Measuring Sustainability and BASF’s Eco-Efficiency Analysis
Have You Seen These Men?

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BASF Biopolymers

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Senior Sustainability Specialist
BASF Product Stewardship
We create chemistry for a sustainable future

“We will integrate sustainability more closely than ever into our business.

And innovation is the key.”

Dr. Kurt Bock, Chairman of the Board of Executive Directors of BASF SE

Sustainability is a core element of our Purpose and Strategic Principles

- We add value as one company.
- We innovate to make our customers more successful.
- We drive sustainable solutions.
- We form the best team.

Sustainability is an integral part of BASF
BASF understanding of sustainability

Weighing the options, pursuing the best solutions

Journey – need for dialogue & partnership

Balancing economic, environmental and social needs – today and tomorrow

Growth driver for our business
Sustainability: Measuring

Being able to measure sustainability is critical to its successful integration into business strategy and strategic decision making.
Number of Studies Performed by BASF since 2002

- 11 Carbon footprints
- 10 Environmental Impact Assessments
- 15 Total Cost of Ownership
- 68 Eco-efficiency Analyses
- 1 AgBalance™
- 13 NSF Verifications (since 2010)
- 11 Unique Business Units
Eco-Efficiency Analysis

- Measures **Economic** and **Environmental** Impacts
- Over a **life-cycle**
Example for Car Economics

Total costs to own a product throughout its life:

- **purchase**
- **depreciation**
- **Insurance, taxes**
- **consumption**
- **maintenance**
- **waste fees**
Economic Impact Categories

- Raw material costs.
- Labor costs.
- Energy (electric and natural gas).
- Capital & non-capital investment costs.
- Maintenance.
- EH&S programs and regulatory costs.
- Illness & injury costs (medical, legal, lost time).
- Property protection & warehousing costs.
- Waste costs (hazardous, non-hazardous)
- Training costs.
- Other as applicable
Emissions Impact Categories

Emissions

Solid Waste
- Residential, Hazardous, Mining, Construction, Radioactive

Green House Gases
- CO₂, N₂O, halogenated hydrocarbons, CH₄

Ozone Depletion
- halogenated hydrocarbons

Summer Smog
- Hydrocarbons, CH₄

Acid Rain
- SOₓ, NOₓ, NH₃, HCl

Water
- COD, Heavy Metals, Total N, PO₄, Chlorides, Hydrocarbons

Air
- SOₓ, NOₓ, NH₃, HCl
## Life Cycle Inventory (Ecoprofile): Site questionnaire

### Eco-profiles

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<tr>
<th>Operation:</th>
<th>Site:</th>
<th>Country:</th>
<th>Year:</th>
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#### OUTPUT PRODUCTS

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#### INPUT SERVICES

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#### INPUT FUELS

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#### INPUT MATERIALS

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### Process:

#### Air emissions

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### Solid waste

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<th>To incinerator</th>
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Life cycle data is gathered in seven environmental impact categories and depicted on an environmental fingerprint. The data are then weighted, aggregated and normalized to obtain an overall environmental impact.
Eco-Efficiency Methodology: Balancing Costs and the Environment

Customer benefit:
1 functional unit for ....

The most eco-efficient product has the lowest combined environmental impact and cost. Eco-efficiency is measured from the diagonal line.

Alternative B is most eco-efficient.
Eco-Efficiency Case Studies
Natural Oil polyols vs. petroleum based polyols

Application: flexible foam for furniture
Bio-based materials may not be “Green”.

Analysis beats Greenwashing!

Analysis supports informed decision making!

Eco-efficiency portfolio comparing a wide range of applications utilizing bio-based materials
Sustainability and Decision Making

Sustainability Metrics Support Decision Making

**STRATEGIC DECISIONS**
- Investment decisions
- Technology decisions
- Site decisions
- Evaluate product portfolio

**MARKETING, CUSTOMERS**
- Demonstration of product advantages
- Improved customer relations
- Product differentiation
- Better understand competitive advantage
- Provides needed benchmarks

**RESEARCH AND DEVELOPMENT**
- Quantification of the most important factors
- Drive sustainable products and processes
- Drive production/process improvements

**STAKEHOLDER AND GOVERNMENT DIALOGUE**
- Communication with authorities
- Demonstration of sustainability
- Government “approvals”
- Provides needed benchmarks
For More Information:

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