



Welcome to the
BASF Group



„a future worth living for coming generations“

Presented by:

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Cultivating Innovation - Creating Value

- **Sustainable Development as a core to Business Philosophy**
- **Measuring Sustainability**
 - Eco-Efficiency Analysis
 - Methodology
 - Examples
- **Overview of Plastics Industry and Transportation Market**

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BASF 2015



**Ensure Sustainable
Development**

**Help our customers to
be more successful**

**The
Chemical
Company**

**Form the best team in
industry**

**Earn a premium on
our cost of capital**

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BASF 2015: “Ensure sustainable development” Shaping the Future

- Long-term **economic success** combined with **environmental protection** and **social responsibility**
- Business activities to ensure a high quality of life for **current** and **future** generations
- Activities **aligned** with long-term goals and strategy as well as corporate values, organizational structures and management processes
- **Transparency** through continuous reporting and clear goals in the areas of economy, the environment, safety, health and social responsibility



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The Verbund – A Competitive Advantage



The Verbund networks:

- Fully integrated production
- Energy and waste flows
- Logistics and infrastructure

Benefits:

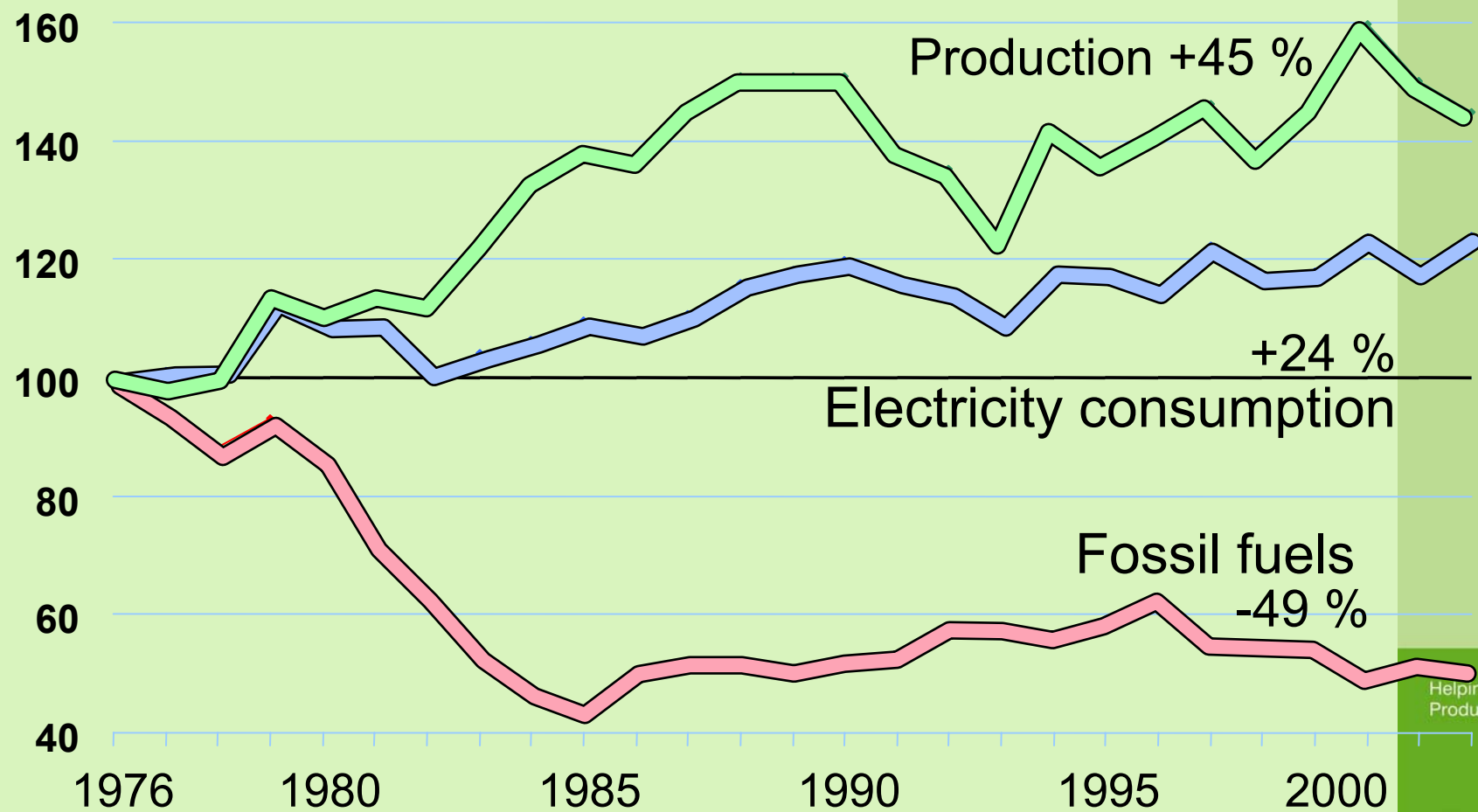
- ➔ Extremely efficient use of raw materials and energy
- ➔ Conservation of natural resources
- ➔ Lower emissions and waste

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The Energy Verbund: Conserving Resources

Index: 1976 = 100; Ludwigshafen site



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BASF worldwide

Eco-Challenges

■ Marketplace

- Recycled content
- Biodegradable
- ELV
- IMDS Inventory
- “Full formula disclosure” ...

■ Competition

- Materials
- Biotechnology ...

■ Eco-Confusion

- Greenwashing

Eco-Integrity

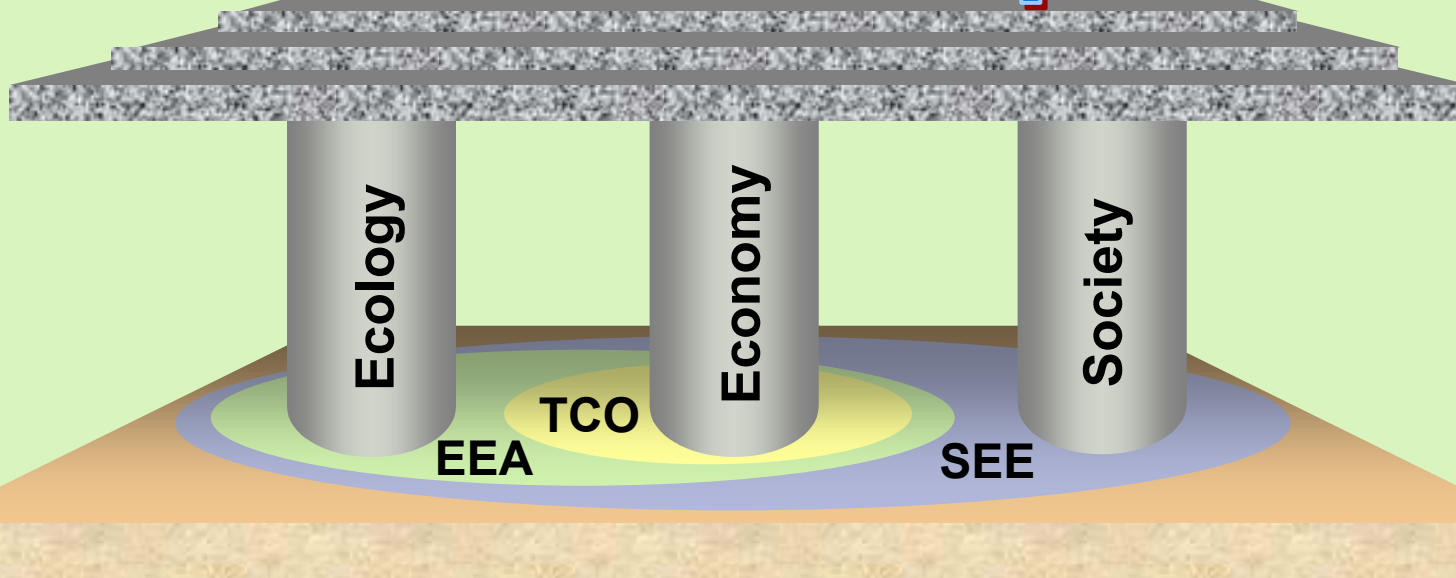


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Measuring Sustainability

sustainable development



TCO = Total Cost of Ownership

EEA = Eco-efficiency Analysis

SEE = SEE-Balance® or Socio-eco-efficiency Analysis

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Eco-efficiency Analysis (EEA)

- BASF strategic tool for measuring sustainability by comparing the ecological impacts and economics of a product or process over their life-cycle.
 - Societal impacts are incorporated in a separate analysis called SEE-balance®.
- Developed in Germany in 1996
- Over 300 projects completed globally
- Third-party certified by the German Technical Monitoring Association (TÜV)



**Validated
Ecoefficiency
Analysis
Method**

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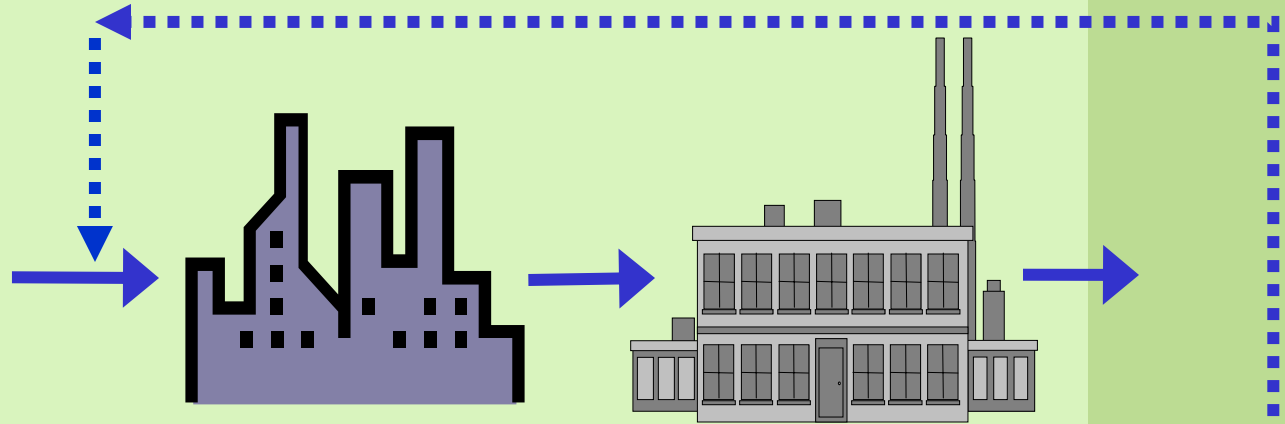
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Considers the Life Cycle

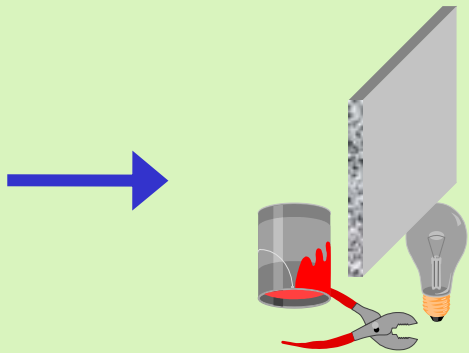


Extraction of Raw Materials



Processes

Products



Use of products



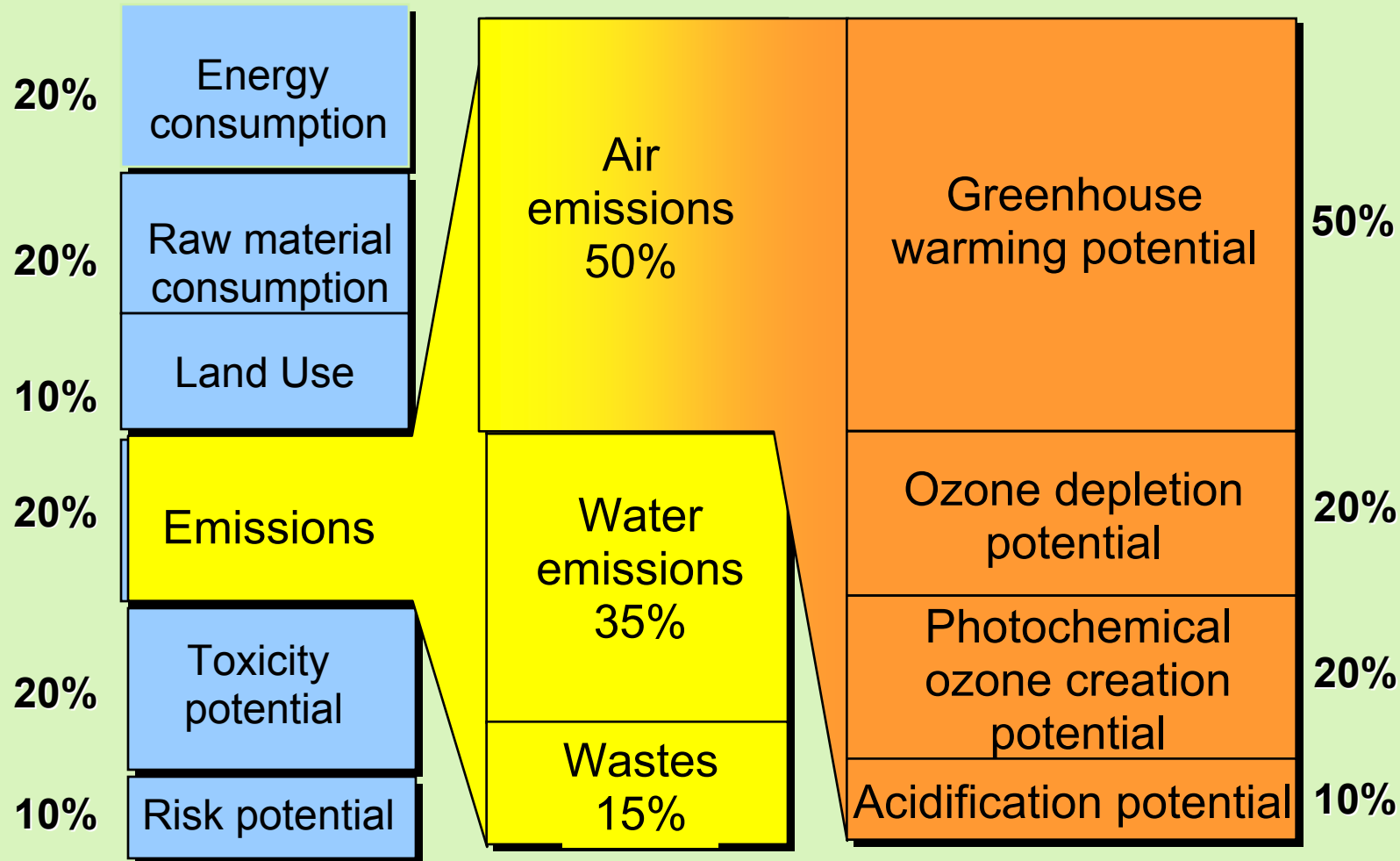
Disposal



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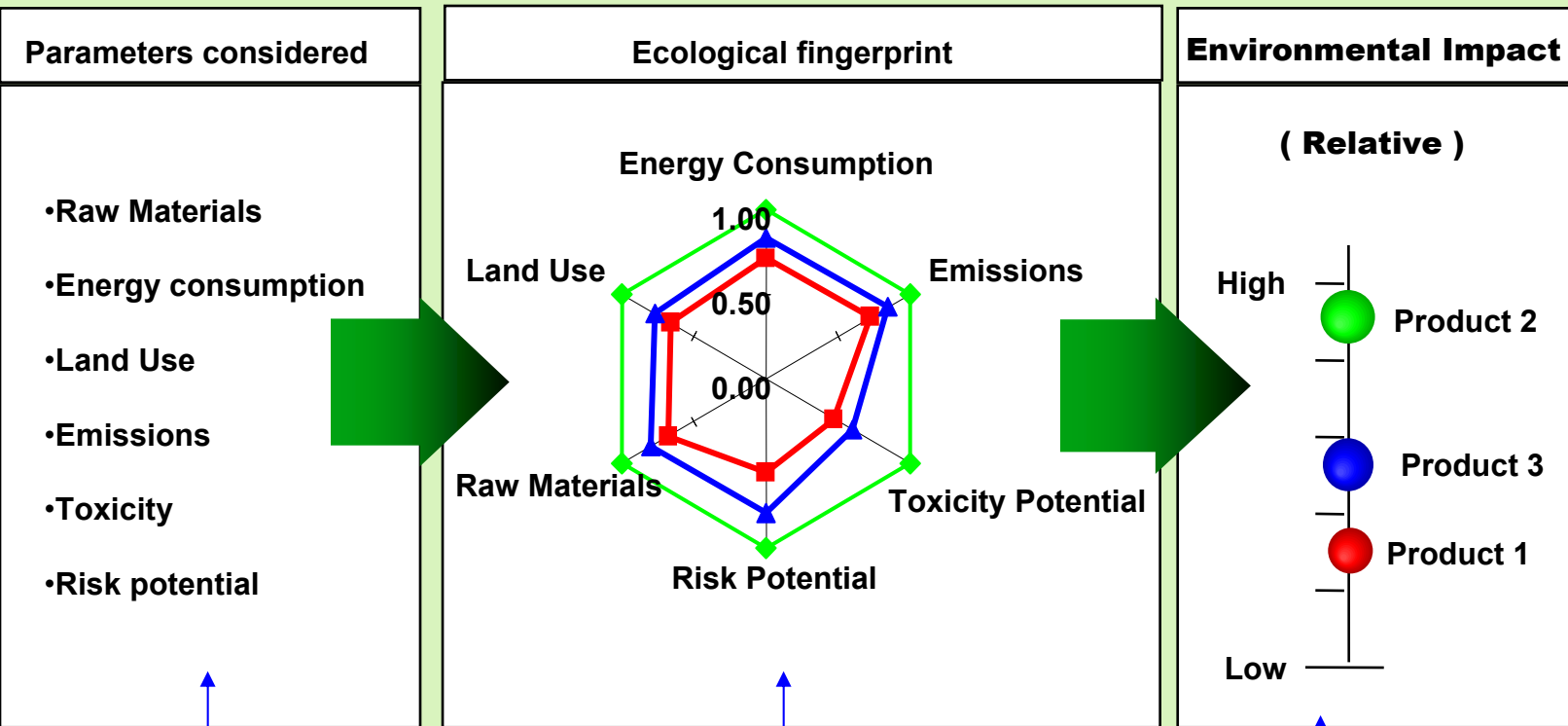
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Societal Weighting Factors



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The Ecological Fingerprints



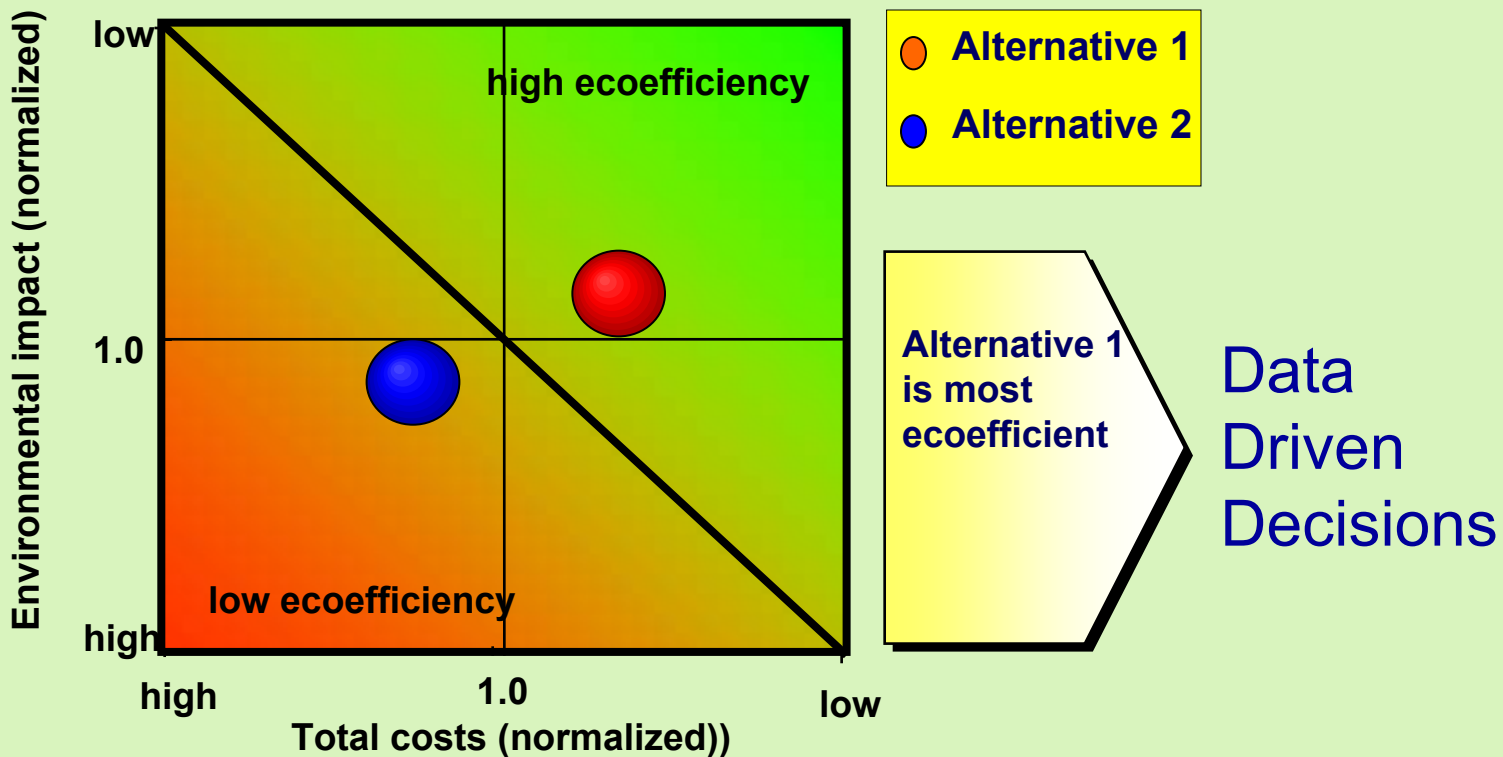
Metrics

These two diagrams are different ways to show the same result: Product 2 has highest adverse ecological impacts.

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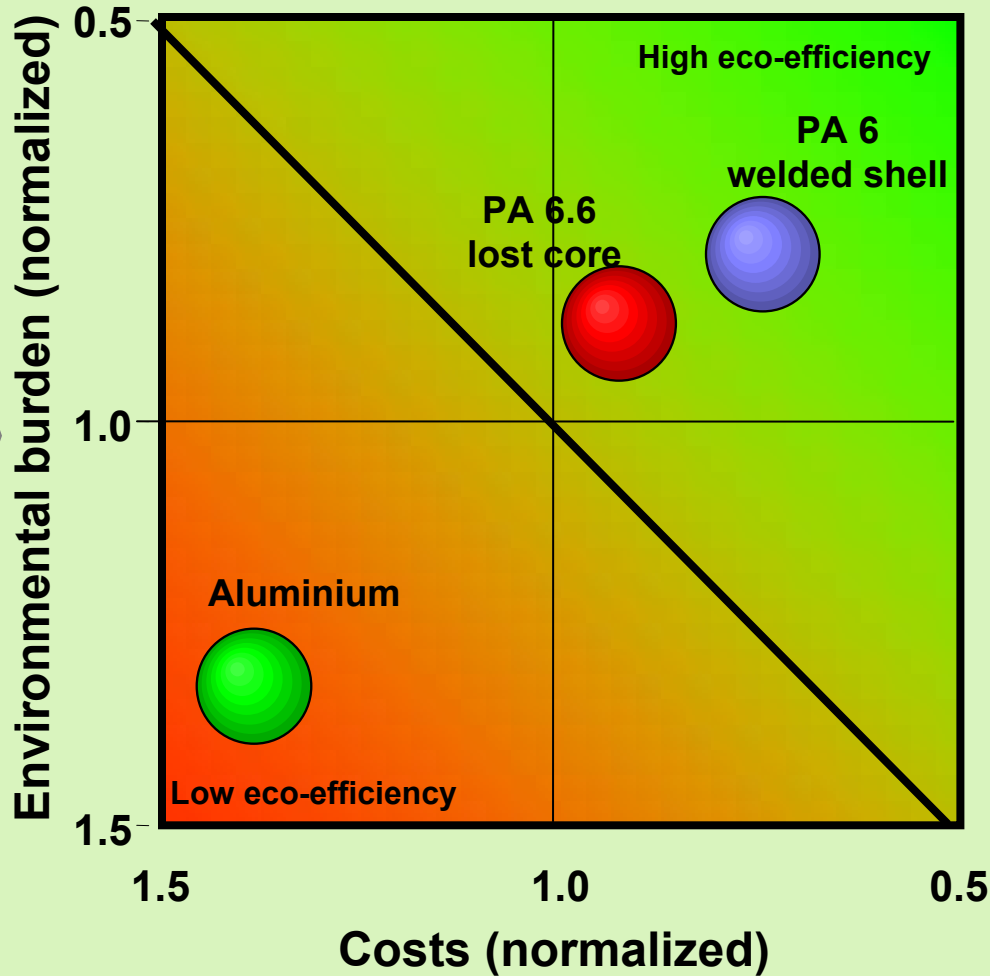
BASF Eco-efficiency Analysis

The “Eco-efficiency Portfolio” environmental and economic considerations



Example #1: EEA Portfolio for Air Intake Manifold

Customer-related benefit: Production, use and recycling of a typical four-cylinder intake manifold



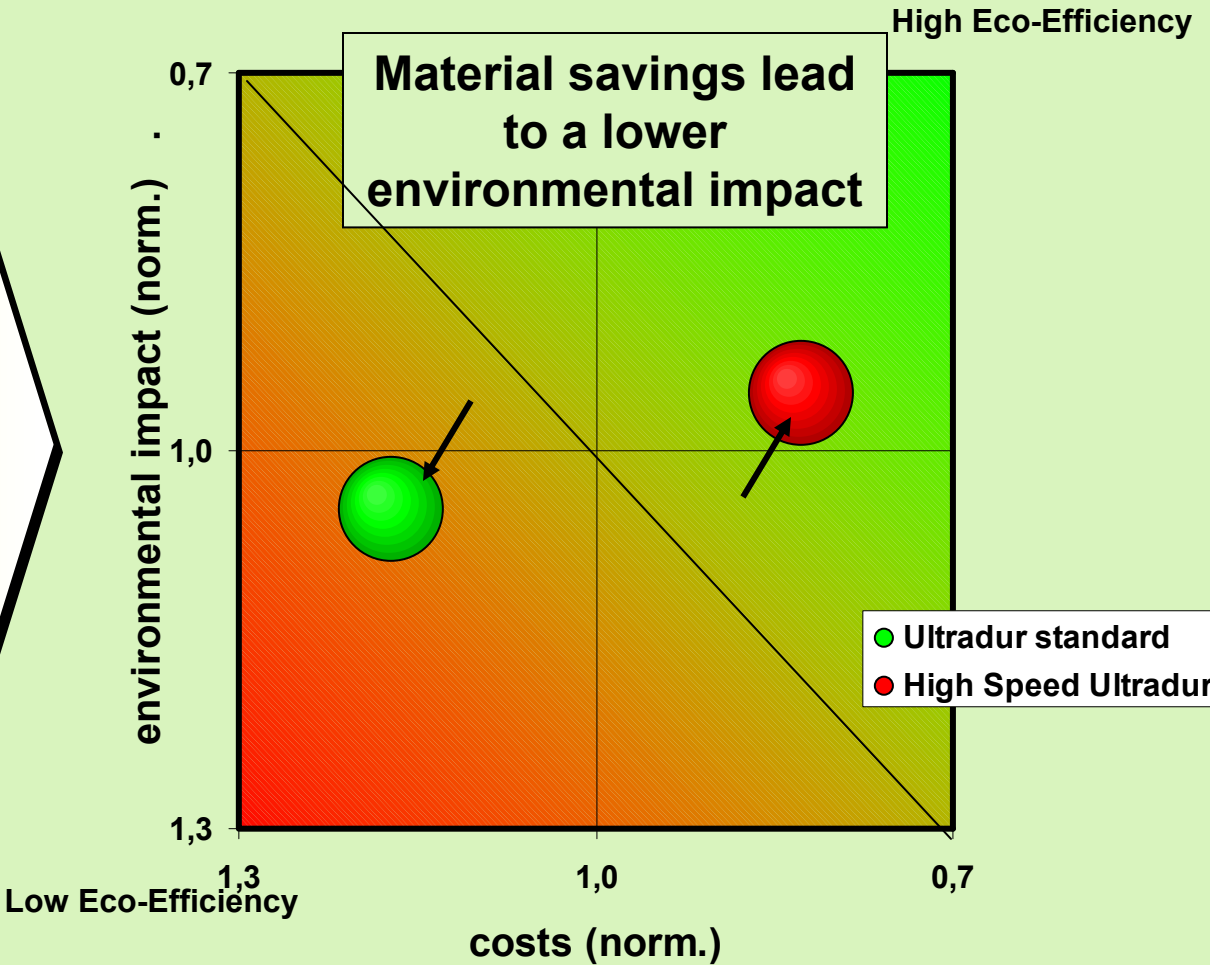
PA 6 is the most eco efficient product, the shell process is most favorable

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Example #2: Ultradur[®] High Speed Optimized Design utilizing 5% less material Eco-Efficiency Portfolio

customer benefit:
Production of 1000 injection molding components



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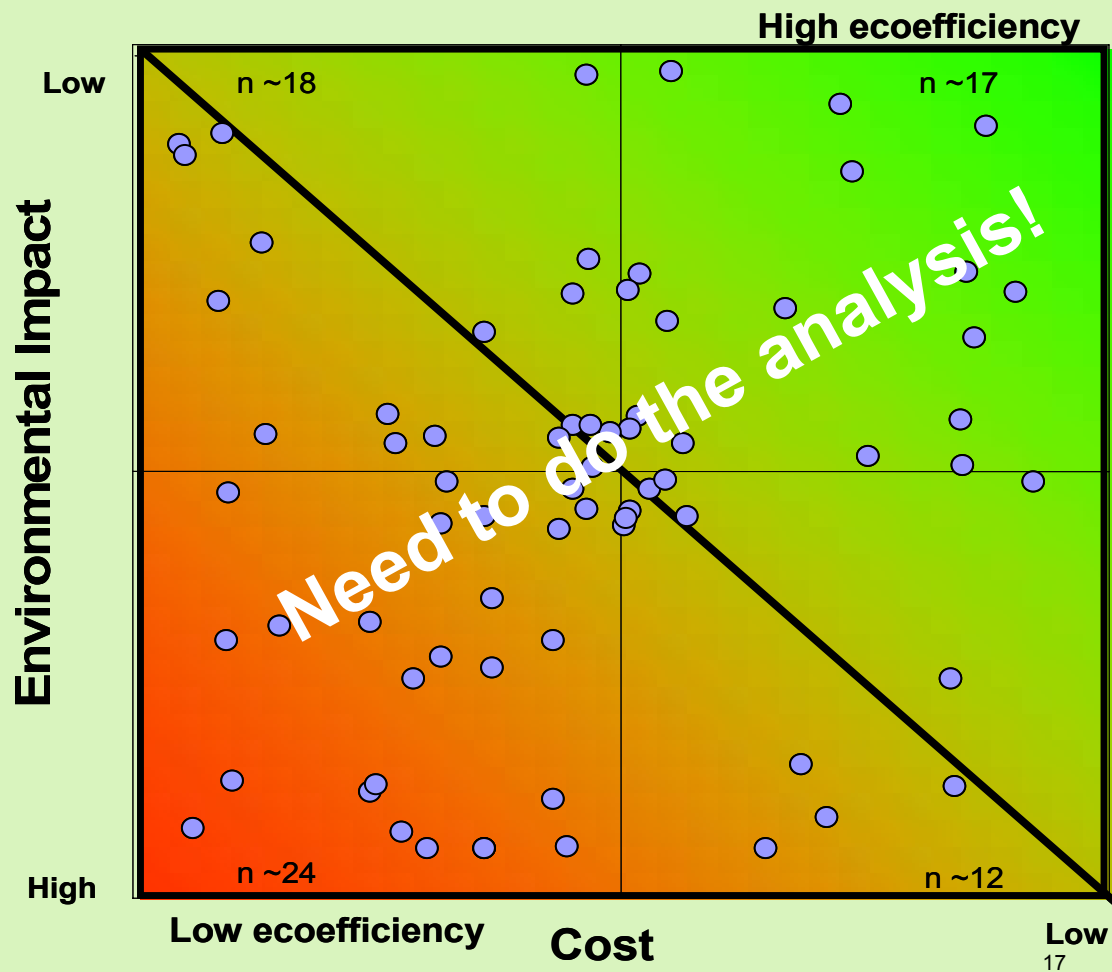




Eco-efficiency of bio-based materials vs conventional materials

Eco-Confusion

- Bio-based materials may not be Green.

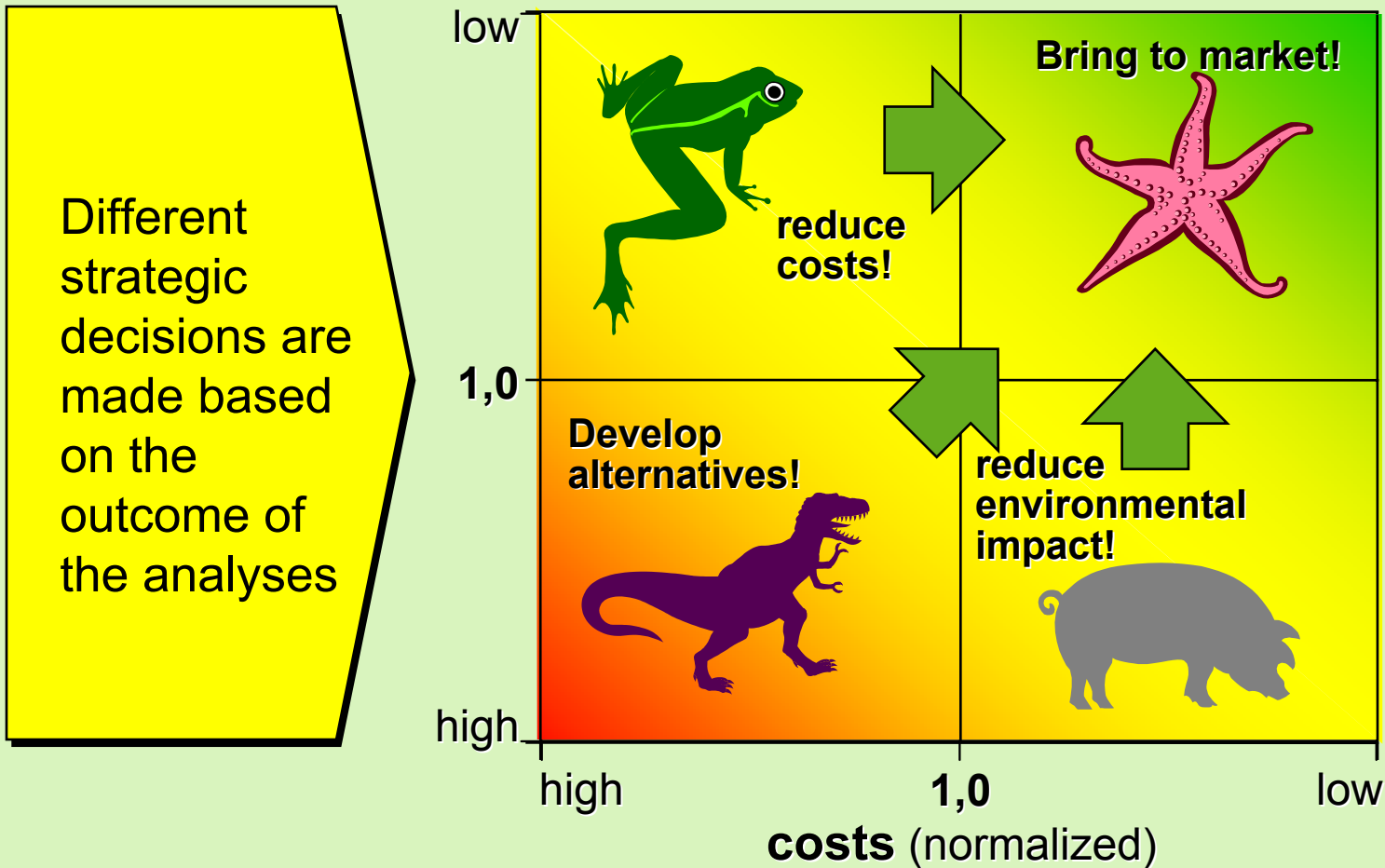


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Eco-Efficiency Analyses drive Decisions

Environmental Impact (normalized)



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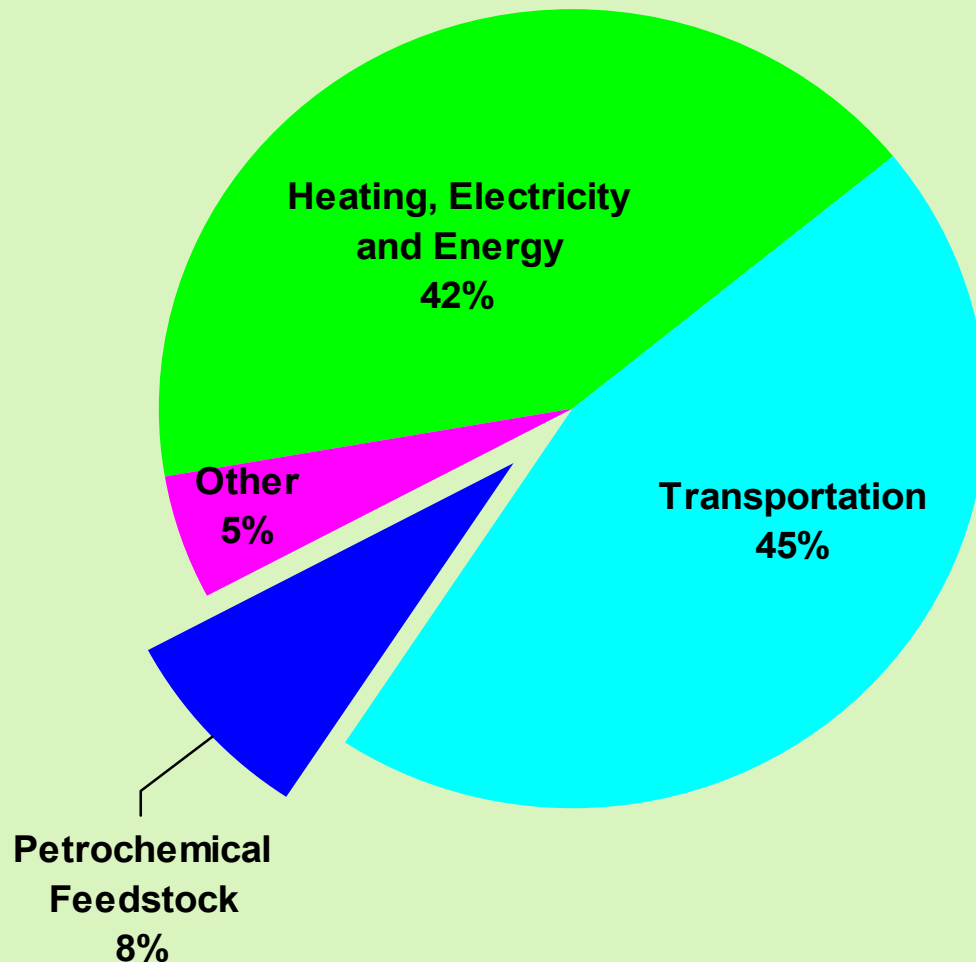
INDUSTRY OVERVIEW

PLASTICS & TRANSPORTATION

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A Minimal Amount of the World's Oil Consumption Used to Produce Plastics

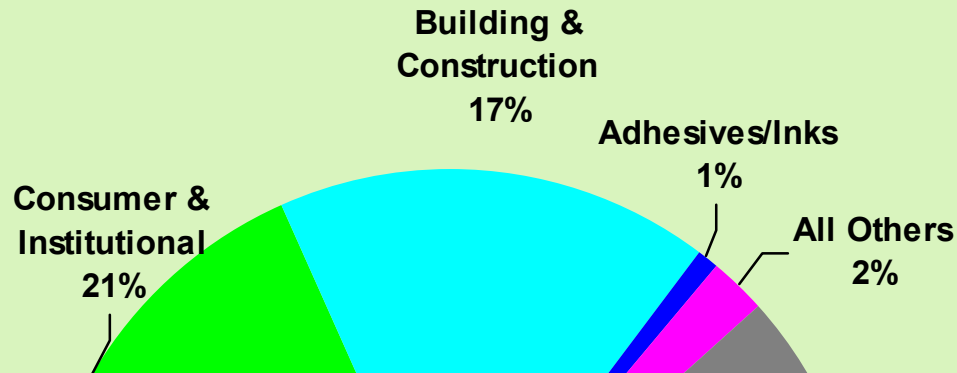


(~4% used to produce plastics)

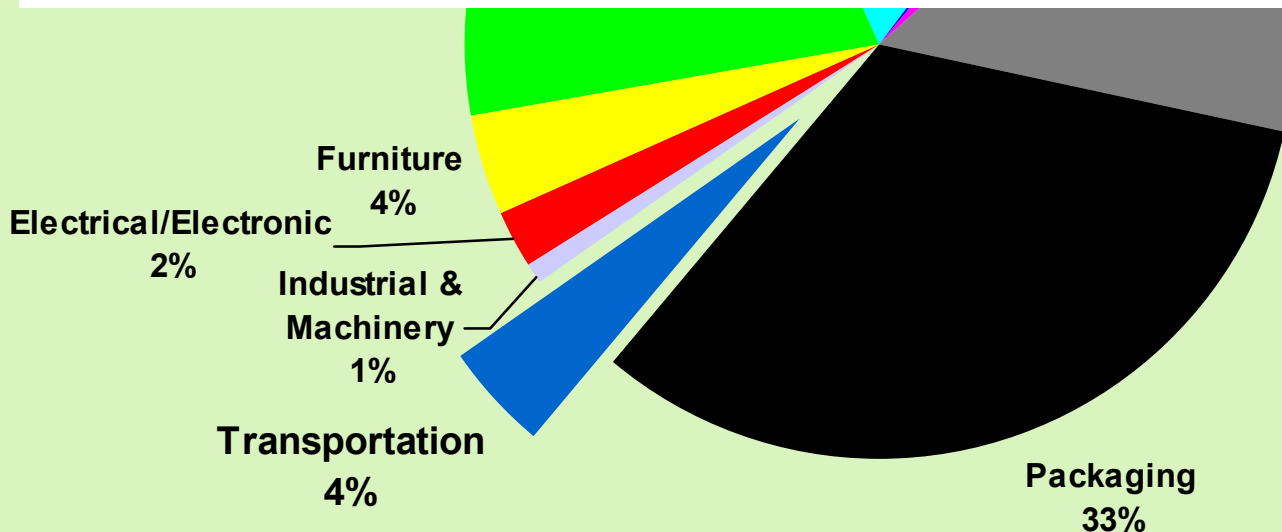
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2007 Thermoplastic Resin Sales ~\$85.3B and ~116 B pounds



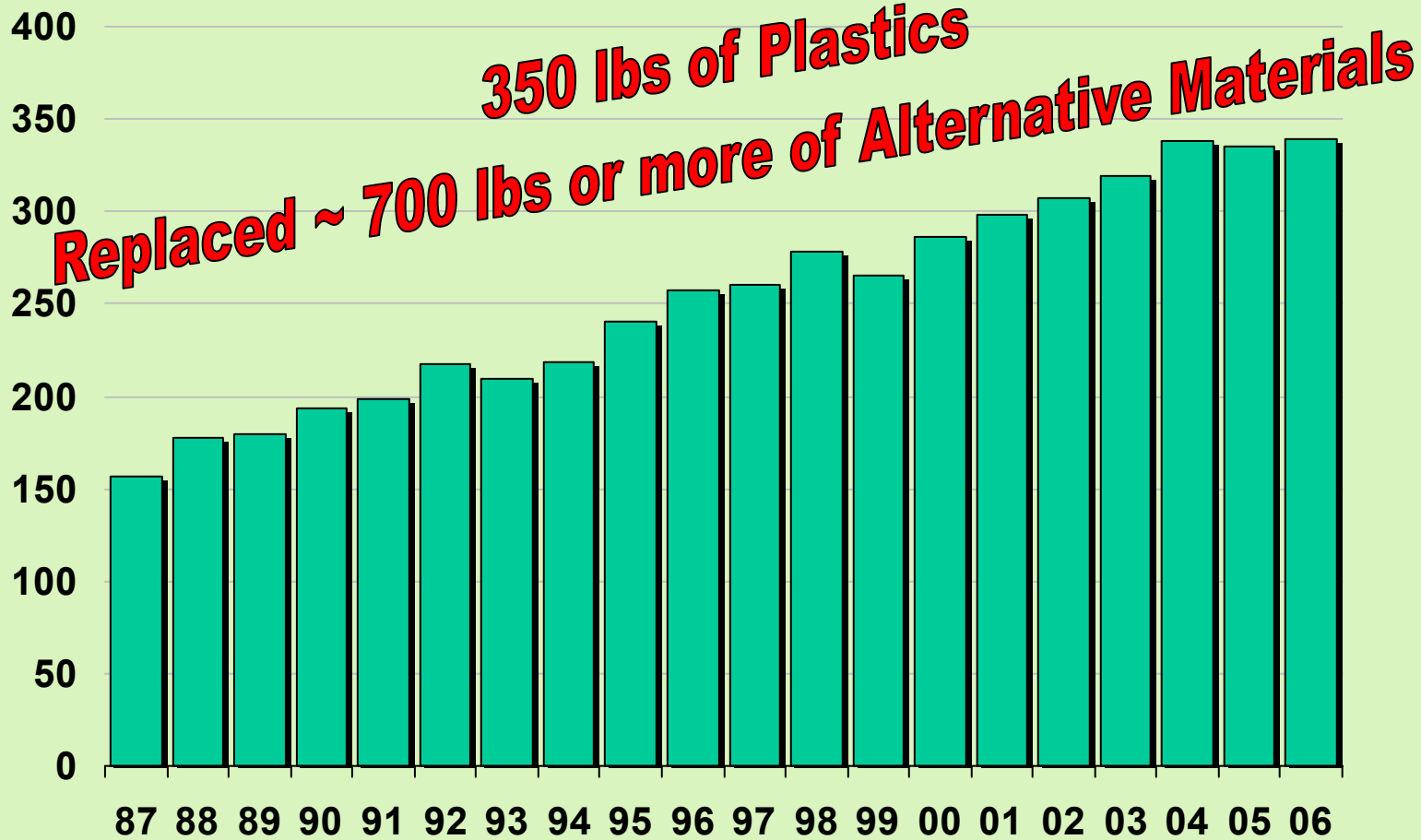
**ONLY 0.16% of Global Oil Consumption
Used to Produce Plastics for Transportation**



Plastics / Composites in Light Vehicles

> Doubled in 20 years, ~ 10% of vehicle weight

Pounds/vehicle



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Optimizing Vehicles' Efficiency & Performance

"Plastics Make It Possible!"

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Thank you!

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Key Areas of Responsible Care

„We act in a responsible manner and support the Responsible Care® initiatives. Economic considerations do not take priority over safety, health issues and environmental production.“

Environmental Protection



Product Stewardship



Occupational Health & Safety



Responsible Care®

Voluntary worldwide initiative with the goal to make steady improvements with respect to

- environment
- safety
- health



Process Safety & Emergency Response



Distribution Safety



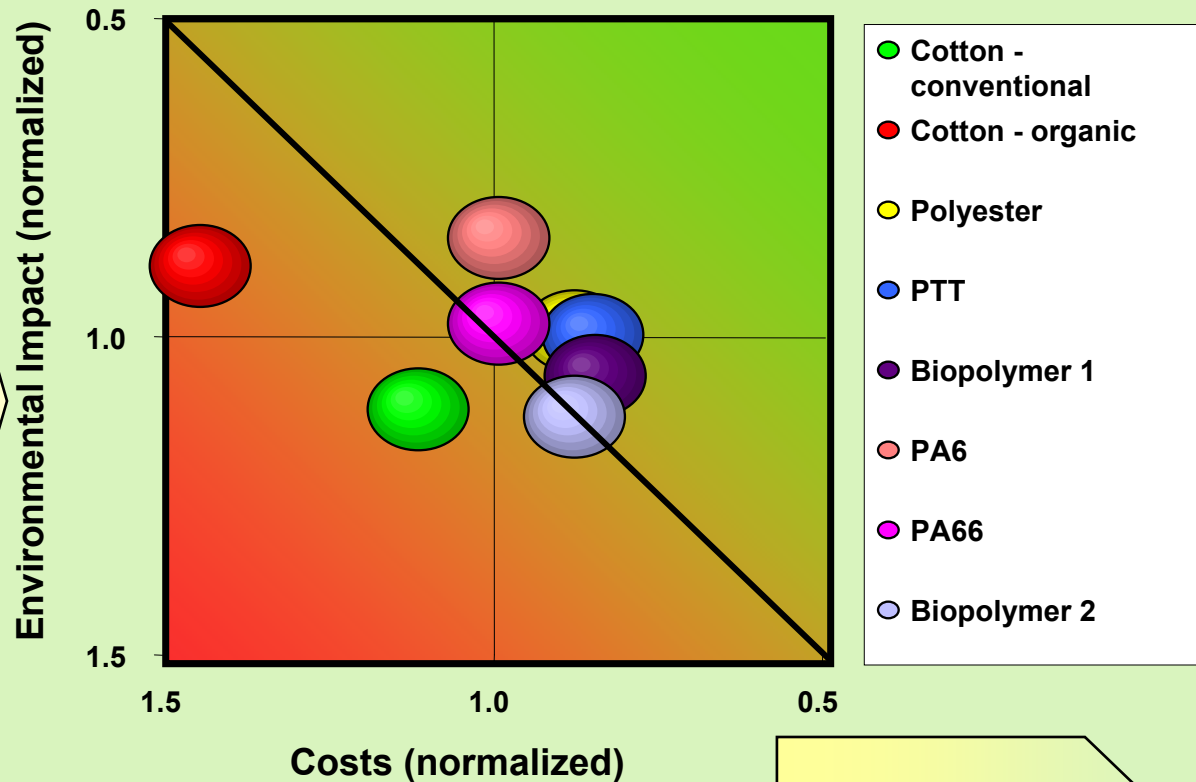
Dialogue

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Example #3: Textile Fiber EEA Portfolio

Customer Benefit:
• 10 year use of garment, produced with 1 m² of fabric



In the Base case the garments made from polymeric materials have similar eco-efficiency.

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How does BASF use Eco-Efficiency Analysis?

Strategic Decisions

- Investment decisions
- Technology decisions
- Site decisions
- Evaluate product portfolio

Marketing

- Improved understanding of product benefits and competitive landscape
- Product Differentiation
- Improved customer relations

Research and development

- Project Prioritization
- Quantification of the most important factors
- Develop sustainable products and processes

Stakeholder and Government Dialogue

- Communication with authorities
- Demonstration of Sustainability
- Government “approvals”

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BASF Websites

- ▶ **BASF Group:** www.basf.com
- ▶ **BASF Corporation:** www.basf.com/usa
- ▶ **Eco-efficiency Analysis:**

www.basf.de/en/corporate/sustainability/oekoeffizienz/



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