Performance Butadiene Rubbers – Taking performance to a new level

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Head of Business Unit Performance Butadiene Rubbers
Duesseldorf, September 16, 2010
BU Performance Butadiene Rubbers offers top solutions which meet today's and tomorrow's requirements

Agenda

- PBR – Business overview
- Growth drivers
- Investments and technology upgrades
- Outlook
PBR – Business overview

Facts
- Production capacity: >800,000 t/a (all rubber grades)
- Sales: >€500 m
- Employees: ~1,000
- Customers: >250
- Production sites: Dormagen (GE); Triunfo, Cabo, Caxias, (BR); Port Jérôme (FR); Orange (US)

Products & brands
- Product groups: Polybutadiene rubbers
  Styrene-butadiene rubbers
- Brand: Buna

Markets & competition
- Share: LANXESS No. 1 in performance rubber
- Market size: ~€11 bn EUR in 2010e
- Competitors*: Goodyear, KKPC, Petrochemicals, NKNK, Polimeri, Sibur, Sinopec, Styron

* Merchant market

PBR offers a full range of performance rubbers for a variety of industries

End uses*
- Tire 71%
- Lifestyle & leisure 6%
- Technical rubber (Industrial & mining) 7%
- Plastics 16%

Global demand 2010e
- Americas 23%
- APAC 52%
- EMEA 25%

Global market split by grade
- ESBR
- Performance rubbers**
- LXS rubber split by grade
- ESBR
- Performance rubbers**

BU PBR – Number one in global synthetic rubber market

Source: LXS estimates based on CMAI 2010; * Based on BU sales; ** Such as Nd-PBR and SSBR
BU PBR with solid footing in the performance rubber market

**TOP 15 PBR/SSBR producers 2010**

<table>
<thead>
<tr>
<th>Capacity [kt]</th>
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</thead>
<tbody>
<tr>
<td>LANXESS</td>
</tr>
<tr>
<td>Sinopec</td>
</tr>
<tr>
<td>BSFS</td>
</tr>
<tr>
<td>Goodyear</td>
</tr>
<tr>
<td>JSR</td>
</tr>
<tr>
<td>EFremov</td>
</tr>
<tr>
<td>Polimeri</td>
</tr>
<tr>
<td>Petrochina</td>
</tr>
<tr>
<td>Sibur Group</td>
</tr>
<tr>
<td>JR</td>
</tr>
<tr>
<td>KKK</td>
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</table>

| Mainly captive use | Partially captive use |

**Nd-PBR capacities of leading producers**

<table>
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<th>Capacity [kt]</th>
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<tr>
<td>LANXESS</td>
</tr>
<tr>
<td>KKK</td>
</tr>
<tr>
<td>Polimeri</td>
</tr>
<tr>
<td>Sibur</td>
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<tr>
<td>Carbochem</td>
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</tbody>
</table>

Sources: CMAI 2010 and LANXESS market intelligence

Strong global footprint with world-class manufacturing base

- Global player with strong assets in Europe, LatAm and North America
- Serving current and future requirements of our performance oriented customers
- Excellent and awarded sales force in all regions

**BU PBR: production site**

**BU PBR: technical & marketing center**

- Cabo de Santo Agostinho, BR
- Orange, US
- Duque de Caxias, BR
- Triunfo, BR
- Port Jérôme, FR
- Singapore
- Dormagen, GE

Prepared to grow with customers in emerging markets
Performance Butadiene Rubbers demand is driven by two megatrends

**Growth driving megatrends**

**Mobility**
- Tire labeling, overall performance improvement for tires
- Increasing transportation, growth in retreading for truck tires
- Energy efficient tires, e-mobility

**Urbanization**
- Population growth
- Increase in consumption of performance goods

**Market development (2011-2015)**
- Performance applications*: ~10%
- Overall long-term CAGR: 3-4%
- Asia-Pacific: ~5%
  - EMEA: ~2%
  - Americas: ~2%

* Markets for SSBR and Nd-PBR
Minimum performance of tires regulated in the EU and soon to come in further countries

European legislation effective from 2012
Fuel efficiency classes, passenger tires

- **RRC** in kg/t

A  RRC < 6.5
B  > 6.6 RRC < 7.7
C  > 7.8 RRC < 9.0
D  > 9.1 RRC < 10.4
E  RRC < 10.5
F  > 10.6 RRC < 12.0
G  RRC > 12.1

F and G will be banned as of 2016

Source: EU parliament; * LANXESS estimates; ** Rolling resistance coefficient

Regulations in preparation in US and Japan
Tire labelings in several countries other than EU

U.S.
- Tire labeling technically finalized by NHTSA with design under review
- Once the rule is fully finalized, it will be implemented within 24 months

Japan

Manufacturers need high-end rubber to achieve an overall performance improvement for tires

Rolling resistance accounts for 20%-30% of fuel consumption

Selected tire\(^1\) classifications by grip and rolling resistance

<table>
<thead>
<tr>
<th>Grip</th>
<th>RR*</th>
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<tbody>
<tr>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>B</td>
<td>E</td>
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<td>B</td>
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<td>A</td>
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</tbody>
</table>

Rolling resistance still underperforming

LANXESS solutions to reduce rolling resistance

- Effect of SSBR in treads
- Rolling resistance reduction
- Grip
- SSBR
- Durability

Selected tire\(^1\) classifications by grip and rolling resistance

<table>
<thead>
<tr>
<th>Standard rubber</th>
<th>LXS HP rubber</th>
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<tbody>
<tr>
<td>Rolling resistance coefficient</td>
<td>minus 12%-14%</td>
</tr>
</tbody>
</table>

Source: GTÜ and ACE; * Rolling resistance; \^six of the leading global tire producers

11
Change in consumer behavior for tire consumption triggered by an overall win-win situation

### Environment
- Environmental impact over a tire’s life cycle
  - Fuel consumption/rolling resistance
  - Production
  - Abrasion
  - Others

- Significant reduction of CO₂ emissions possible
- Possible annual savings world wide:
  - ~20 bn liter fuel
  - ~50 m tons CO₂ emissions

### Safety
- Nd-PBR in side walls:
  - Excellent resistance to flex cracking
  - Exceptional resistance to fatigue

### Efficiency
- Reduction of rolling resistance by 10% leads to a fuel reduction by 2-3%:
  - Fuel: -0.2l/100km*
  - CO₂ emissions: -4g/km*

Sources: EU; U.S. Department of Energy; Transportation Research Board; * Example for Michelin Energy Saver

LANXESS Nd-PBR also provides opportunities in the growing retreading market

### Fleet operators focus on cost reductions per mileage
Fleet operator benefits from high-performance retreading:
- Purchasing costs:
  - Retread only ~25% of new tire but almost full PBR content
- Attractive operating costs for retreads with SSBR/PBR:
  - Improved rolling resistance by ~30%, hence reduced fuel consumption
  - Higher abrasion resistance, hence more mileage driven

Retread demand growth in Asia

Sources: www.retread.org; www.tyrepress.com; LANXESS market intelligence
Low rolling resistance is a crucial factor for e-cars to extend driven mileage range

E-mobility is a source of future mobility

- Governments promoting e-mobility with several initiatives, i.e. in Germany, France, U.S and China
- Challenge: limited energy storage in batteries as crucial factor to enlarge driven mileage range
- Approach: reduction of rolling resistance in e-cars to become the main goal

Registration of new cars, 2020e split

Source: acatech; Heise; * McKinsey, scenario: oil price: ~110 USD/barrel, 1m e-cars in Germany until 2020

Supply / demand expected to tighten mid-term

HP rubbers expected to grow by ~10% p.a.

- Tire labeling makes innovation in rubber grades visible to customer
- Emerging markets shift towards performance applications
- Market for all polybutadiene rubbers in tight supply
- Smart debottlenecking of ~50kt of Nd-PBR fastest process to serve demand from Asia

Source: LANXESS estimates based on CMAI, SRI, LMC

Nd-technology to become global standard
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Strategic investments underpin excellent competitive position of BU PBR’s production sites (1/2)

<table>
<thead>
<tr>
<th>Production site</th>
<th>Strong set-up drives organic growth</th>
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<tbody>
<tr>
<td>Dormagen – Germany</td>
<td>Debottlenecking of ~15kt Nd-PBR</td>
</tr>
<tr>
<td></td>
<td>Streamlined, highly reliable single line Nd-PBR operation</td>
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<td></td>
<td>Plant serves primarily the tire market</td>
</tr>
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<td>Lowest energy consumer within BU PBR</td>
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<td></td>
<td>100% of butadiene demand supplied by pipeline</td>
</tr>
<tr>
<td>Port Jérôme – France</td>
<td>High degree of flexibility to produce high-performance PBR</td>
</tr>
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<td></td>
<td>Low environmental footprint with state of the art technology</td>
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<td></td>
<td>Most modern and automated PBR manufacturer within LANXESS</td>
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<td></td>
<td>Capability to produce specialized PBR’s</td>
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<td>High share of butadiene supplied by pipeline</td>
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</table>
Strategic investments underpin excellent competitive position of BU PBR’s production sites (2/2)

<table>
<thead>
<tr>
<th>Production site</th>
<th>Strong set-up drives organic growth</th>
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</table>
| Cabo – Brazil   | ▪ Expanding Nd-PBR production capacity by ~20kt  
                  ▪ Using latest LANXESS technology  
                  ▪ Capability to produce functionalized SSBR products  
                  ▪ Located in high-growth region  
                  ▪ Overall balanced butadiene supply |
| Orange – USA    | ▪ Debottlenecking of ~15kt Nd-PBR production capacity  
                  ▪ Largest merchant market manufacturer of PBR products  
                  ▪ Capability to produce all standard PBR grades offered by LANXESS  
                  ▪ Excellent infrastructure along the Gulf Coast  
                  ▪ Fully supplied by two butadiene pipelines |

LANXESS rubber know-how is a benchmark in the industry

- LANXESS with more than 100 years of expertise is the inventor of synthetic rubber:  
  - Many patent applications for enhanced rubber properties in the pipeline  
  - Full innovation pipeline is capitalized quickly by strict time-to-market strategy  
  - Fostering innovations hand in hand with industry leading customers and research institutes

“Tire Industry Supplier of the Year” awarded by tire technology expo underpins LANXESS innovation excellence
Rubber market in transition towards higher performance – BU PBR prepared to grow disproportionately

- Market increasingly relies on performance rubbers to solve tomorrow’s requirements
- LANXESS SSBR and Nd-PBR go hand in hand to achieve maximum performance
- Market for all polybutadiene rubbers in tight supply
- Strengthening LANXESS leading position in merchant rubber market
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