Eco Efficiency

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Sustainable Development and Eco Efficiency

Eco Efficiency: The reconciliation of financial and environmental impacts in corporate decision making regarding products, services, and business operations.

Development of Environmental Protection in Firms

End-of-Pipe Technology
Integrated Environmental Protection (part 1)
Integrated Environmental Protection (part 2)
Sustainable Development

80’s 90’s 00’s

Waste Water Treatment Plants
Waste Materials Are Raw Materials
Green Engineering
Social, Economical, and Ecological Design of products.

Implementing Eco-Efficiency

- Reducing the material intensity of goods and services - using less to make a product or service.
- Reducing the energy intensity of goods and services - using less energy.
- Reducing toxic emissions.
- Enhancing the recycling possibilities and options of material used.
- Maximizing the use of renewable and recycled resources.
- Extending product durability - making things last longer.
- Increase the service intensity of goods and services - making things that do more.
**Eco Efficiency Analysis**

- Method for the comprehensive assessment of products and processes.

- Ecological and economic aspects are given equal weight in assessment.

- Products are analyzed from the perspective of the end customer.

- Future scenarios and effects of various action options are presented.

- Eco efficiency analysis is a structured and standardized process (ISO certified).

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**Central Questions of the Analysis:**

- How much of our product does the customer need as input into the production of their product?
- How much energy is required for this process?
- What emissions and wastes arise from this process?
- How long does the effect last before the customer requires more of our product?
- What are the economic costs of the process “cradle to grave”?

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**Weighting of Criteria**

Values are weighted by relevance factors. These state how strongly individual criteria flow into overall pollution.

Examples:

- Ozone destruction is weighted relative to the greenhouse warming potential.
- Importance society places on different types of pollution.
- Availability and natural occurrence of raw materials.

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**Developing the Ecological Fingerprint**

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- What emissions and wastes arise from this process?
- How long does the effect last before the customer requires more of our product?
- What are the economic costs of the process “cradle to grave”?
Scenario Analysis: The Second Step of Eco Analysis

Environmental Impact (Normalized)
- Low
- High

Depending on the position of the analyzed product, different strategic recommendations are developed.

1.0
- Bring to Market
- Reduce Environmental Impact
- Reduce Costs
- Develop Alternatives

Costs (Normalized)
- Low
- High

Eco Analysis: Dyeing Denim for Blue Jeans (BASF)

Demand Specific Benefit
- Select BASF Product
- Define Comparable Products

Dyeing of Blue Denim for the Production of 1000 Jeans.

Synthetic Indigo Granules
- Biotechnological indigo granules
- Synthetic indigo solution
- Synthetic indigo solution and electrochemical dyeing

Eco Analysis: Dyeing Denim for Blue Jeans (BASF)

Powder from Plants
- Solution
- Electrochemical
- Granules

Risk Potential
- Toxicity Potential

Energy Consumption
- 1.0

Material Consumption
- 0.0

Environmental Impact (Normalized)
- Low
- High

Implications:
- Construct a plant for the production of solution based dyeing
- Increase R&D spending for electrochemical process (pilot plant)
- Exit plant technology from product portfolio

Eco-Efficiency
- High Eco-Efficiency

Benefit to the customer, 1,0000 jeans dyed with indigo.