Industry Requirements onto LCI/LCA Database

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Validated Eco-Efficiency Analysis Method
Sustainable Development is based on three Pillars

Sustainable Development

Economy

Ecology

Society

Eco-Efficiency-Analysis

SEEbalance-Analysis*

* being developed
What is Eco-Efficiency Analysis?

- Method for the **comprehensive assessment** of products and processes.

- **Ecological (ISO 14040) and economic aspects (LCC)** are given equal weight in assessments.

- Eco-efficiency analysis is a **standard** tool in the **BASF Group**; more than 200* analyses have been carried out.
  
  - More than 2000 LCI-data sets created
  - Experiences with about 150 internal managers and 40 externals
  - Projects in all product groups (chemical production, energy, coatings, cars, electronics, waste systems, agriculture, textiles, packaging,...)

* Status 10/2003
Requirements of Industry Managers onto LCA-Projects

• Quantitative results with a clear assessment
• Simple and impressing illustration of the results
• Scenario and sensitivity analysis
• Short timeframe (2 month)
• Low costs for the analysis (<30,000 €)
• Combination of LCA with LCC
Reliability versus Effort of LCA's

- Full LCA
- Full EEA with critical review
- Full EEA
- Streamlined EEA

Reliability of EE results / in %

Timeframe and costs of a study / month
Eco-efficiency portfolio for floor covering

Ecoprofile for main material 2 was actualized (about 10 % worse)

The influence of the ecoprofile of the material onto the overall result is small
Eco-efficiency portfolio for floor covering

Ecoprofile for main material 2 produced in another country

The influence of the country, where the material is produced onto the overall result is small.
The influence of the weighting factors onto the overall result is small.
Eco-efficiency portfolio for floor covering
Variation of lifetime: residential to commercial

The influence of the lifetime onto the overall result is very high.
Conclusions

• **Main influence factors** for the results of eco-efficiency-analyses are **technical and market data**.

• **Preciseness of LCA data** has only a **small relevance** onto LCA in decision making.

• **Managers in companies need clear and defined results**.

• A very **practical approach** for LCA is **necessary and reliable enough** for industrial and political purpose.
Appendix
Jeans Dyeing Project
**Alternative Systems for Indigo Granules**

**Determine demand-specific benefit**
- Dyeing of blue denim for the production of 1000 jeans

**Select BASF product**
- synthetic indigo granules

**Define comparable products**
- Indigo powder from plants
- biotechnological Indigo granules
- synthetical indigo solution, 40%,
- synthetical Indigo solution, 40%, electrochemical dyeing process
In the Eco-Efficiency Portfolio, the Environmental Impact is plotted against the Costs.

Benefit: 1,000 jeans dyed with indigo

- Electrochemical
- Solution
- Biotechnological
- Granules
- Plants

High eco-efficiency

Low eco-efficiency

Environ. Impact (normalized)

Total costs (normalized)
Consequences of the Analysis

- Construction of a plant for the production of 40% indigo solution (beginning production at the end of 1999)
- Increased R&D expenditure for the electrochemical process (construction of a pilot plant)
- Communication with customers and professional circles

Success of the measures: Increase of the market share from 2% (1999) to approximately 40% (2002)
The detailed Results can be read off in the Ecological Fingerprint

- Energy consumption
- Material consumption
- Emissions
- Risk potential
- Toxicity potential
Acceptance of the Method by Stakeholders, NGOs and Science...

...Basically, the large number of indicators used in eco-efficiency analysis make relatively reliable statements possible...

...Politically, it is worth considering how this tool can find wider application......

....The sensitivity considerations carried out in the eco-efficiency analysis make sense and provide good orientation as regards further ecological and economic optimizations....
Pilot project with UNEP/UNIDO to improve the eco-efficiency of Moroccan dyehouses

Assessed since 2002 as one of the world’s most sustainable chemical companies, partly as the result of the development of eco-efficient products.
What does BASF use Eco-Efficiency Analysis for?

**Internal**
- **Strategy**
  - Decisions on investments
- **Politics**
  - Discussion with opinion makers in political decisions

**External**
- **Research/product development**
  - Prioritization of research projects
- **Marketing**
  - External customers optimize their products and processes with eco-efficiency analyses
Consequences of Eco-Efficiency Analyses

Depending on the position of the analysed product, different strategic recommendations are given.

- High Environmental Impact and high costs: develop alternatives!
- High Environmental Impact and low costs: reduce environmental impact!
- Low Environmental Impact and high costs: reduce costs!
- Low Environmental Impact and low costs: bring to market!
Are you interested?

How can you proceed?

- Get in touch with us. (http://www.oekoeffizienzanalyse.de)
- We will provide you with a tailor-made proposal.
- The time frame for a study varies between 2 and 6 months.
- Your own efforts to determine the input data are relatively low.
- The total costs are between € 20,000 and 30,000 (depending on the complexity).
The Eco-Efficiency Team:

Our Homepage: [http://www.oekoeffizienzanalyse.de](http://www.oekoeffizienzanalyse.de)