BASF’s Performance Polymers
Delivering sustainable value

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President
Performance Polymers Division

September 5, 2012
Performance Polymers – A strategic fit for BASF

BASF Group sales 2011

- Oil & Gas: 16%
- Agricultural Solutions: 6%
- Functional Solutions: 15%
- Chemicals: 18%
- Plastics: 15%
- Performance Polymers: 7%
- Performance Products: 21%
- Other: 9%

€73.5 billion
1 | BASF – leading in Performance Polymers

2 | BASF – Performance Polymers for the automotive industry
What makes BASF a leader in Performance Polymers?

<table>
<thead>
<tr>
<th>#1 Polyamide &amp; Intermediates</th>
<th>#2 Engineering Plastics</th>
<th>#2 Foams</th>
<th>#1 Specialty Plastics</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image of production plant]</td>
<td>![Image of automotive parts and logos]</td>
<td>![Image of man working on a ladder]</td>
<td>![Image of car]</td>
</tr>
</tbody>
</table>

Key success factors

- World-scale production plants
- Compounding facilities in all major regions close to customers
- Regional technical and development centers
- Close collaboration with OEM´s and tier suppliers
Balanced sales with a focus on growing markets and segments

Performance Polymers sales by region 2011

- South America, Africa, Middle East: 5%
- North America: 21%
- Asia Pacific: 26%
- Europe: 48%

Performance Polymers sales by industry 2011

- Automotive: 21%
- Building, construction: 19%
- Textile, carpet: 11%
- Electrical, electronics: 6%
- Packaging: 9%
- Other: 28%
- Universal*: 6%

* Fiber optical cable, Furniture, Sports & Leisure
Performance Polymers – Sales and earnings development

Sales* (in € billion)  EBITDA (indexed)

* Sales to 3rd parties
Strong global footprint – Serving our customers in all regions

North America
- Freeport
- Wyandotte

Europe
- Antwerp
- Ludwigshafen
- Shanghai

Asia
- Ansan
- Pasir Gudang

South America
- Sparta
- São Bernardo

- recently acquired

Production sites
- Technical centers/offices

Serving our customers in all regions with a strong global footprint.
1 | BASF – leading in Performance Polymers

2 | BASF – Performance Polymers for the automotive industry
Engineering plastics for automotive is an attractive growth market

Strategically relevant engineering plastics demand for automotive applications* (in million tons)

- Market growth ~6% p.a.
- Accelerated growth in Asia
- Major growth drivers are
  - Increased demand for individual mobility in emerging markets (more cars)
  - Growing focus on emission reduction (more plastics in cars)

Key facts

* (Polyamide, PBT, POM, and HT polymers)
Source: Boston Consulting Group, BASF

*CAGR 6% p.a.
*CAGR 5% p.a.
*CAGR 4% p.a.
*CAGR 8% p.a.
*CAGR 6% p.a.

2011 2020

Asia Pacific Europe Americas

BASF Investor Day Automotive September 5, 2012
### BASF is #1 in Engineering plastics market for automotive

#### Engineering plastics market in 2011

<table>
<thead>
<tr>
<th>Company</th>
<th>Market Share</th>
<th>Total Market Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASF</td>
<td>14%</td>
<td>3.6 million tons</td>
</tr>
<tr>
<td>DuPont</td>
<td>22%</td>
<td>1.3 million tons</td>
</tr>
<tr>
<td>Lanxess</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
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</tbody>
</table>

- BASF: 3.6 million tons (14% of market)
- DuPont: 1.3 million tons (22% of market)
- Lanxess: Unknown
- Others: Unknown

#### BASF in engineering plastics

- Globally #2
- Ability to serve customers globally
- Innovation in products and applications

#### BASF engineering plastics for automotive

- Globally #1
- Technical, engineering & application competence
- Preferred development partner at OEMs

Source: BASF
Performance Polymers meet the demand of the automotive market

<table>
<thead>
<tr>
<th>Efficiency</th>
<th>Safety &amp; Comfort</th>
<th>Sustainability</th>
<th>Freedom of Design</th>
</tr>
</thead>
</table>
| ▪ Light-weight solutions by metal replacement  
  ▪ Lowering systems costs | ▪ Optimizing crash resistance  
  ▪ Improving sound absorption | ▪ Lowering fuel consumption  
  ▪ Reduction of CO₂ emissions | ▪ Integration of functions  
  ▪ Miniaturization and downsizing |
Performance Polymers developed from product seller to system solution provider

Product seller Ultramid®

Made portfolio fit for customer needs

Tailormade system solutions through Ultrasim®

1990

2005

Today
Automotive light-weight today
~50 kg weight reduction potential

Air intake manifold

Charge-air lines

Oil pan

Cross beam

Lower bumper stiffener

Wheel rim

Online body panel

Seat

Structural inserts

Interior

Exterior

Under the hood
Under-the-hood – High-tech Ultramid® for metal replacement

Ultramid® Endure – New polyamide specialty for metal replacement in high temperature areas

- **Main applications**
  - Charge-air lines
  - Intake manifold
  - Sensor and actuator

- **Key customer benefits**
  - Weight reduction
  - Lower system costs
  - Easy processability

- **Growth drivers**
  - Trend to downsized and turbo-charged engines
  - Number of cars produced
  - Catch-up potential in emerging markets for metal replacement
Interior – Innovative Ultramid® composite material reduces weight by ~50%

First production part made from continuous fiber reinforced thermoplastic composite

- **Main applications**
  - Seat pan, already commercial
  - Development projects with all major car seat manufacturers

- **Key customer benefits**
  - Increased legroom
  - Weight reduction of almost 50%
  - Lower CO₂-emissions

- **Ultrasim® simulation tool**
  - Proprietary BASF technology
  - Crash simulation
  - Shorter development time and lower cost

- **Growth drivers**
  - Roll-out at other OEMs
  - Substitution of metal structure
Exterior – Innovative Ultramid® solutions to increase safety

Ultramid® CR – Innovative polyamide for crash parts

- **Main applications**
  - Lower bumper stiffener, already commercial with GM Europe

- **Key customer benefits**
  - Increased protection of pedestrians
  - Weight reduction (~50%)
  - Lower CO₂- emissions

- **Growth drivers**
  - New legislation in EU demanding better protection of pedestrians
  - Substitution of other materials
Exterior – Ultramid® Structure
World’s first full plastic wheel rim

Ultramid® Structure – First all-plastic wheel rim suitable for high-volume production

- **Key customer benefits**
  - Weight reduction of more than 30% compared to aluminum
  - Lower fuel consumption
  - Greater range
  - Design freedom and variety of colors

- **Next steps**
  - Design optimization and extensive testing with OEMs currently underway
  - Obtain approval by official authorities (e.g. TÜV)
  - Market introduction expected by 2016

- **Target markets**
  - Electric vehicles
  - Small and mid-sized cars

⇒ Potential: ~24 kg Ultramid® Structure per car
BASF Engineering plastics solutions
Today and tomorrow

Semi-structural parts

Structural parts

Ultramid®
Short glass fibers

Ultramid®
Long glass fibers

Polyamide with continuous fibers

Ultrasim®

Today

Tomorrow
**Ultrasim® simulation tool**

Key for light-weight solutions of tomorrow

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**Ultrasim®**

- BASF proprietary simulation tool combining material know-how with design and processing expertise
- Helps selecting the optimal material for a specific part
- Crash behavior of parts can be forecasted

**Advantages**

- Less prototyping needed
- Lower development cost
- Shorter development time

**Application area**

- OEMs and major tier-suppliers
Automotive light-weight tomorrow
~100-150 kg weight reduction potential

- New technologies and materials required
- Access new applications with continuous fiber reinforced plastics
- Possible applications
  - Structural parts (e.g. suspension components, roof modules, etc.)
  - Chassis (>100 kg weight reduction)
Tremendous growth potential through new technologies for light-weight construction

Long term perspectives with composite materials
Weight/property

- **BASF's future light-weight composite material concepts**
  - Based on continuous fiber-reinforced plastics
  - Show up to 60% weight reduction compared to aluminum
  - Ultrasim™ simulation tool helps to accelerate development process

- **Current status and outlook**
  - BASF already offers solutions based on epoxy- and polyurethane systems
  - First serial automotive application expected within next 5-10 years

<table>
<thead>
<tr>
<th>Today</th>
<th>Tomorrow</th>
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<tbody>
<tr>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td></td>
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<tr>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Aluminum</td>
<td></td>
</tr>
<tr>
<td>40% vs. steel</td>
<td>-60% vs. aluminum</td>
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<tr>
<td>Continuous fiber-reinforced plastics</td>
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BASF’s Engineering plastics targets in Automotive 2015

Operational targets for engineering plastics only

- **Remain the pacesetter for innovation**
  - Continue to be the No. 1 development partner for leading OEMs
  - Leverage cross-divisional competencies (e.g. light-weight team, seat team)
  - Further develop Ultrasim® simulation tool

- **Invest in new capacities**
  - Increase compounding capacities in all regions
  - Open technical centers in emerging markets (e.g. Shanghai)

- **Remain No. 1 in engineering plastics for the automotive industry**
  - Grow sales share in emerging markets by more than 8 % p.a.
  - Resulting in doubling sales
BASF’s Performance Polymers Division targets 2015

Financial targets

- Grow sales to approx. €6.1 billion by 2015; auto sales to grow even faster
- Steadily increase profitability
- Continue to generate a substantial premium on cost of capital