

Social impacts evaluated with the **SEEBALANCE** method

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Eco-Efficiency Analysis, SEEBALANCE, Sustainability
Evaluation

Sustainability Assessment Methods

ISO 14040 & 14044

Life Cycle Inventory

... quantification of inputs and outputs

Life Cycle Assessment

... evaluation of environmental impacts
... absolute results

Eco-Efficiency Analysis

... including all life cycle costs
... comparison of products or processes
... ecological and economic aspects have equal weight in the assessment
... normalized results
... method validated by TÜV and NSF



SEEBALANCE

... including social aspects

Matryoshka principle:
each step “nests” the previous one

Analogy between ecological and social assessment

Ecology (LCA)

Social LCA

What is measured?

Impacts on **environment**
e.g. - emissions → GWP

Impacts on **goals** of stakeholders
e.g. - safety and health at work (employees)

How to measure?

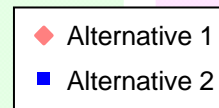
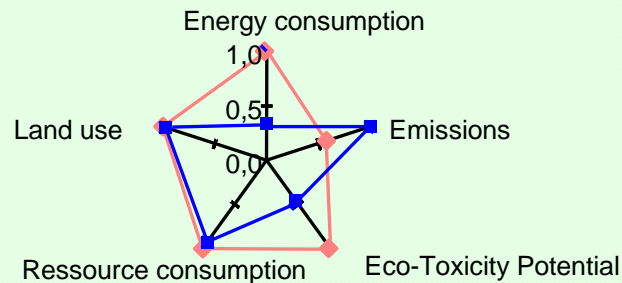
Measurement with LCI (Input/ Output) and LCIA
e.g. 42 mg CH₄ → 2 mg CO₂-equivalents

Measurement with **indicators**

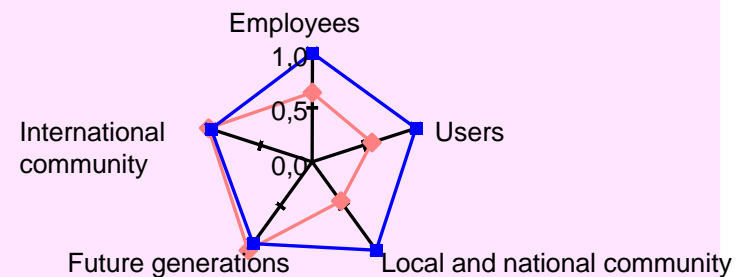
e.g. 3 reportable working accidents

Aggregation and presenting of results

ecological fingerprint



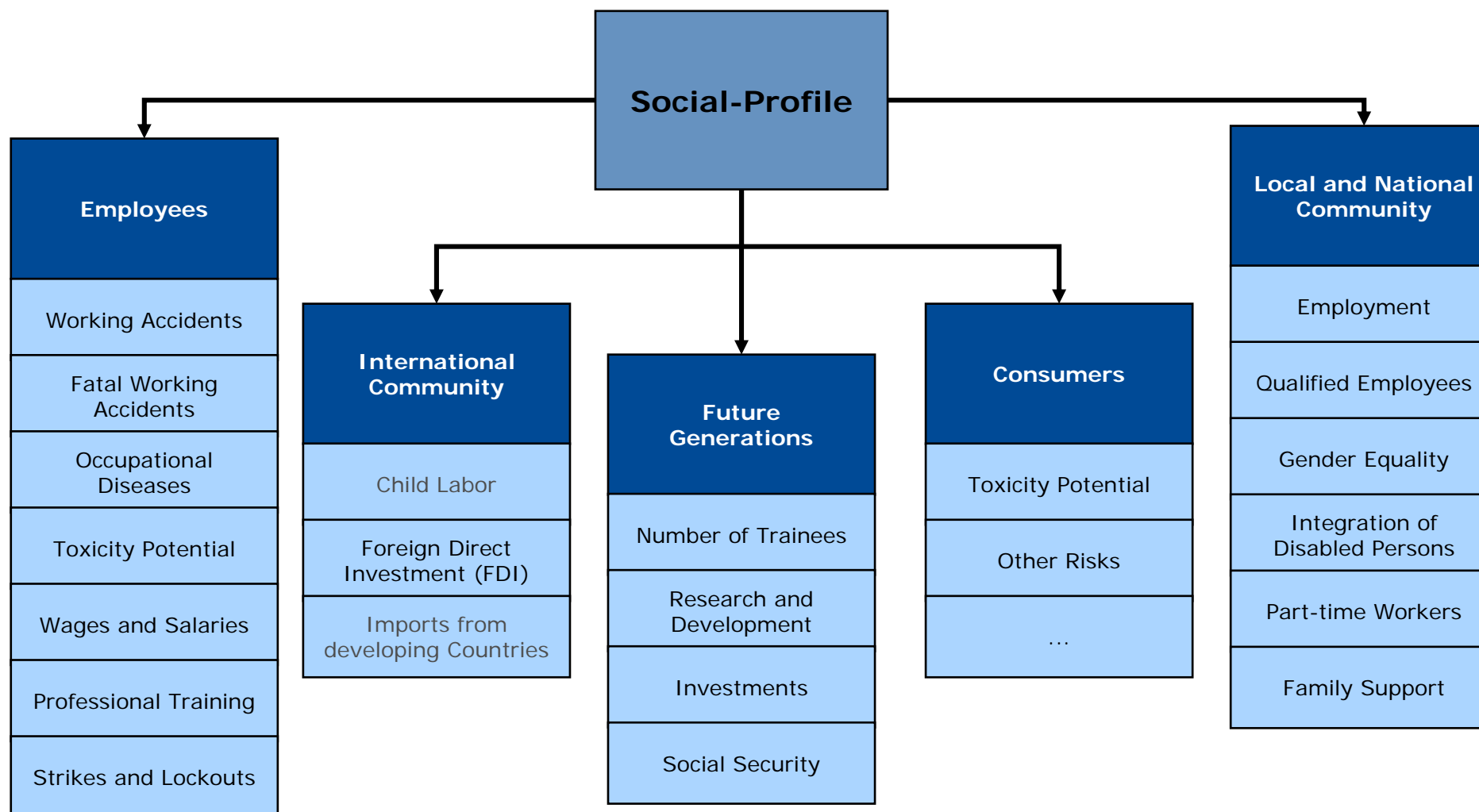
social fingerprint



source: Schmidt (2003)

Assessing Impacts

Overview of Social Impact Categories in SEEBALANCE



Determination of Socio-Profile with Statistical Values: Sector Assessment

Statistics A

Working Accidents in
sector 24, Chemical
Industry (2001)

12 217 Accidents

Statistics B

Total Production of sector
24, Chemical Industry
(2001)

~ 210 Mio. t

**~ 58 working accidents / Mio. t
chemical products**

NACE 24:

- 24.1: Base Chemicals
- 24.2: Plant Protecting Agents
- 24.3: Coatings
- 24.4: Pharmaceuticals
- 24.4: Detergents
- 24.X: ...

Sources:

- Federal Statistical Office
- Federal parliament (Dt. Bundestag)
- Organizations
- Workers' compensations board (Berufsgenossenschaften)
- Companies (BASF,..)

Data management: Social database

Social Database
Social indicators

Input:

- Production input
- Indicator input
- Social profile input

Output:

- Social profile output
- Production Overview
- Indicators with missing production
- Completeness check
- Close

Basic data :

- Countries and companies
- NACE codes
- Indicators
- Quantity units
- Years
- Sources

Input fields

Output fields

Basic Data

Social database (amount of production)

Production input

Enter a country and/or year / NACE and press "new".

Country: Year: NACE: Clear

Country	NACE	Quantity	Unit	Comment	Source
Deutschland	01	2,24E+05	1000t	Agriculture, hunting and related service activities	
Deutschland	01.1	1,85E+05	1000t	Growing of crops; market gardening; horticulture	
Deutschland	01.12	3,32E+03	1000t	Growing of vegetables, horticultural specialities and nursery products	
2001 Deutschland	01.13	2,10E+03	1000t	Growing of fruit, nuts, beverage and spice crops	
2001 Deutschland	01.2	3,84E+04	1000t	Farming of animals	
2001 Deutschland	01.21	3,08E+04	1000t	Farming of cattle, dairy farming	
2001 Deutschland	01.22	1,06E+02	1000t	Farming of sheep, goats, horses, asses, mules and hinnies	
2001 Deutschland	01.23	5,07E+03	1000t	Farming of swine	
2001 Deutschland	01.24	2,15E+03	1000t	Farming of poultry	
2001 Deutschland	01.25	2,00E+02	1000t	Other farming of animals	

New Search Show all

Datensatz: 1 von 1464

Close

Social database (values for social indicators)

Social profile input

Production data

Year: 2008 Country: Deutschland Source: ID: 2

Quantity: 2,24E+05 Unit: 1000t

NACE: 01 Agriculture, hunting and related service activities

Comment:

Indicator Measurement

Indicator	Indicator Quantity	Unit	Source	Comment	Ratio
companies	3,75E+05	number	Ref ID 3493 Landwirtsch	Datenerhebung nur alle zwei Jahre; Wert aus 2007	1,67322013639378E-06
gross value added	1,56E+10	EUR	Ref ID 3495 - Bruttower		0,0696069298477894
Gross value added gr	-4,39E+09	EUR	Ref ID 3495 - Bruttower		-0,0196132491676377
turnover	2,86E+04	Mio EUR	Ref ID 3494 - Finanzen		1,2795344210968E-07
share of exports work	3,09E+00	%	Ref ID 3554_Comtrade:		1,379629008E-11
subsidies	7,49E+09	EUR	Ref ID 3497 - VGR-Sub		0,0334631517689309
strikes and lockouts	0,00E+00	hours	Ref ID 3525_Bundesag		0
R&D (company exper	1,19E+08	EUR	Ref ID 3522_BMBF For		0,000531657551468995
foreign direct investm	3,60E+07	EUR	Ref ID 3526_Bundesba		0,000160837578595662
exports	5,72E+09	EUR	Ref ID 3574 Stat. Bund		0,0255696455054023
employees	2,52E+05	working y	Ref ID 3538 Beschäftig		1,12391959609494E-06

Datensatz: 1 von 20

Datensatz: 1 von 1464

Example: calculation the number of working accidents for colouring of shirts

Social profile: 58 working accidents / Mio. t chemical products (NACE 24)

LCI : application of 60 g dyestuff (NACE 24) for 1 shirt

58 working accidents / Mio. t * 0.00006 t

= $3.5 * 10^{-9}$ working accidents / shirt

(1 billion of shirts → 3.5 working accidents)

→ Same calculation for other social indicators.

Case study: X-SEED

User Benefit:

**Production - within 5 h (*) -
use and disposal of
1 m³ precast concrete with
comparable early and final
strength development.**

Reference:

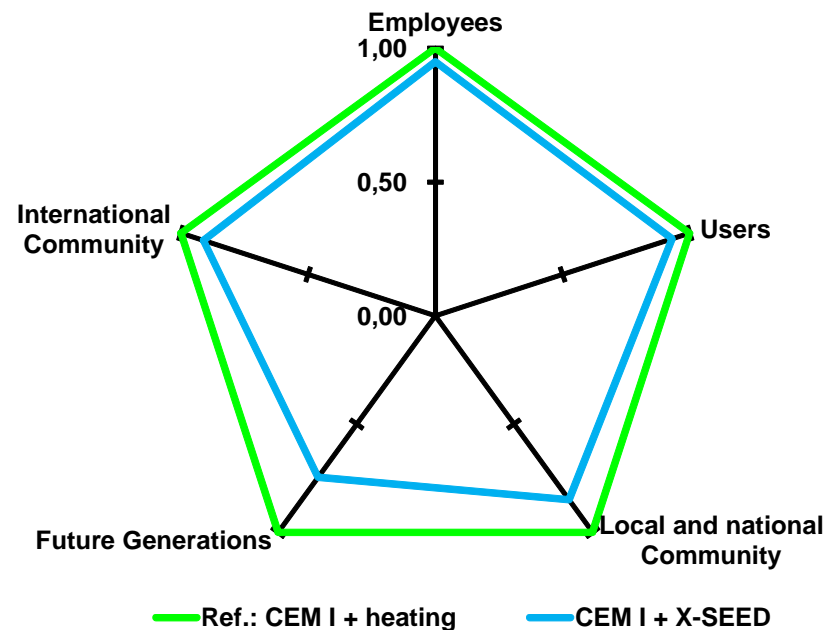
**400 kg CEM I 52.5
+ heat curing (with steam)**

X-SEED:

**400 kg CEM I 52.5
+ X-SEED (2.5% bwc)**

(*) The time for de-moulding can be reduced even further in some specific cases, using X-SEED 100, the limit of 5 hours was chosen as minimum requirement to be achieved.

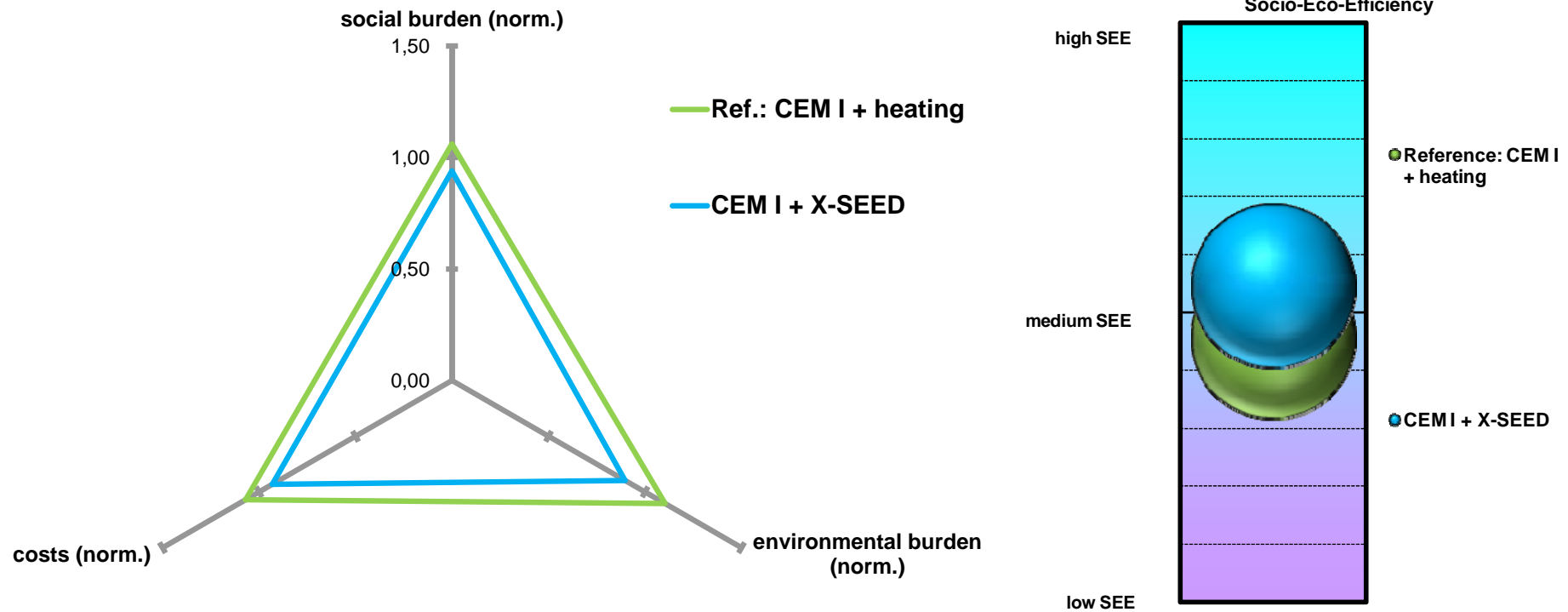
Social Fingerprint



Results are standardized (values between 0 and 1)

- Cement and clinker production have the highest social impact along the value chain for most social indicators
- The net social effects associated to the use of fuel oil (oil & refinery sector) are low.
- ▶ X-SEED implies a **higher level of employment and qualified employment**
- ▶ Without increasing the risk of working related risks (injuries, diseases)
- ▶ The human-toxicity potential can be reduced

SEEBALANCE Results



- The X-SEED mix design has economical, ecological and social advantages
- This gives a positive score in the final result of SEEBALANCE

How to use the Eco-efficiency Analysis and SEEBALANCE?

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 advantages

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
- Impact assessment
- REACH

Contacts



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