Using Material Flow Cost Accounting for Resource Efficiency Assessment

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Member of iPoint Group | www.ipoint-systems.com
Corporate development

ifu hamburg
Productivity meets Sustainability.

Stands for...
Institute for Environmental IT Hamburg

Founded: 1992

Location: Hamburg, about 25 employees

Software for material flow visualization and analysis
• Standard software: e!Sankey and umberto
• Customizing: specialized applications and interfaces

Sustainability consulting
• Consulting on Carbon Footprinting, Life Cycle Assessment, and Resource Efficiency
• Sustainability workshops, methodological training
The basic principle

Increased system transparency leads to increased energy and material efficiency.
Our portfolio

**e!sankey®**
*show the flow.*

- Sankey diagram creation
  - Visualize material and energy flows
  - Create convincing Sankey diagrams
  - Used for presentations and reports

**umberto®**
*know the flow.*

- Material flow management and material flow analysis
  - Increase material and energy efficiency
  - Calculate carbon footprints
  - Conduct life cycle assessments (LCAs)
  - Analyze the eco-efficiency

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- Sustainability experts through experience
  - Competent partner for sustainability management
  - Sustainability workshops
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Our consulting services

Problem Definition
Environmental assessment, process optimization, ...

System understanding

Analyze

Quantification of potentials

Prioritize

Measure catalog

Implement

Less energy and material consumption, reduced environmental impacts and costs

Tools

Material and energy flow analysis

Resource efficiency analysis

Life cycle assessment (LCA)

Material flow cost accounting

Carbon footprinting
MFCA view on costs of material losses

Waste management costs

Material costs
Logistic costs
Production costs
Labour costs
Investment costs
Energy costs
System costs

Hidden Costs
(often 7 times as high as waste management costs)

MFCA: All costs are also allocated towards losses in the system based on the physical relations (DIN EN ISO 14051)
MFCA view on costs of material losses

MFCA: All costs are also allocated towards losses in the system based on the physical relations (DIN EN ISO 14051)

Source: DIN EN ISO 14051
Material Flow Cost Accounting (MFCA; ISO14051)

Material and Energy Flows

- **Process 1**: Electricity: 2,063 kWh, Raw material: 714 t, Waste: 26 t
- **Process 2**: Electricity: 2,662 kWh, Waste: 76 t
- **Process 3**: Electricity: 4,542 kWh, Waste: 42 t
- **Product**: 570 t

Traditional Cost Accounting

- **Process 1**: Electricity: 619 EUR, Labor: 1,226 EUR, Raw material: 8,288 EUR
- **Process 3**: Electricity: 1,362 EUR, Labor: 2,014 EUR, Maintenance: 1,226 EUR
- **Product**: 17,301 EUR

MFCA

- **Process 2**: Electricity: 769 EUR, Labor: 691 EUR, Maintenance: 1,077 EUR
- **Process 3**: Electricity: 1,322 EUR, Labor: 2,014 EUR, Maintenance: 1,226 EUR
- **Product**: 14,426 EUR, Waste: 2,806 EUR

Calculation of the hidden costs of material losses
MFCA in multi-process systems

- MFCA is usually applied to multi-process systems on-site, but can be applied to supply chains and life cycle models, too.
- Efficiency increase in a downstream process causes huge financial savings and environmental improvements upstream.

Figure: Wastage- and product-related flows in a life cycle model (Source: Viere)
Case study: textile company

Company produces yarn from cotton and fabrics thereof

Complex material and energy flow model to inventory the production and identify causes of costs

Holistic information on entire production process based on consistent data.
MFCA example: textile company – combed yarn waste sold

- Goal: Identification of all waste-related costs → inefficiency costs
MFCA example: textile company – combed yarn waste sold

The yarn waste from combing, is purchased with the cotton

expenses of combed yarn waste
MFCA example: textile company combed yarn is waste sold for 38,038 € → loss 31,152 €
Additional benefits through holistic approach

- Efficient motors can reduce energy consumption for spinning
- Amortisation > 5 years does not justify investment
- Additional reduction in air conditioning, through reduced off heat from motors
- Net amortisation < 2 years
- Resource efficiency improved!
silicon
methanol
HCl
elastomers
fluids
silanes
resins
emulsions
pyrogenic silicas
Identify your improvement potentials

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Environmental assessment, process optimization, ...

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Less energy and material consumption, reduced environmental impacts and costs
Thank you very much for your attention!

Any questions concerning the implementation of MFCA?

Please Contact us!

... also if you are interested in our products and services!