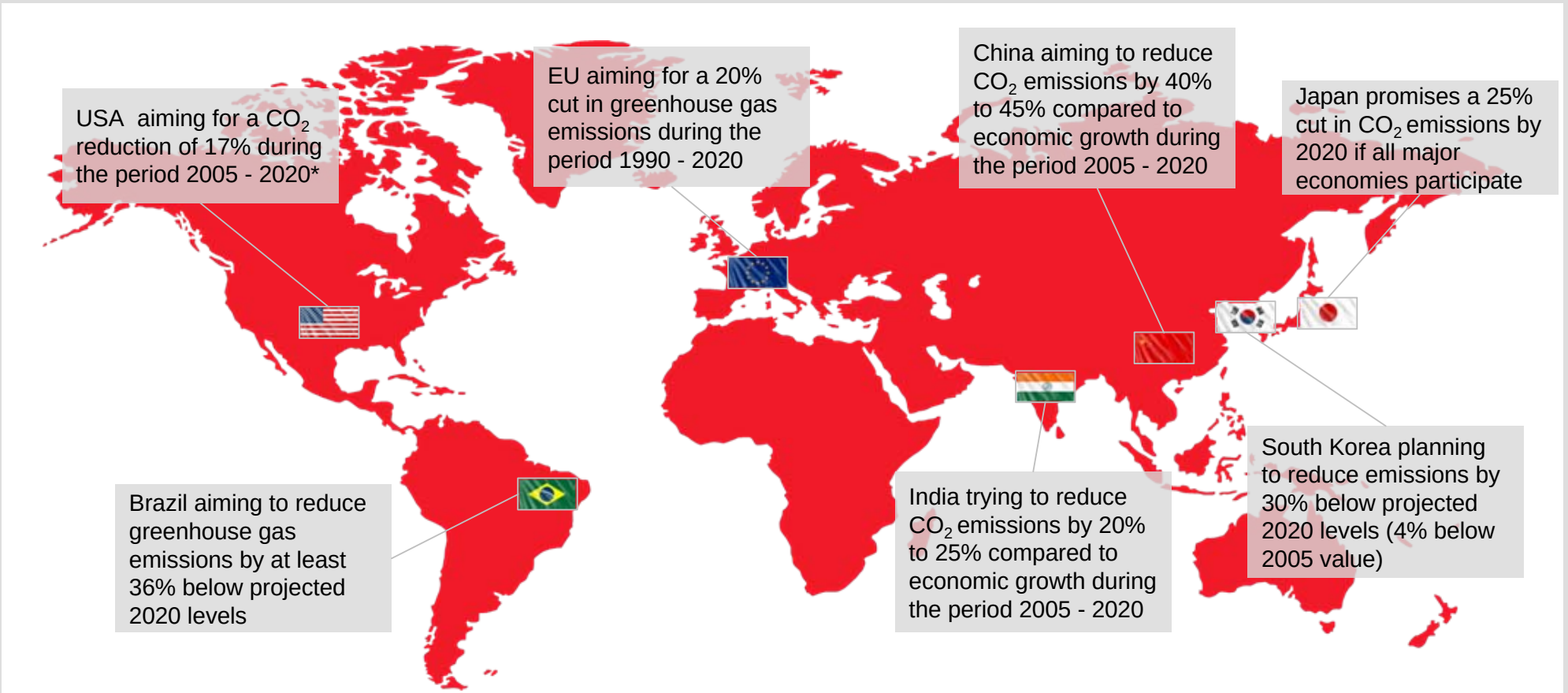
Worldwide initiatives for CO_2 emission reduction



Source: United Nations Framework Convention on Climate Change (UNFCCC)

* Provided that the awaited law on climate control comes into effect as scheduled

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EU – a clear commitment to increase energy efficiency

EU Energy Efficiency Plan

- Increasing energy efficiency to boost sustainable growth and competitiveness
- EU strategy focusing on
  - enforcement of existing legislation
  - development of innovative solutions

Key objectives for 2020 (compared to 1990)

- Cutting energy consumption by 20%
- Reduce annual greenhouse gas emissions by 740 million tons
- Cutting energy costs by EUR 100 billion per year

Sources: EU Energy Efficiency Plan 2011, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0109:FIN:EN:PDF
Directive of the European Parliament and of the Council on energy efficiency, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0370:FIN:EN:PDF

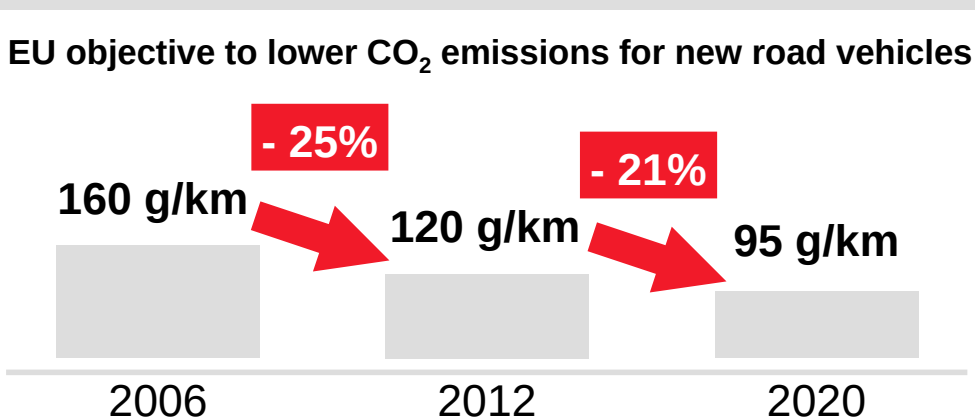
Road traffic forms a substantial part of the EU Efficiency Plan

Key Facts

- 18% of global CO_2 emissions are related to road traffic
- In the EU, transport is the only economic sector whose CO_2 emissions are constantly increasing, especially in those segments involved in road transportation

EU Objective by 2012 (compared to 2006)

- Lowering average CO_2 emissions for newly-registered road vehicles from 160 g/km to 120 g/km until 2012 and to 95 g/km until 2020
- Of that, 10 g/km is to be achieved through measures which are not directly linked to fuel combustion (e.g. tires)



Source: Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0001:0015:EN:PDF

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Modern tires improve energy efficiency in road traffic

Key Facts

- 20% to 30% of a vehicle's fuel consumption is related to tires
- 24% of road vehicle's CO_2 emissions are related to tires

New EU regulations aim to

- improve energy efficiency and safety standards of future tires
- enable consumers to make informed buying decisions

Sources: BMW, Der Reifen im Spannungsfeld zwischen hohen technischen Anforderungen und immer schärfer werdenden gesetzlichen Auflagen, 2008
Michelin, CO_2 Reduzierung – Ein Beitrag der Reifenindustrie, 2008

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EU type approval – improving standards for future tires

1) Regulation 661/2009/EG

- Establishes uniform requirements for the type approval of new tires (categories C1 – C3*) across the EU with regard to
  - safety (wet grip)
  - rolling resistance
  - rolling noise
- Introduction of new limit values for type-approval of tires in November 2012
- As of November 2014 all new vehicles must be equipped with type-approved tires and only type-approved tires can be sold on the replacement market

Limit values for the safety aspect of wet grip

Usage category	Limit value (G)
M+S tires with a maximum permissible speed of 160 km/h	0.9
M+S tires with a permissible speed above 160 km/h	1.0
Regular road tires	1.1

Limit values for rolling resistance

	Phase 1 (as of 2012)	Phase 2 (as of 2016)
Tire category	Limit value (kg/t)	Limit value (kg/t)
C1	12	10.5
C2	10.5	9.0
C3	8.0	6.5

Source: Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:200:0001:0024:EN:PDF

* Tire categories: C1 – tires according to ECE R 30 (cars)
C2 – tires according to ECE R 54 (light trucks)
C3 – tires according to ECE R 54 (heavy duty vehicles)

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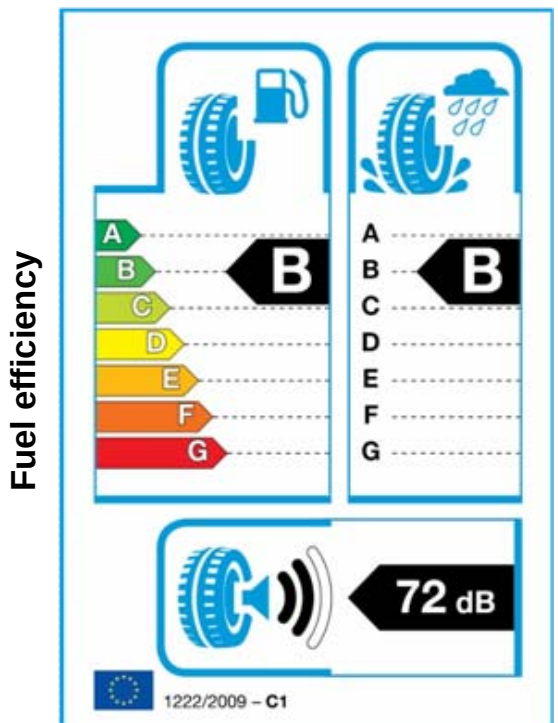
EU tire labeling – enabling consumers to make informed buying decisions

2) Regulation 1222/2009/EG

- Tire labeling aims to increase the safety as well as the ecological and economical efficiency of road traffic
- The label informs consumers about key tire performance parameters
  - impact on fuel efficiency associated with rolling resistance
  - impact on safety associated with wet grip
  - external noise level
- Tire labeling becomes mandatory from November 2012, meaning that all tires* produced as of July 2012 must have the label

Indicating three key parameters of tires



Source: Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labeling of tires with respect to fuel efficiency and other essential parameters: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:342:0046:0058:EN:PDF

* passenger car, light truck and heavy duty vehicle tires

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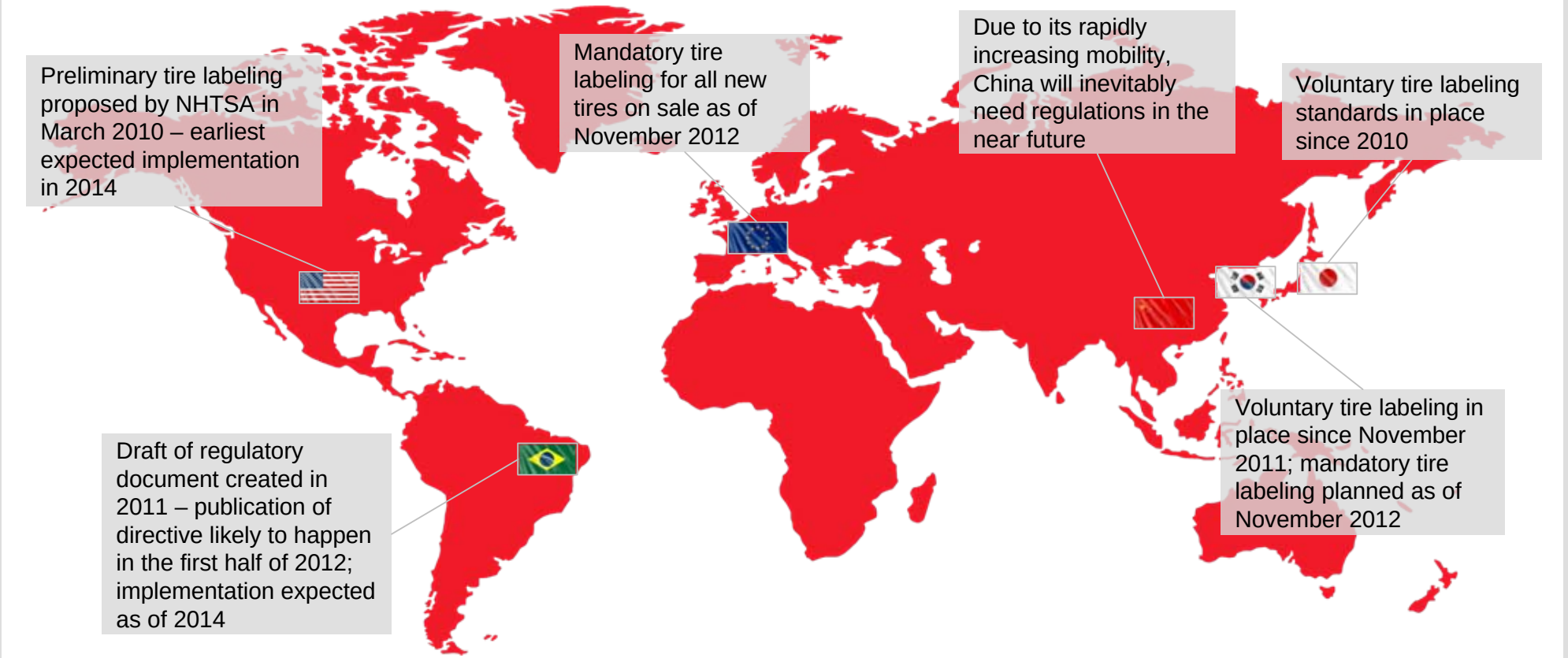
Worldwide adoption of tire regulations and implementation of tire labeling is emerging



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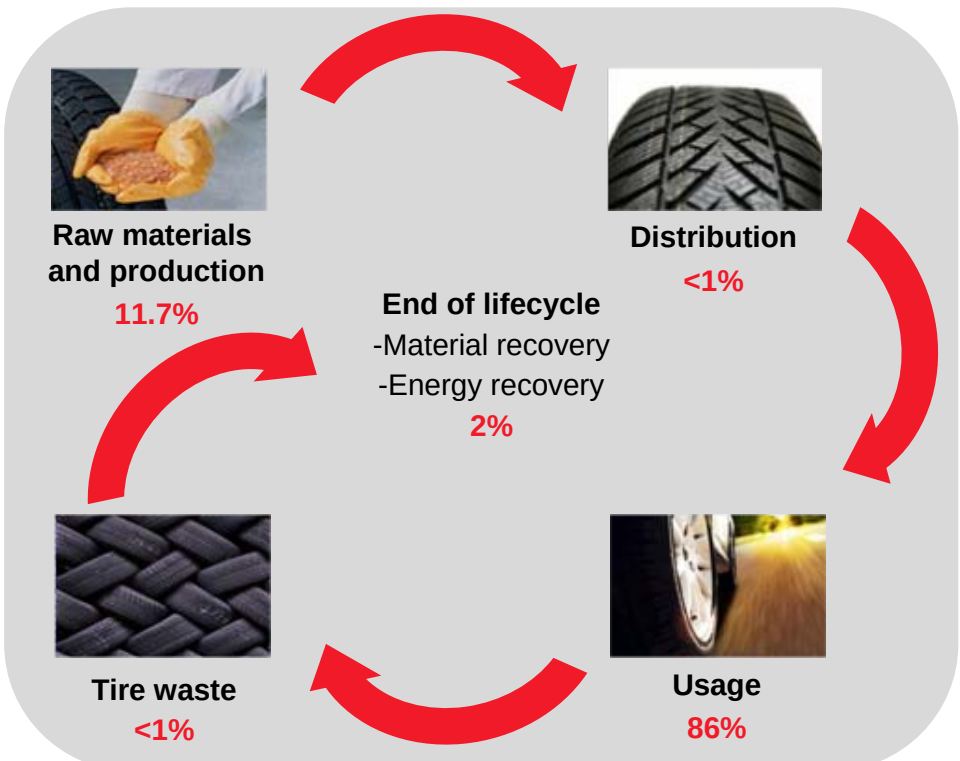
Tires have the highest environmental impact when they are in use on the road

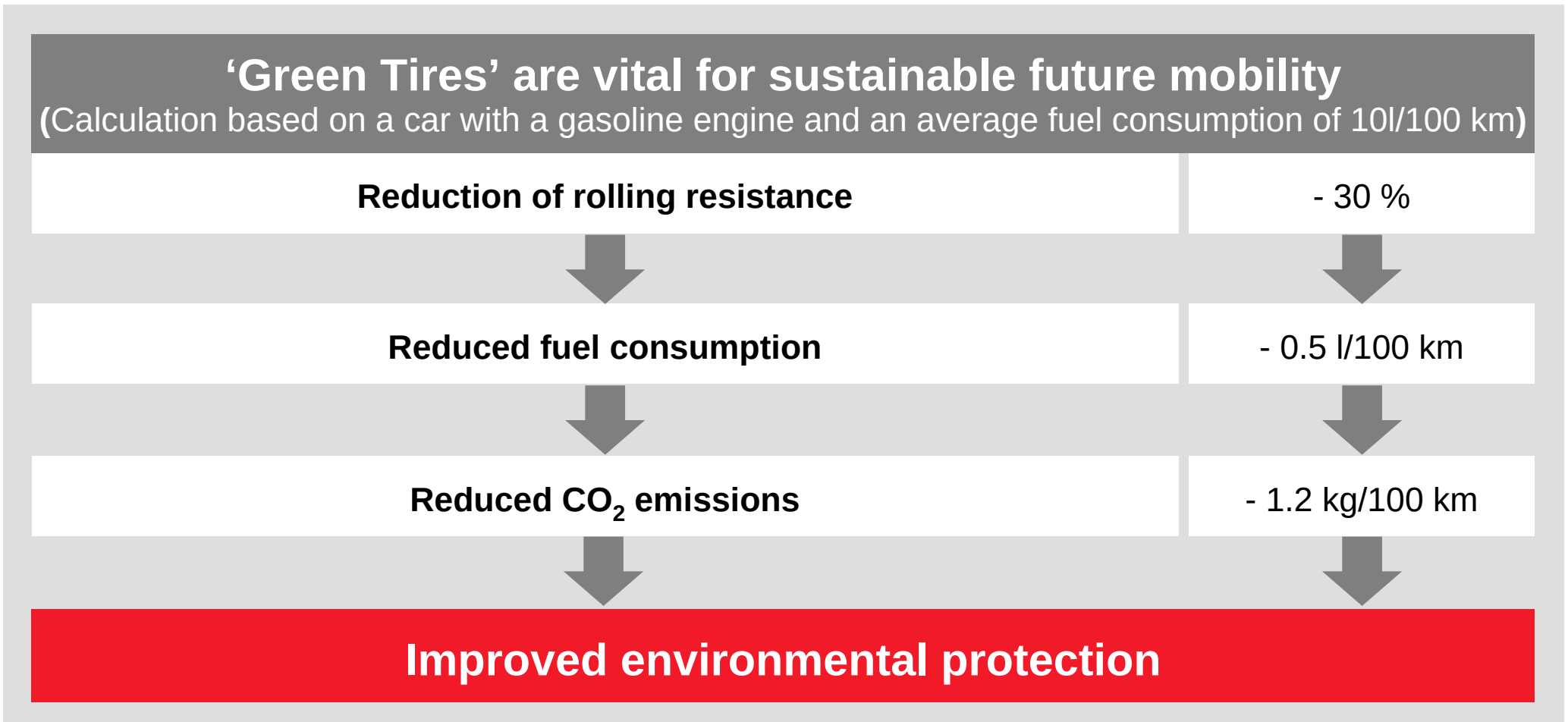
- The biggest share of environmental pollution related to tires is created during usage on the road, in total 86%
  - tire wear/ particulate matter from abrasion accounts for around 10%
  - 76% of the adverse environmental effects caused by tires can be traced back to fuel consumption (respectively associated emissions) during usage

Contribution of the different stages of tire life cycle in the global impact on the environment



Source: Michelin Fact Book 2003

Ecological interaction of tires



Source: www.auto-motor-und-sport.de/eco/verbrauchsreduzierung-rollwiderstandsoptimierte-reifen-alles-ueber-den-reifen-rollwiderstand-1899808.html

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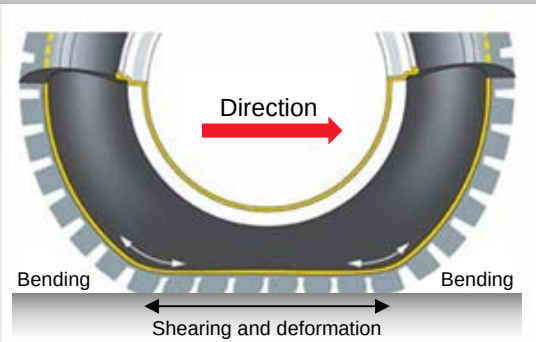
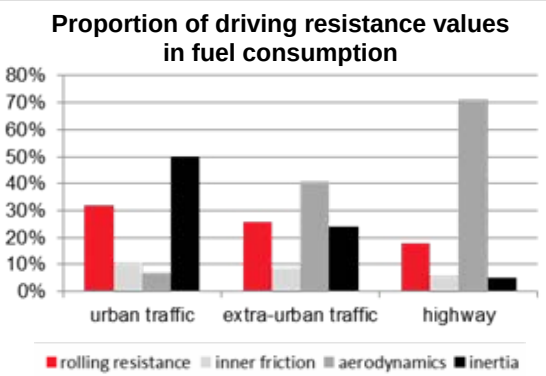
Impact of rolling resistance on engine performance

Fuel consumption | **CO_2 emission** | **Noise emission**

- During travel, the tire deforms to absorb road surface irregularities – it is because it can change shape that it provides grip and comfort
- As the rubber compounds are being deformed, they heat up and dissipate part of the energy transmitted by the engine – a phenomenon known as rolling resistance
- On average, 20% to 30% of fuel consumption is used to overcome rolling resistance, while the rest of the fuel consumed serves to counter air resistance, inertia and inner friction (e.g. in the engine or transmission)

‘Green Tires’ with lower rolling resistance help to reduce fuel consumption





Sources: BMW, Der Reifen im Spannungsfeld zwischen hohen technischen Anforderungen und immer schärfer werdenden gesetzlichen Auflagen, 2008
Michelin Fact Book 2003
www.adac.de/infotestrat/reifen/rollwiderstand.aspx

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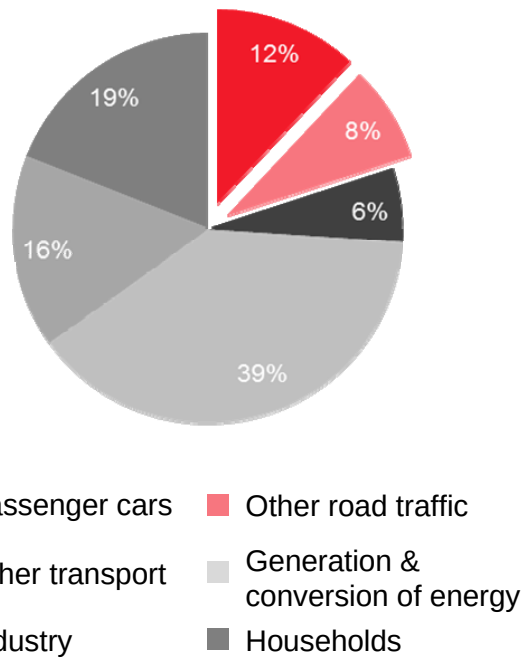
The interrelationship of CO_2 emissions and tires

Fuel consumption | **CO_2 emission** | **Noise emission**

- Passenger cars are responsible for
  - around 12% of total CO_2 emissions in the EU
  - around 5% of man-made CO_2 globally – and rising
- A reduction of road traffic emissions – especially in developed countries – would have a significant effect on the overall CO_2 balance
- Rolling resistance and fuel consumption have an immediate impact on CO_2 emission

Fuel-efficient 'Green Tires' help to reduce road-traffic-related CO_2 emissions

Road transport accounts for about one fifth of the EU's total CO_2 emissions



Sources: ec.europa.eu/clima/policies/transport/vehicles/cars_en.htm
www.acea.be/index.php/news/news_detail/sources_of_co2_emissions_in_the_eu

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Road traffic and noise pollution

Fuel consumption

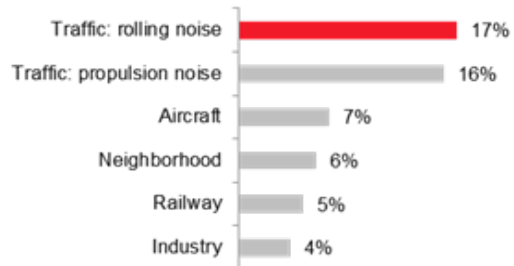
CO_2 emission

- Traffic noise is by far the biggest source of noise pollution
- Overall increase in traffic has offset continuous reduction achievements in noise pollution by the entire road transport sector
- Road traffic noise components consist primarily of propulsion noise (engine, exhaust systems etc.) and rolling noise (tire-road interaction)
- The vast array of preventive and remedial measures includes tire and engine technologies, road surfacing and traffic management strategies

‘Green Tires’ with innovative tread patterns and optimized rubber composites help to reduce rolling noise emission

Noise emission

At 33%, traffic noise represents the biggest source of noise pollution in Germany



Sources: www.nynas.com/templates/Page____9037.aspx?epslanguage=EN
www.iproplan.de/cms/images/stories/pdf/10_03.pdf

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‘Green Tires’ meet multifaceted consumer demands

High safety standards

Reduced environmental impact

Greater durability

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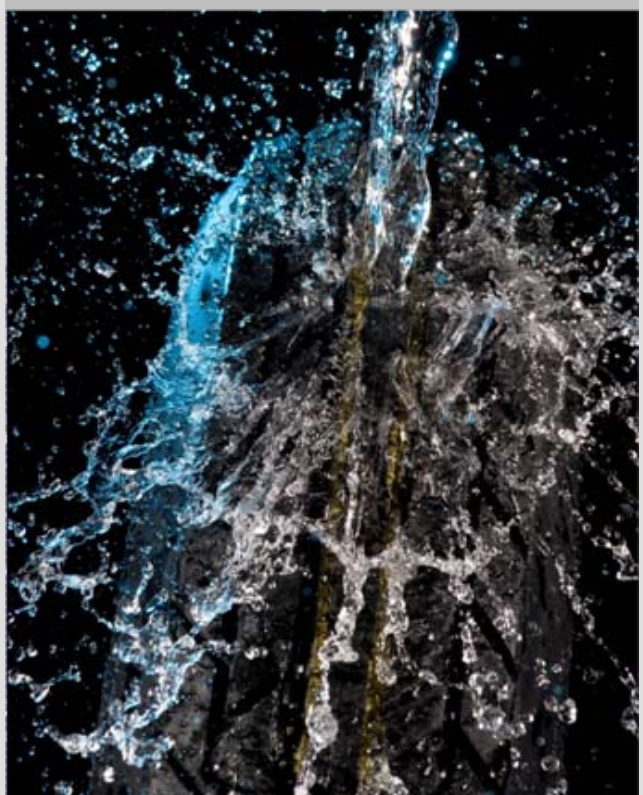
‘Green Tires’ – improving safety standards

Safety | Sustainability | Durability

Safety comes first

- Safety ranks as the most important parameter for road users
- ‘Green Tires’ perform excellently in key aspects such as traction, handling and wet grip
- Wet grip of tires is a key factor for safety
  - ‘Green Tires’ guarantee a better wet road grip and thus a shorter braking distance than regular tires
  - new EU tire labeling informs customers about the important safety aspect of wet grip performance and helps set the right priorities in the purchasing process



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‘Green Tires’ – providing better environmental protection

Safety | **Sustainability** | Durability

Growing societal demand for environmental stewardship

- High consumer demand for sustainable mobility driven by
  - increasing traffic volume
  - soaring prices of fossil fuels
  - raising ecological awareness
- ‘Green Tires’ allow every road user to make a personal contribution to improving the energy efficiency of automobiles and to better environmental protection
- Fitting all vehicles worldwide with ‘Green Tires’ could result in annual savings of around 20 billion liters of fuel and some 50 million metric tons of CO_2 emissions

Source: Michelin

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‘Green Tires’ – increasing mileage and service life

Safety | Sustainability | **Durability**

Enhancing ride quality and mileage

- Raising consumer demand for driving comfort and tire durability due to
  - increasing personal mobility
  - longer travel distances and higher mileage
  - growing cost sensitivity
- ‘Green Tires’ provide enhanced mileage and longer service life, resulting in
  - better price-performance ratio
  - saving environmental resources
  - reduced particulate matter from tire abrasion
  - less tire waste

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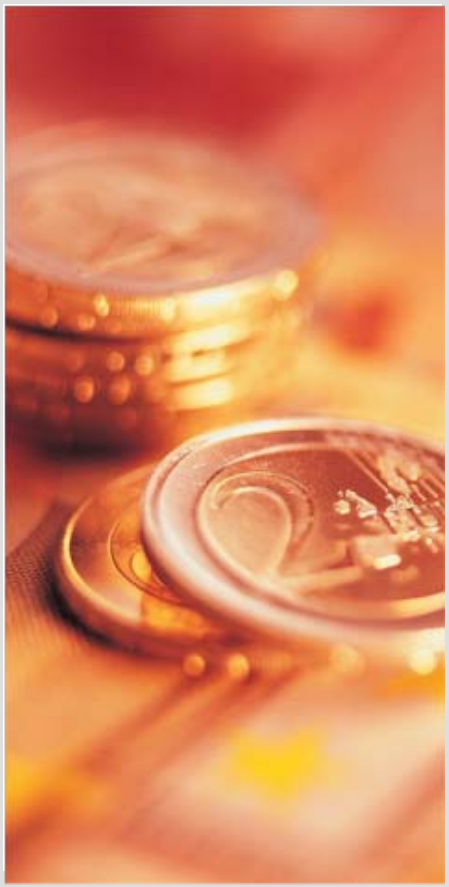
‘Green Tires’ – a worthwhile investment

‘Green Tires’ offer savings potential

- While ‘Green Tires’ may cost a little more up front, they reduce fuel consumption by 5% to 7%
- Consumers will benefit in the long run from better fuel economy, translating into savings at the gas pump
- ***Example:*** A car owner traveling 12,500 km per year could easily save up to €100 of fuel per year. The additional investment of €20 to €50 per tire amortizes within two years



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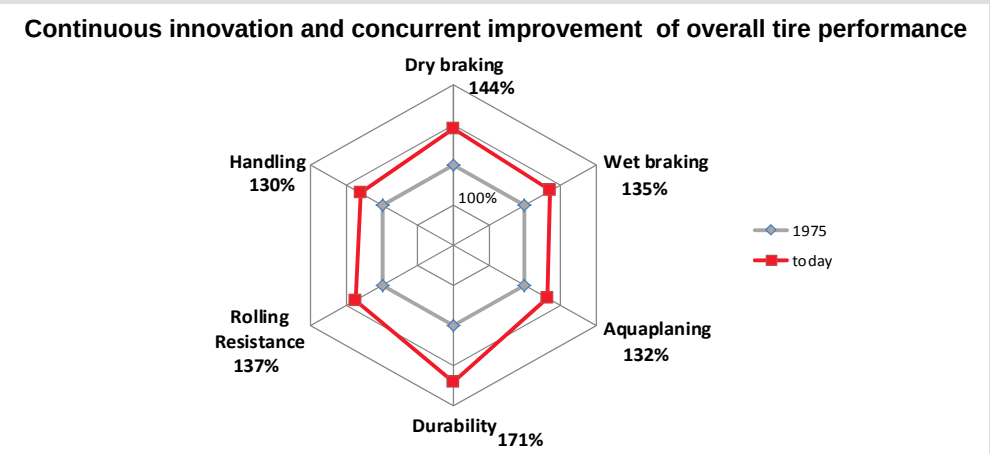
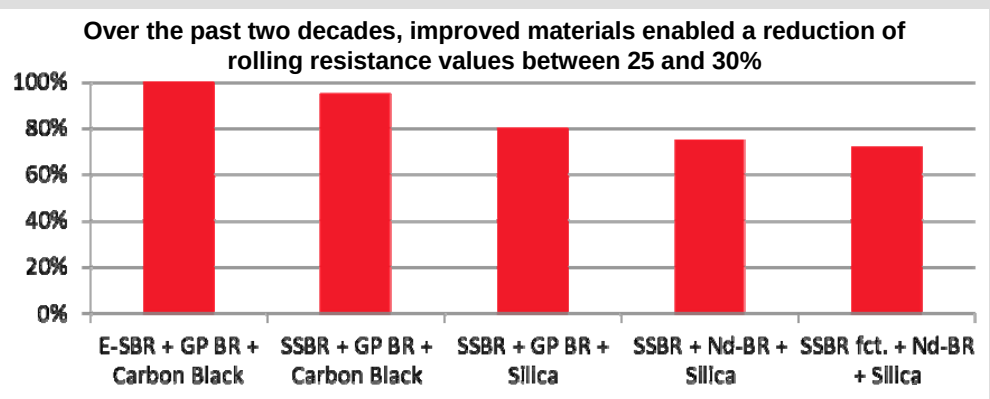
Significant improvements in overall tire performance

- Due to the continuous development of innovative technologies and materials, modern high-quality tires offer exceptional performance in all parameters
- Since 1975, tire producers have managed to optimize all key tire parameters by at least 25%, e.g.
  - rolling resistance
  - handling
  - dry traction
  - wet traction
  - aquaplaning
  - durability





Source: Continental AG

‘Green Tires’ that effectively combine efficiency and safety are already a reality

Examples

Pirelli	Bridgestone	Continental	Goodyear	Michelin	Hankook
Cinturato P1	**Ecopia EP 150**	**Ecocontact 5**	**EfficientGrip**	**Energy Saver**	**Kinergy Eco**
▪ Reduced rolling resistance **25%***	▪ Reduced rolling resistance **15%***	▪ Reduced rolling resistance **20%***	▪ Reduced rolling resistance **15%*****	▪ Reduced rolling resistance **20%***	▪ Reduced rolling resistance **12%***
▪ Reduced wet braking distance **3%***	▪ Reduced wet braking distance **5%***	▪ Reduced wet braking distance **10%***	▪ Reduced wet braking distance **3%*****	▪ Shorter wet braking distance **3m** (from 80 to 10 km/h)*	▪ Reduced wet braking distance **8%***
▪ Improvement of mileage **30%****	▪ Improvement of mileage **15%***	▪ Improvement of mileage **12%***	▪ Improvement of mileage **3%*****	▪ Improvement of mileage **40%*****	▪ Improvement of mileage **no data**

Sources: www.pirelli.com; www.bridgetstone.eu; www.conti-online.com; www.goodyear.eu; www.michelin.de; www.hankooktire-eu.com

* Compared to their predecessors
** Compared to ordinary tires
*** Compared to the average performance of leading competitors’ tires

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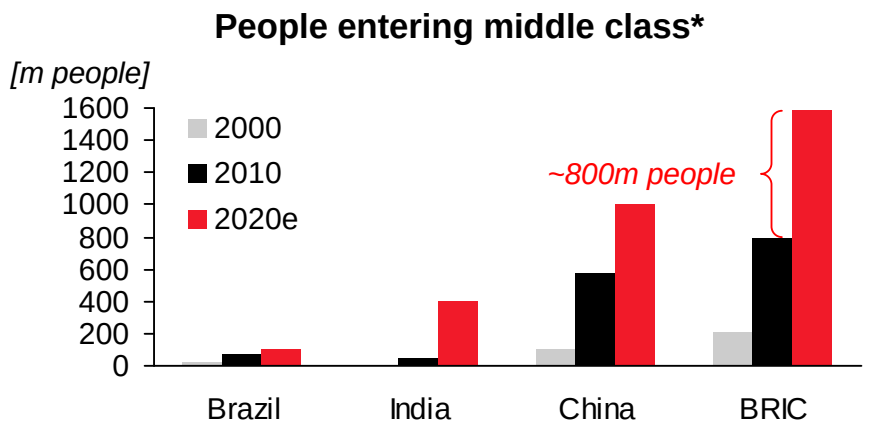
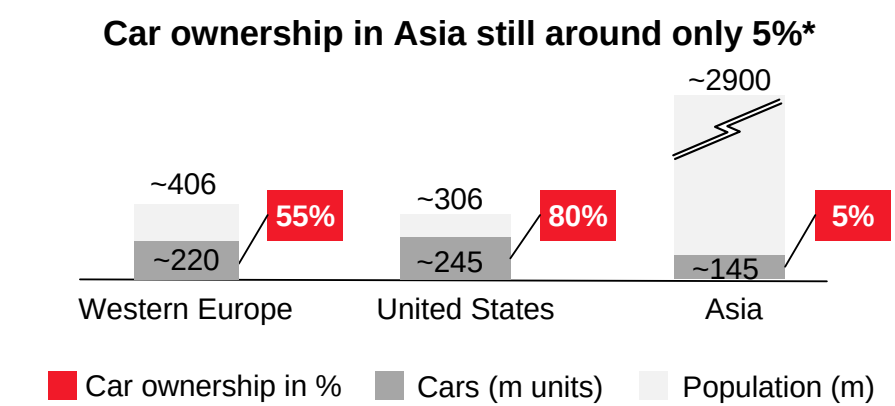
Increasing worldwide demand for mobility

- Rising worldwide prosperity, particularly in China and India
- Enables an increasing number of new middle-class families to achieve personal mobility
- Millions of trade-ups to be realized soon
  - bicycles for mopeds
  - mopeds for cars
- Leading to increased car ownership, especially in Asia

Future mobility demand driven by emerging Asian middle class



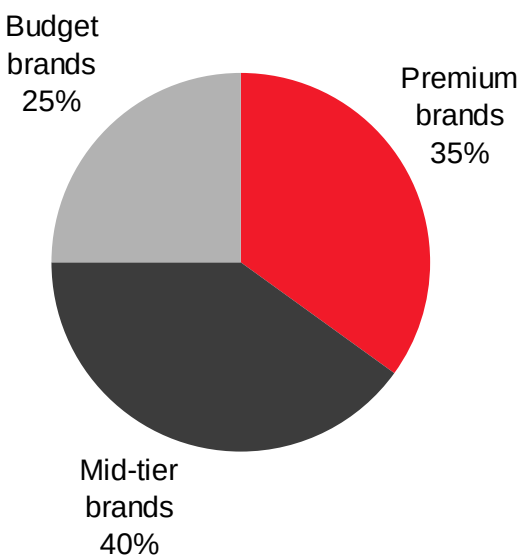


Sources: Goldman Sachs Global Economics Group. "Is this the BRICs decade?", 2010
Michelin estimates

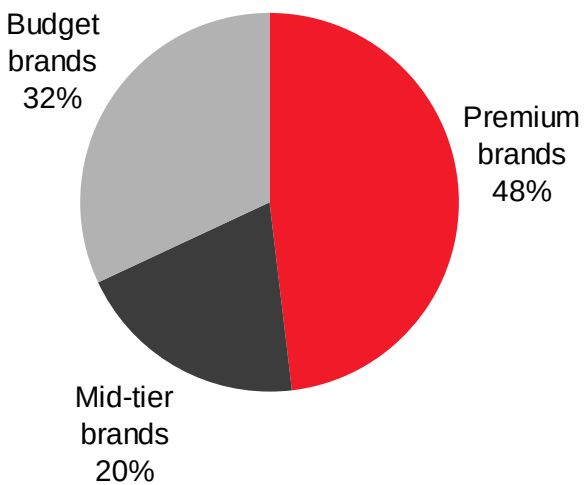
* Population with income >$6,000 and <$30,000/capita in BRIC countries

New tire regulations will lead to a polarized tire market

Tire market by segment, pre-regulation*



Tire market by segment, post-regulation



Growing demand for high-performance premium brands

Source: Exane BNP Paribas estimates

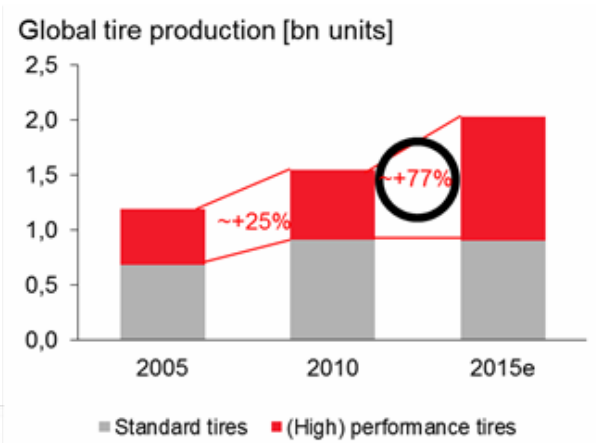
* global tire related regulations (EU, Japan, South Korea, etc.)

Increasing demand for tires

Demand for high-performance tires is growing

- By 2015, the high-performance tire segment will have increased by 77%
- Rolling-resistance-optimized tires are expected to replace regular tires and become the standard in Europe
- The implementation of new EU regulations will challenge the global rubber, tire and automotive industries to adapt their products and processes to the CO_2 emission requirements

Increasing tire demand



LANXESS offers the right products for ‘Green Tires’

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Expertise and innovation as key elements for sustainable development

Driving sustainable mobility…

- LANXESS has more than 100 years of experience in the development and production of synthetic rubber and rubber chemicals
- LANXESS sets the pace in the field of performance rubbers by constantly developing new innovative products
- Half of LANXESS' sales to the rubber industry are to tire manufacturers
- LANXESS has a clear focus on products for 'Green Tires'

…through continuous development

LANXESS is committed to products for tires

R&D	▪ Focusing on product innovations that enable our customers to create safe, durable, and fuel-saving tires that meet challenges of growing mobility in worldwide markets	
Production facilities	▪ Expanding rubber production capacities to serve growing demand ▪ Construction of world's largest Nd-PBR plant in Singapore until 2015	
Technical support	▪ Technical experts in the rubber business units support our most exacting customers with state-of-the-art services and solutions that add significant value to their business	

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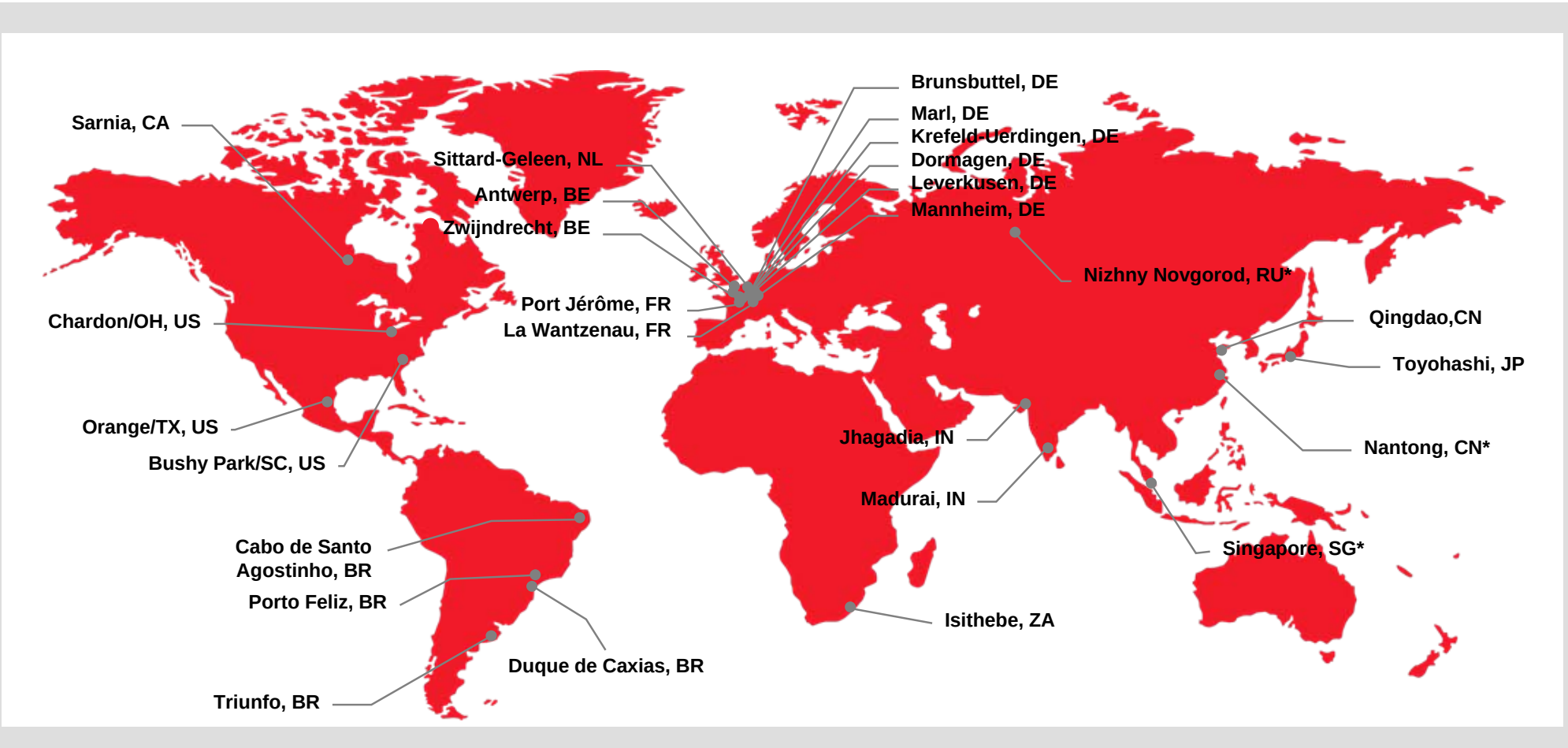
LANXESS' sites worldwide providing products for the tire industry



* under construction

LANXESS offers the broadest portfolio of synthetic rubbers and additives in the industry (1/2)

Supplier	Tire			Technical Rubber Products								
	SBR	BR	IIR	EPDM	CR	NBR	HNBR	AEM	ACM	EVM	CSM	FKM	ECO
LANXESS	✓	✓	✓	✓	✓	✓	✓			✓		✓	
POLIMERI EUROPA	✓	✓		✓		✓							
DUPONT					✓			✓				✓	
DOW	✓	✓		✓									
Exxon			✓	✓									
JSR	✓	✓	✓	✓		✓							
ZEON CHEMICALS	✓	✓				✓	✓		✓				✓

LANXESS offers the broadest portfolio of synthetic rubbers and additives in the industry (2/2)

Supplier	Accelerators					Antidegradants					Special Chemicals		
	CBS	TBBS	DCBS	MBS	MBT	6PPD	IPPD	77PD	DTPD	TMQ	DBD	BDTCH	BCI-MX
LANXESS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FLEXSYS						✓		✓					
SINORGCHEM						✓	✓						
China Sunsine Chemical Holdings Ltd.	✓	✓	✓		✓					✓			
Kemai	✓	✓	✓							✓			
KUMHO PETROCHEMICAL						✓							
GENERAL QUIMICA	✓	✓			✓					✓			
ISTROCHEM DUSLO	✓	✓				✓	✓						
WUHAN JINGHE											✓		✓

LANXESS

‘Green Tires’ energized by LANXESS

Tread	→ *Influences grip, fuel economy and noise*
Undertread	→ *Joins the tread to steel belt and carcass*
Upper steel belt	→ *Influences driving features and shape*
Sidewall	→ *Protects carcass from damage*
Lower steel belt	→ *Influences the driving features and shape*
Carcass	→ *Gives support and shape*
Innerliner	→ *Replaces the tube*
Steel wires	→ *Keeps the tire safely attached to wheel rim*

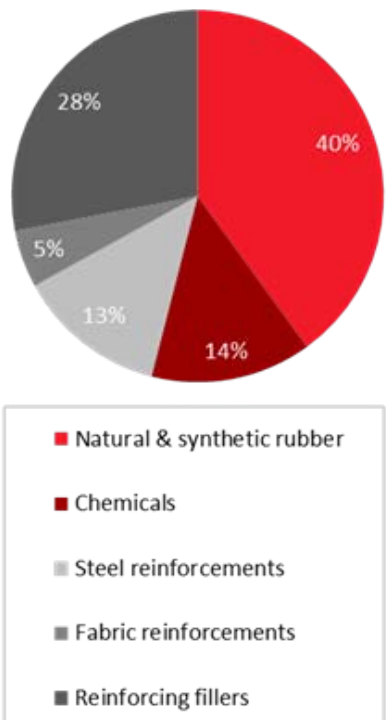
Energized by LANXESS rubber and/or additives

LANXESS

Need to meet different requirements of tire compounds to increase overall performance – examples

Tread	▪ Needs to be soft to provide grip and comfort and at the same time robust to minimize tire abrasion ▪ Low heat build-up required
Undertread	▪ Must ensure good adhesion between the tread compound and the cap ply
Sidewall	▪ Must be able to easily change shape ▪ High resistance to flex cracking and fatigue as well as low heat build-up required
Carcass	▪ Needs to stick particularly well to polyamide and steel reinforcements
Innerliner	▪ Must be particularly impermeable to air

A passenger car tire is made up of more than 200 components



Source: Michelin Fact Book 2003

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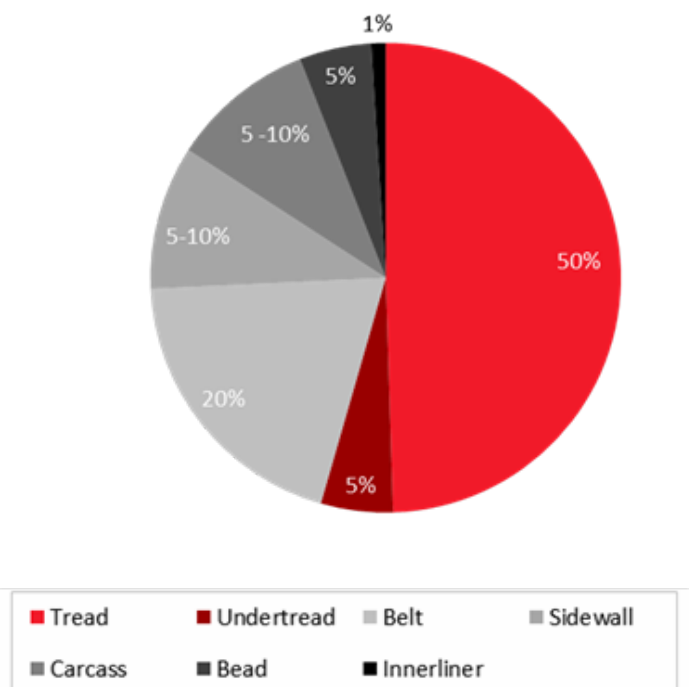
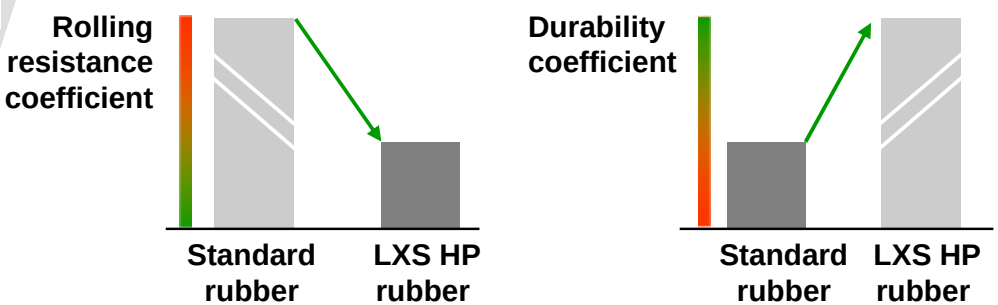
High-end rubbers needed to improve tire efficiency

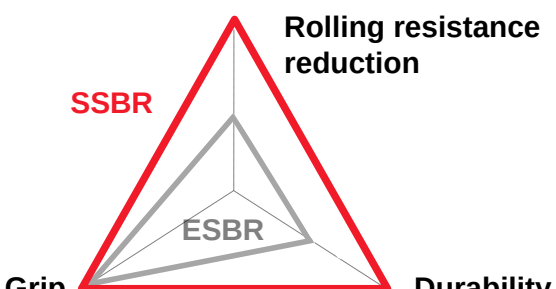
Proportion of tire components in rolling resistance



LANXESS solutions to increase tire performance

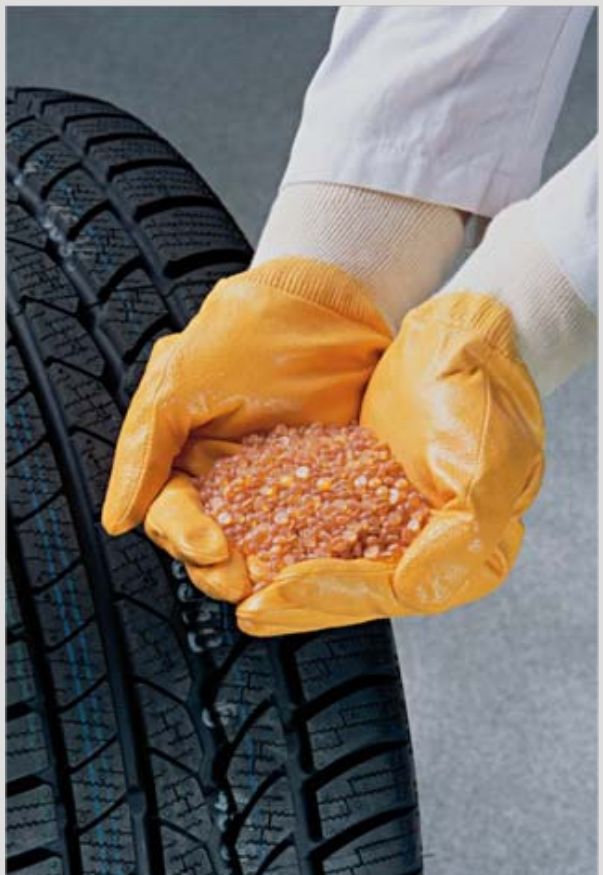


Effect of LANXESS high-end rubbers in treads



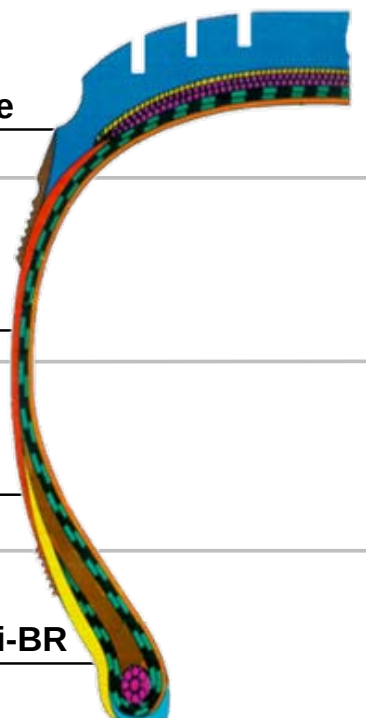
Source: BMW, Der Reifen im Spannungsfeld zwischen hohen technischen Anforderungen und immer schärfer werdenden gesetzlichen Auflagen, 2008

Synthetic rubbers – more than just more efficiency



Characteristics of ‘Green Tires’: LANXESS products

Optimized microstructure and filler interaction → **Fuel economy**	**S-SBR** **Nd-PBR** **Nanoprene**
Long chains (physical network) → **Crack resistance**	**Nd-PBR**
Flexible chains → **Elasticity**	**Nd-PBR** **Co-BR**
High hardness → **Wear resistance**	**coupled Li-BR**



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LANXESS premium products for ‘Green Tires’ – Solution-styrene-polybutadiene rubber (S-SBR)

Characteristics	▪ High density of anchor points that stick particularly well to the hard filler particles → excellent bonding to silica ▪ Covering of the silica particles with a thick, friction-reducing rubber skin → reduction of the internal friction of the reinforcing silica particles
Benefits	▪ Optimized rolling resistance → increase in fuel efficiency and reduction of CO_2 emissions ▪ Outstanding road grip → enhanced safety ▪ Very long service life → improved mileage
Main brand	Buna® VSL

LANXESS

LANXESS premium products for ‘Green Tires’ – Neodymium polybutadiene rubber (Nd-PBR)

Characteristics	▪ Highest stereoregularity, narrowest molecular weight distribution and least branching within group of high cis-BRs → manufacture of tires with outstanding physical data ▪ Very linear and unique macrostructure → lower heat build-up and higher flexibility than other tire elastomers ▪ Strain-induced crystallization → greater resistance
Benefits	▪ Optimized rolling resistance → increased fuel efficiency and reduction of CO_2 emissions ▪ Excellent resistance to abrasion, flex cracking and fatigue → improved safety and durability
Main brand	Buna® CB

LANXESS

LANXESS premium products for ‘Green Tires’ – Regular butyl and halobutyl rubber

Characteristics	▪ Innerliners made of butyl rubber are highly impermeable to air → help prevent under-inflation ▪ Butyl rubber in tread compounds → softer tires and better grip and comfort
Benefits	▪ Optimized rolling resistance → increased fuel efficiency and reduction of CO_2 emissions ▪ Improved wet traction → greater safety
Main brands	X_Butyl® X_Chlorobutyl® X_Bromobutyl®

LANXESS

LANXESS premium products for ‘Green Tires’ – Nanoprene

Characteristics	▪ Consists of particles of only around 50 nanometers made from polymerized styrene and butadiene – i.e. “traditional” tire rubber raw materials →minimal size ▪ Nanoparticles with a swell-resistant, highly cross-linked core have special “anchor points” on their surface → Nanoprene particles can be perfectly linked with silica and silanes
Benefits	▪ Enhanced road grip → greater safety ▪ Significant improvement in abrasion resistance → increased tire lifespan/mileage and reduced rubber particle emissions
Main brand	Nanoprene®

LANXESS

LANXESS premium products for ‘Green Tires’ – Sulfenamides for sulfur cross-linking

Characteristics	▪ Highly effective accelerator of vulcanization → better kinetics and network establishment
Benefits	▪ Outstanding scorch safety and fast vulcanization time → optimized safe and short tire curing
Main brand	Vulkacit® **CZ / NZ / DZ / MOZ**

LANXESS

LANXESS premium products for ‘Green Tires’ – Phenylendiamines and quinoline as antidegradants

Characteristics	▪ Protection of rubber goods against oxygen, ozone, fatigue cracking and rubber poison → manufacture of tires with good aging resistance ▪ Technologically and economically superior antidegradants for rubber particles → improved service life of tires
Benefits	▪ Protection against fatigue and ozone, prevention of aging and improved service life of tires
Main brand	**Vulkanox® 4020 / 4010 NA / 4030 / 3100 / HS**

LANXESS

LANXESS premium products for ‘Green Tires’ – Peptizer for mastication of natural rubber

Characteristics	▪ Reduction of molecular weight of natural rubber → improved processing and blending of mix
Benefits	▪ Reduction of total mixing energy → lower energy required for processing of tires ▪ Shorter mixing time → higher output
Main brand	Renacit® **10 / 11 / 9203**

LANXESS

LANXESS premium products for ‘Green Tires’ – Antireversion agents

Characteristics	▪ Improved stability of network → maintaining physical tire characteristics ▪ Introduction of hybrid cross-links during vulcanization or repairing network during service life → improved service life of tires
Benefits	▪ Slower reversion of tread compound → more constant tire performance over the entire life of the tire ▪ Lower rolling resistance and DPG replacement possible → reduced fuel consumption and almost no aniline (carcinogenic) emission
Main brands	Vulcuren® Perkalink® 900

LANXESS

LANXESS premium products for ‘Green Tires’ – Processing agents

Characteristics	▪ Customized processing promoters available for all kinds of tire related compounds, e.g. processing agents specifically developed for use in silica treads
Benefits	▪ Improvement in processing properties → higher productivity, less energy consumption ▪ No adverse effects on the tire’s physical properties → no compromise between savings in production and tire performance necessary
Main brands	**Aflux®** **Aktiplast®**

LANXESS

LANXESS premium products for ‘Green Tires’ – Release agents

Characteristics	▪ Typically adapted to the customer's specific setup → tackle all release problems of a production process in a tire plant ▪ Powder release agents for all grades of rubber, including soft and oily synthetic rubber compounds
Benefits	▪ Aqueous paints for the inside of tires and bladder coatings → problem-free vulcanization and lower scrap rates ▪ Semi-permanent bladder coating → longer service life ▪ Powder release agents → easy interim storage of rubber sheets and further processing after relevant mixing stages
Main brand	**Rhenodiv®**

LANXESS

LANXESS premium products for ‘Green Tires’ – Specialty accelerators

Characteristics	▪ Improve reversion properties in all kinds of rubber grades ▪ When combined with benzothiazole sulfenamides or benzothiazoles → enhance solubility of these accelerators
Benefits	▪ Improved availability of other accelerators (when combined) → higher crosslinking efficiency ▪ DPG replacement in silica formulations → no aniline (carcinogenic) emissions ▪ Exceptionally useful in difficult formulations based on mercaptosilanes → further optimized rolling resistance
Main brand	**Rhenocure®**

LANXESS

LANXESS premium products for ‘Green Tires’ – Bonding agents

Characteristics	▪ Ensure reliable bonding of rubber compounds with the textile and steel reinforcing layers of a tire
Benefits	▪ Stable RFL dip quality for fabric impregnation → less formaldehyde necessary ▪ Use in steel cord compounds → consistently high level of rubber to metal bonding in radial tires
Main brands	**Rhenosin®** **Rhenogran®**

LANXESS

LANXESS premium products for ‘Green Tires’ – Zinc oxide and crosslinking resin

Characteristics	▪ Provide an excellent solution to the problems involved when producing butyl bladder compounds
Benefits	▪ Resin and ZnO already incorporated into butyl rubber → prevents clumps of resin forming on hot metal surfaces in the internal mixer ▪ Even dispersion of crosslinking chemicals → higher bladder durability
Main brand	**Rhenogran® PCZ-70/IIR**

LANXESS

LANXESS premium products for ‘Green Tires’ – Rhenoshape® Curing Bladders

Characteristics	▪ Ensure a smooth and efficient tire curing process
Benefits	▪ Increased productivity → longer bladder life and shorter cure cycles with high conductive compound ▪ Better tire finish appearance → innovative bladder venting design and surface finish reduce tire scrap
Main brand	**Rhenoshape®**

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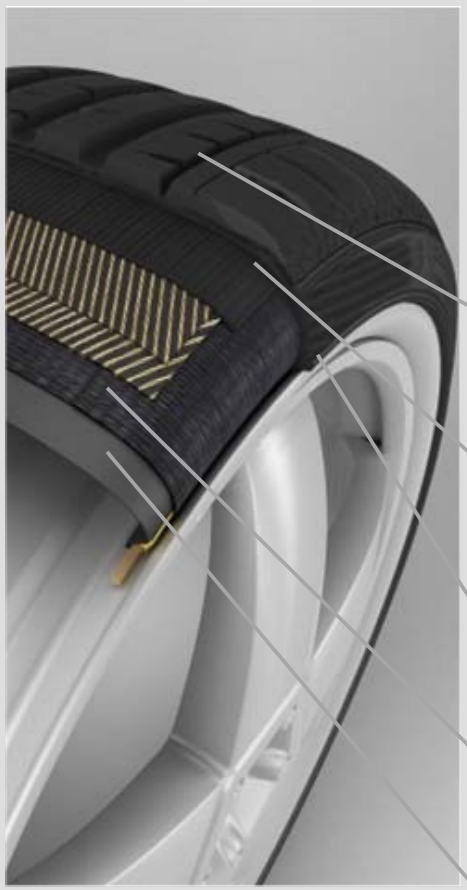
LANXESS premium products for ‘Green Tires’ – Overview



LANXESS products / Tire components	Synthetic rubber			Additives								
	Buna VSL	Buna CB	Butyl, Chlorobutyl, Bromobutyl	Nanoprene	Vulkacit CZ , NZ, DZ, MOZ	Vulkanox 4020, 4010, NA, 4030, 3100, HS	Renacit 10, 11, 9203	Vulcuren, Perkalink 900	Aflux®, Aktiplast®	Rhenodiv®	Rhenocure®	Rhenosin®, Rhenogran®
Tread	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Under-tread					✓	✓	✓	✓			✓	✓
Side-wall		✓			✓	✓	✓	✓	✓		✓	
Carcass		✓			✓	✓	✓	✓	✓		✓	✓
Innerliner			✓		✓	✓	✓	✓	✓	✓		

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LANXESS – for a sustainable future of mobility

- Performance rubbers key to solving demanding tire requirements
- LANXESS as the leading supplier of high performance rubbers and additives
- LANXESS S-SBR and Nd-PBR for maximum performance
- Vast expertise on how next tire generations can help achieve sustainable mobility goals

LANXESS


LANXESS
Energizing Chemistry

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