BADER Group
www.bader-leather.com

BADER®

## Competence Centre Sustainability

## Statement

location:
PL-Boleslawiec (BAD102)
CN-Dalian (BAD103)

all locations

location:
D-Ichenhausen
PL-Boleslawiec
CN-Dalian
MX-Leon

# Sustainability in leatherproduction, life cycle assessment methods, certifications and labeling

## 1 Terms and definitions

The current debate in the professional and general public concerning greater sustainability in economic management, production, use, and disposal of products is marked by a number of definitions and assessment terms whose meaning and content should initially be clarified to ensure an objective approach.

### Sustainability

The fact that the concept of sustainability itself is not clearly defined and is therefore used differently is named here only for the sake of completeness. In its use of the concept, BADER orients itself exclusively towards the so-called three-pillar model in the definition provided by the special committee of the German Federal Parliament in "The protection of man and environment":

"Sustainability is the concept of sustainable development of economic, ecological and social dimensions of human existence. These three pillars of sustainability interact with one another and require balanced coordination on a long-term basis."

Only basic life cycle assessment terms are defined below.

### Carbon footprint

The carbon footprint as such does not exist in principle. Two different – albeit similar – approaches exist:

a) **PCF (product carbon footprint)**
Product-related carbon footprint

The PCF includes all carbon emissions of a specific product in a specific application. Usually the entire life cycle of the product is examined (from cradle to grave). This is where the chief difficulties lie, also with regard to data collection, because the process chain can be extremely long in some cases. The PCF can also be used to compare different products.

b) **CCF (<u>corporate</u> carbon footprint)**

Location-related carbon footprint

The CCF includes all carbon emissions of a specific (production) location. Therefore all results of this assessment are always country-specific. In some cases, this is important particularly with regard to energy production in individual countries. Thus these results do not sufficiently reflect as a whole the measures taken or the environmental performance of a company compared to a company in a different country.

If the production of a specific product and a specific application are to be compared at different locations (combination or mixture of PCF and CCF), this puts very high requirements on system definition, differentiation, data collection and on their assessment. Because this is not a customary procedure, it is not possible to estimate to what extent usable results can be obtained here or the time and effort required for this.

**Life cycle assessment**

The life cycle assessment (always product-related) examines – unlike PCF and CCF – additional environmental impacts and is therefore not limited only to an examination of the

- **Global warming potential**
  (Catchwords: $CO_2$ emission, carbon dioxide equivalents, carbon footprint), but also includes the:
- **Consumption of energy resources**
  (Catchwords: fossil fuels, final disposal, renewable energy),
- **Acidification potential**
  (Specified as $SO_2$ (sulfur dioxide) emissions, catchwords: acid rain, forest decline, soil acidification),
- **Aquatic and terrestrial eutrophication potential**
  (Unnatural nutrient input – particularly of phosphate in water and soil, catchwords: overfertilization, algal growth, mass death of fish),
- **Photochemical oxidant formation potential**
  (Aggressive reaction products caused by sunlight, catchwords: summer smog, ground level ozone),
- **Aquatic toxicity potential**
  (Contamination of wastewater with toxic substances),
- **Human toxicity potential**
  (Assessment of employed hazardous materials, contamination of humans with toxic substances),
- **Ozone depletion potential**
  (Catchword: ozone hole) and
- **Land consumption**
  (Conversion of agriculturally used areas into settlement and traffic areas, however also of natural to agriculturally used areas).

Thus the life cycle assessment is a more comprehensive examination. Contents and procedures are extensively defined in DIN EN ISO 14040:2006/14044:2006 and are basically broken down into the following steps:

- Definition of goals
- Definition of the scope
- Life cycle inventory analysis
- Impact estimation
- Analysis/assessment

Ultimately the life cycle assessment of a product always includes the PCF as well. The extra time and expense required to prepare a life cycle assessment compared to a PCF is estimated by experts to be approx. 20 - 30%.

**Ecological efficiency analysis**

In an ecological efficiency analysis (also a product- or process-related approach), the economic value of a product/process is put into relation to its environmental impacts (not to be confused with ecological effectiveness[Note]). This assessment method is used e.g. for ecological-economic comparisons of different processes, product improvements etc, and primarily serves to improve the (ecological) efficiency of products or processes. **Statements on sustainability cannot be derived from this assessment.**

**Because the above-named terms are often incorrectly interchanged in practice, it is recommendable in all discussions to clarify these terms at the start to avoid any misunderstandings.**

## 2 Automotive carbon dioxide emissions

To obtain a better understanding of the impact of the carbon dioxide emissions of leather production with regard to the overall life cycle of an automobile, it is necessary to visualize the following conditions:

| | |
|---|---|
| Carbon dioxide emissions caused by fuel consumption during usage phase | approx. 80 - 90% |
| Carbon dioxide emissions caused by production and disposal of an automobile | approx. 10 - 20% |

Assuming an empty vehicle weight of approx. 1,200 kg, only approx. 6 - 9 kg (8 to 12 m²) are allotted to the leather interior. This corresponds to a mass percentage of **approx. 0.6%** of the empty weight.

Note: According to Braungart and McDonough, products that can either be returned to biological cycles as biological nutrients or are continuously kept in technical cycles as "technical nutrients" are ecologically effective.

## 3 Standardization processes

With regard to all assessment models named in Section 1, data collection as well as data processing and evaluation methods are currently undergoing standardization throughout the world (e.g.: PAS 2050, DIN EN ISO 14040/44, ISO TC 207, GHG Protocol, PCF pilot project for method comparison).

Therefore every current debate is complicated insofar as it is necessary to initially agree on these points in detail, because otherwise it will not be possible to obtain the desired results and wrong conclusions due to different content are bound to occur (see also Section 6).

## 4 Time and effort required for an assessment

A lot of work is necessary to obtain reliable and sound assessment results. The experiences of a well-known institute, which stated that approx. 3.5 man months were required for a life cycle assessment of two simple building materials, are mentioned here as an example. After detailed consultation, it was confirmed that leather production including all up- and downstream processes in tanneries is a very complex process chain whose life cycle assessment would take approx. 4.5 to 6 months to complete.

In addition to that, a whole range of environmentally relevant measures, which have not been evaluated ecologically, are implemented in tanneries (ancillary and downstream processes). Therefore it is not possible to refer to analog processes in other areas in some cases. Both the data collections and evaluations need to be revised (see also Section 7.2).

Ultimately the various distinctive aspects of any given industry result in the PCR (Product Category Rules), which are part of every life cycle assessment and still need to be developed (see also Section 7.2).

These statements are also confirmed by the fact that the available assessment results of other products are usually based on relatively simple process chains.

## 5 Objective

Regardless of its form, a life cycle assessment is never conducted sweepingly and with conclusive results but always follows a previously defined objective. Therefore the question of the objective (why will the assessment be conducted) should basically be clarified first. The assessment results can basically be used only for this purpose. The use of assessment results for other purposes often leads to wrong conclusions.

## 6 Evaluation limits

The definition of evaluation limits – system limits – is a main problem in all life cycle assessment methods. The definition of what to include in the assessment and what not has a major impact on the time and effort required as well as on the informational value and ultimately on the comparability of the assessment results. These definitions are not covered by existing standards, either. A detailed consensus discussion is always necessary in the preliminary stages (experts also point this out again and again).

As an example, the importance of clarification is demonstrated by the following questions:

- Are the transportation costs incurred by employees traveling to/from work included – aren't they necessarily incurred during product manufacture?
- How are the costs of municipal wastewater treatment included in the assessments?
- How is a technically inefficient energy supply based on a renewable resource assessed?
- How are secondary areas which are not directly relevant for production but for carbon dioxide treated (administration, air conditioning, automobile fleets and their use ...)?

Closer examination of the individual processes results in more and more questions to be clarified in preliminary stages.

**However to obtain results, it is required to reach agreements that are observed by everyone involved, for otherwise the comparability of the results is no longer given in any way.**

With regard to a life cycle assessment of leather production according to Section 1, several basic issues that are a legitimate subject for debate and have been only partially treated by organizations such as UNIDO (United Nations Industrial Development Organization) are listed below. The basic options and problems are diagrammed in the appendix as an overview.

### 6.1 Rawhide

In every life cycle assessment of leather production – regardless whether it is product- or location-related – the impact of rawhide as a source material must be subjected to a separate examination.

a) Every rawhide is a renewable resource due to its origin alone.

b) Livestock is bred, farmed or slaughtered solely for the production of milk and/or meat on a global scale. No cowhide is specifically produced for the leather industry.

c) We only use the hides and pelts that are necessarily produced as by-products in the course of regular and controlled slaughtering within the scope of milk and meat production. Unless they are processed into leather, the hides would be waste that would have to be disposed of in carcass disposal plants with a negative energy footprint.

d) The inclusion of the entire animal farming and slaughtering process in life cycle assessments according to Section 1 are not objectively justified merely for these reasons. These life cycle assessments must be incorporated in the assessments conducted by the agriculture or food production industry. For clarification, water consumption is mentioned here as an example. The inclusion of the quantity of water that a cow consumes during its lifetime in the water balance of leather production leads to absurd results that have nothing to do with the actual production conditions or with the production of hide itself.

The UNIDO also dealt with this issue in 2012 and clearly concluded that livestock breeding and farming as well as slaughtering should not be included the life cycle assessment of leather production and use. In the final report of November 2012 (Life Cycle Assessment, Carbon Footprint in Leather Processing) the following three important points were given as a rationale:

- ⇨ **The produced leather is based on a renewable resource.**
- ⇨ **The product made of this renewable resource can substitute similar products made of non-renewable resources.**
- ⇨ **The rawhide supply is not determined by the leather demand.**

This approach is also consistent with the definition of system limits for other materials and represents a generally recognized scientific approach.

**Therefore the first process relevant for us is the handling for sorting, preservation and storage of hides and their transport to the tannery.**

### 6.2 Energy production

Since every life cycle assessment according to Section 1 includes the total energy consumption, it must be pointed out that especially the production of these energies – particularly electricity – should be evaluated very discriminatingly with regard to their ecological impact. Because a leather producer has, however, only very restricted influence on this production, distortions inevitably arise especially in the assessment of different production locations. An example of this is the varying assessment of nuclear power and fossil fuels, which is at least a legitimate subject for debate in an overall ecological context.

A life cycle assessment is preferable to a PCF or CCF particularly in this regard because the final disposal of atomic fuels is also included in the assessment - to name just one example.

These stated facts particularly show that every objective discussion of life cycle assessments – particularly with regard to global economic management – always contains political components as well.

### 6.3 Employed chemicals

To extend life cycle assessments according to Section 1 with regard to leather production also to the employed chemicals,

a) more data and assessments regarding these chemicals are required because not enough is currently available, and

b) the assessment limits have to be defined during chemical production as well.

After joint clarification of the assessment limits, the supplying chemical industry is responsible for the determination and provision of data and assessments.

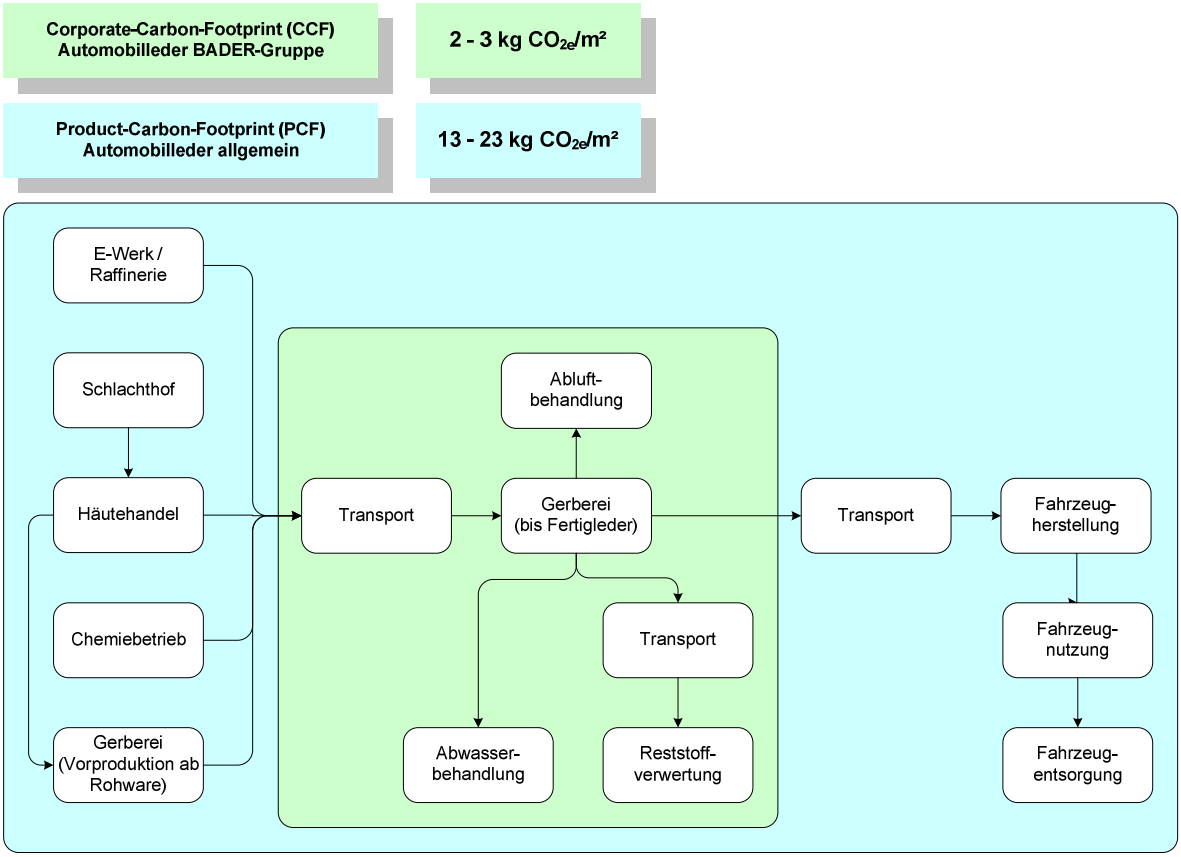
## 7 Current status

### 7.1 BADER's activities

Reliable data on the actual production process and on several ancillary, upstream and downstream processes are currently available. At the moment, BADER is continuing to particularize and extend this to all production locations. These data cannot be disclosed in detail currently because they provide deep insight into our production process – and also into our existential know-how.

In summary the following two value ranges can be quoted. The quoted CCF is based on internal detailed studies conducted by BADER throughout the group; the quoted PCF is based on a detailed literature review conducted by ITG.

## Statement




To demonstrate the expectable dimensions, the following table presents, with reference to Section 2 of the position paper, the situation of an average middle-class automobile assumed for this example (values roughly approximated):

| Description | Value | Unit |
|---|---|---|
| Assumed empty weight | 1,200 | Kg |
| Percentage of carbon dioxide emissions caused by consumption during use | 80 | % |
| Percentage of carbon dioxide emissions caused by production and disposal | 20 | % |
| Specific carbon dioxide emissions caused by consumption | 125 | g/km |
| Assumed total mileage | 250,000 | Km |
| Carbon dioxide emissions caused by consumption | 31,250 | kg $CO_2$ |
| Carbon dioxide emissions caused by production/disposal (1) | 7,750 | kg $CO_2$ |
| Total carbon dioxide emissions (2) | 39,000 | kg $CO_2$ |
| Leather interior 8 m² | 6 | Kg |
| Corresponds to mass percentage of the empty weight | 0.5 | % |
| Carbon dioxide emission percentage caused by leather interior | approx. 65 | kg $CO_2$ |
| Corresponds to a carbon dioxide emission percentage of (1) | 0.84 | % |
| Corresponds to a carbon dioxide emission percentage of (2) | 0.17 | % |

### 7.2 Leather manufacturers' activities in Germany

At the same time an initial CCF for tanneries was compiled by engineering consultants with experience in the industry on behalf of Forschungsgemeinschaft Leder e.V. (Leather Research Foundation) ("$ECO_2$-L"; BADER contributed actively to the contents). Among other things, the Industrial Emissions Directive (IED) and/or the BREF documents were additionally included as a standard of comparison. The definition of the assessment limits takes into account the issues named in Section 6. The following were defined as assessment limits:

a) upstream processes

| | |
|---|---|
| included: | all procurement transports of raw materials ex warehouse (supplier) |
| not included: | production and storage of raw materials (can be amended after submission of data if required) |

b) downstream processes

| | |
|---|---|
| included: | wastewater treatment with downstream external plants up to direct discharge if required (important particularly for comparison of direct and indirect dischargers!)<br>other emissions (waste, exhaust air) quasi "into nature" |

The required PCRs should be compiled in this manner for all processes to be examined. Particularly data determination and assessment of the various, meanwhile available and practiced recycling methods, which are carried out externally and internally during production to some extent, are very complicated. Because they are relevant with regard to the CCF and result in considerable credit notes in some cases, their exact examination is required.

This tool can serve as a standard for comparing different leather production processes and as a basis for further life cycle assessments. For example, discussions are already in progress with a well-known institute to possibly perform a life cycle assessment for leather.

For more detailed information, visit WWW.ECO2L-LEATHER.COM

## 8 Conclusion for Section 1 to 7

The next task in hand will be to enter the discussion of the above-name items in order to advance the existential issue of sustainable production – which is also crucial for the future of leather production. We assume that every further detailed discussion will essentially serve to objectify the discussions after submission of the results presented in Section 7.2.

## 9 CSR – Corporate Social Responsibility

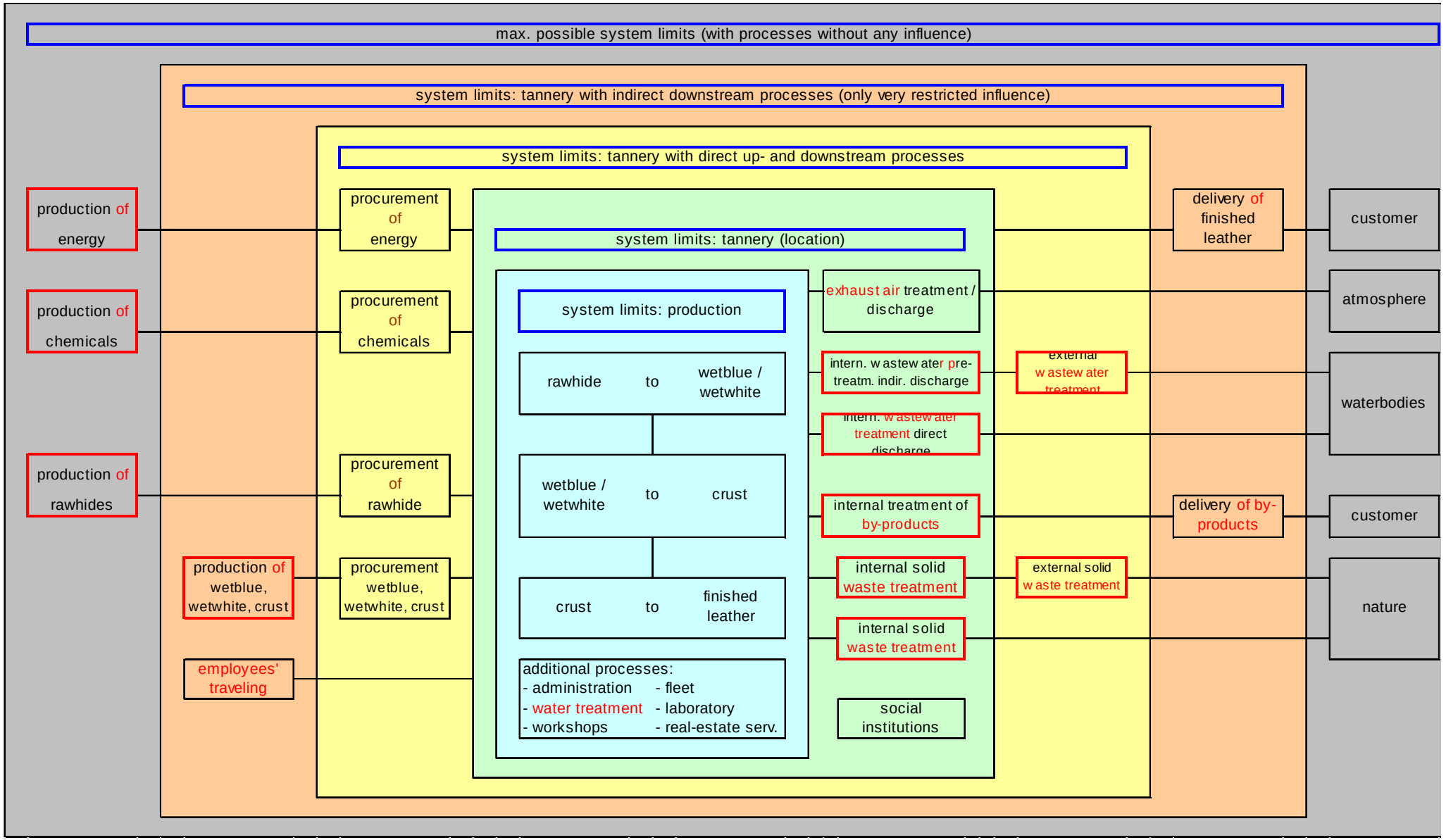
At BADER, a large number of standard CSR criteria has been incorporated the policy guidelines for many years. Systematic editing of the standard criteria is currently in progress. With regard to the current status, we should like to refer to the extensive collection of examples on this subject.

## 10 Certifications and labeling

Basically, BADER assumes that the benefits of any label exist only if they are accessible to the end customer – and are preserved from the B2B through to the B2C area.

It is almost impossible to keep track of the variety of existing labels and certification options. In case of questions, the purpose of the certification/label and the criteria to be considered should be clarified. The purposefulness should always be questioned due to the usually significant costs.

# System limits to ecological assessment methods within leather production – reasonable possibilities




| | | |
|---|---|---|
| sub-processes that are difficult to evaluate for different reasons | system limits: production | … data created by BADER itself |
| | system limits: tannery (location) | … pointless because locations are not comparable (see wastewater and solid waste treatment) !! |
| | system limits: tannery with direct up- and downstream processes | … same system limits as $ECO_2$-L / BEET |