Willkommen
Welcome
Bienvenue

Empa
Materials Science and Technology

Democratisation of LCA: propagating sustainable behaviour through streamlined and inclusive processes for accessible LCA results

78th Jubilee Swiss LCA Forum: Life Cycle Thinking = Lower Footprint?

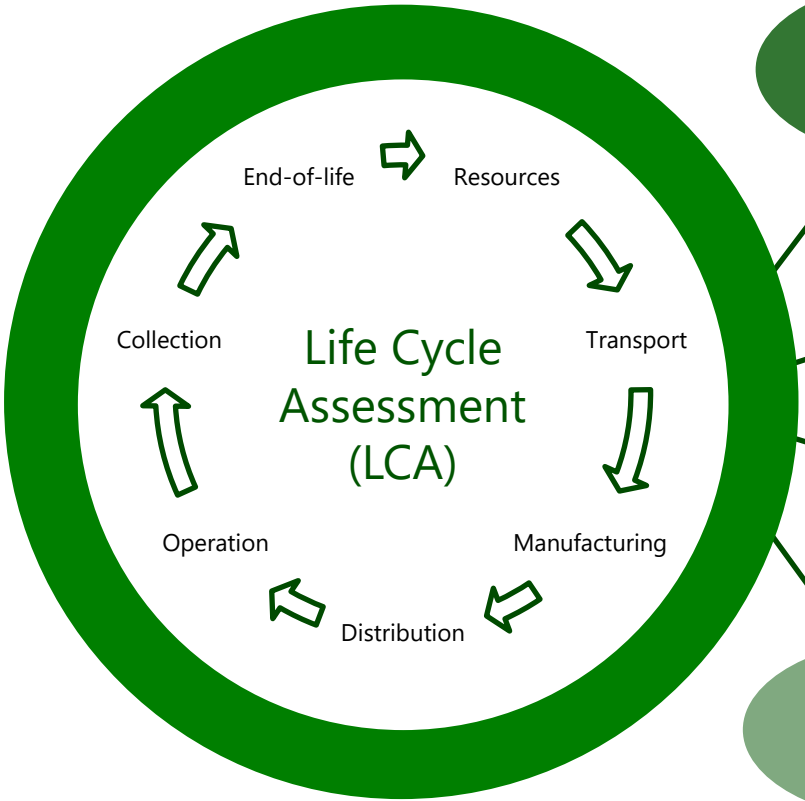
13-14 September 2021, Zürich Switzerland

Didier Beloin-Saint-Pierre (dib@empa.ch), Harald Desing, Roland Hischier

"democracy is the worst form of government – except for all the others that have been tried."
Winston Churchill

LCA is the worst way to do environmental sustainability assessment – except for all the other methods that have been tried

The benefits of life cycle thinking and LCA



Comprehensive model
- Fit for sustainability assessment
- Helps to avoid displacements

Focus on transfer of knowledge
- Made for decision-makers
- Aim at aggregated results

Wide range of applications
- Comparison of any system
- Benchmarking

International recognition
- Available standards
- Used by many organisations

Transforming knowledge into actions

Empa
Materials Science and Technology

Typical audiences of LCA studies: reaching decision-makers

	Governmental organisations	Businesses	Customers
Funding capacity	Yes	Depends on size	No
Can deal with required time to carry out LCA studies	Yes	Rarely	No
Range of actions	Far reaching (national & international)	Sector or company	Individual consumption
Key constraint	Will often not move if society is not ready	Rare changes if potential loss of competitiveness	Limited access to LCA knowledge

The LCA community has mainly targeted these 2 audiences in the past but global trends are still worrisome

We should focus on another audience

Vision for more actions

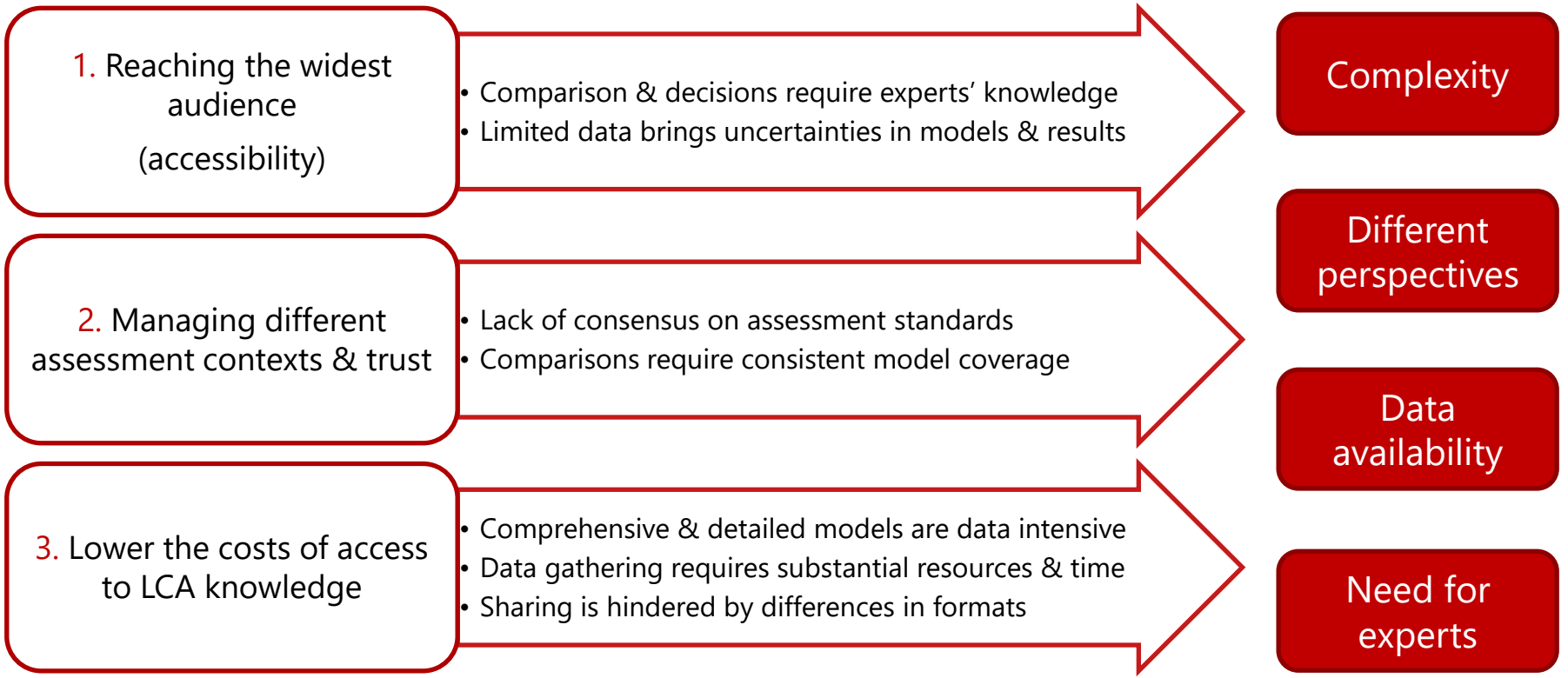
- Reversing the decision pathways (sharing responsibilities)

- Need to democratise the access to LCA knowledge

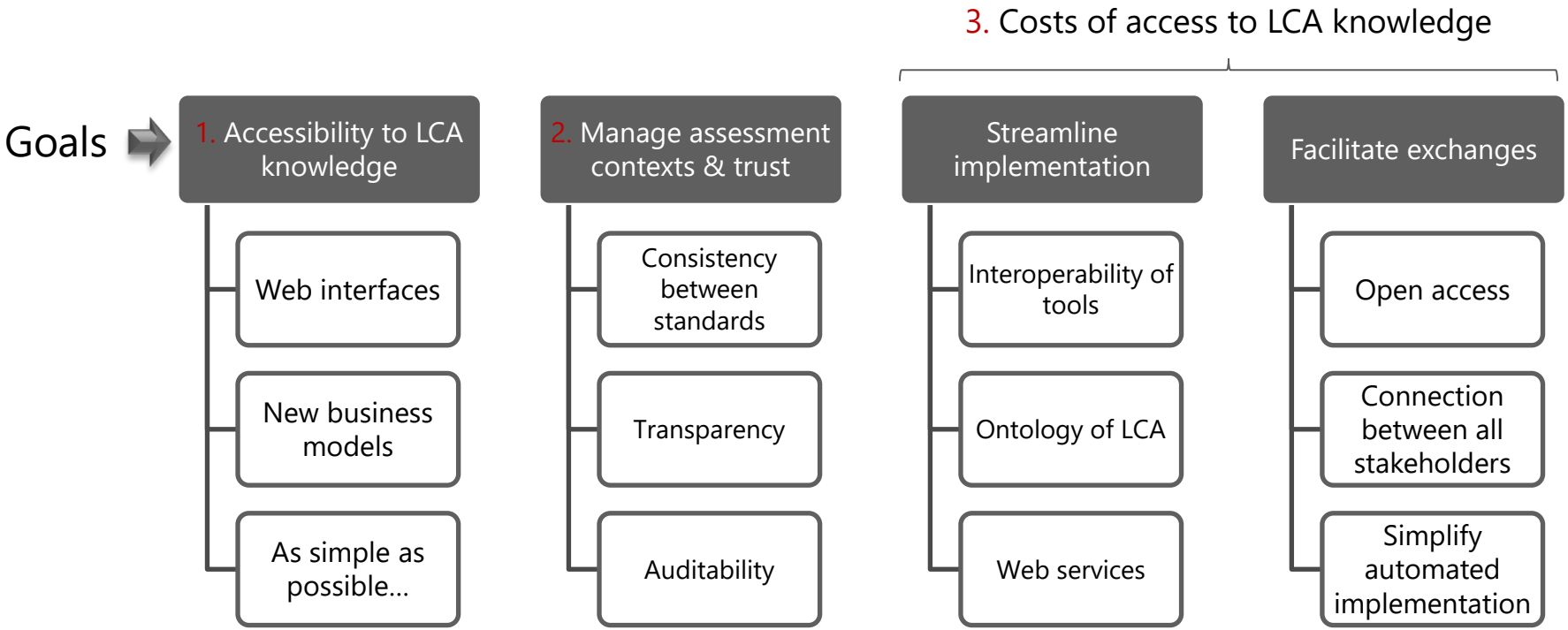
1. Reaching the widest audience (accessibility)
2. Managing different assessment contexts & trust
3. Lower the costs of access to knowledge

Methodological challenges to democratise

Empa
Materials Science and Technology



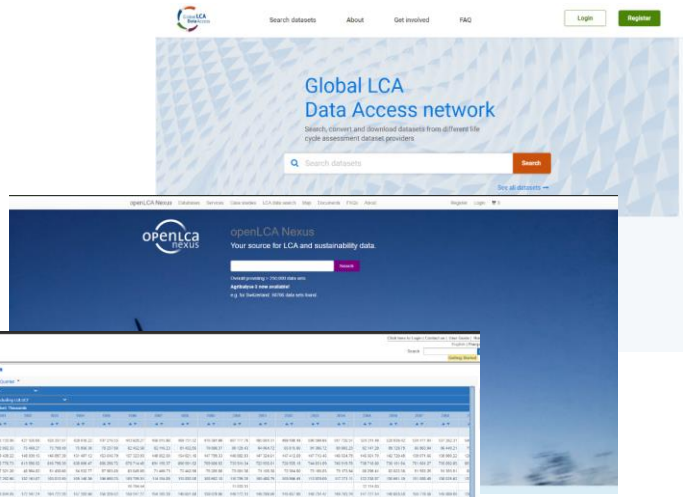
Proposed solutions for 2030

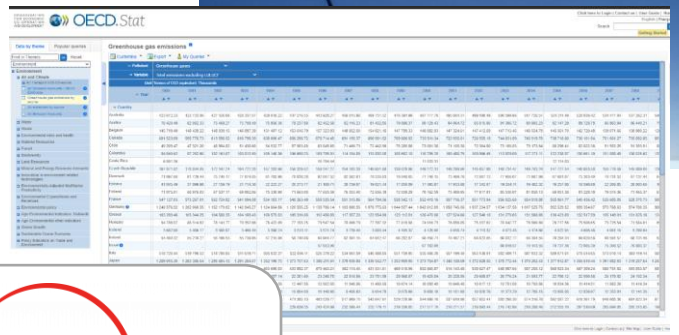


General solution: build on the current digital transformation and its tools

Examples of digital solutions for data

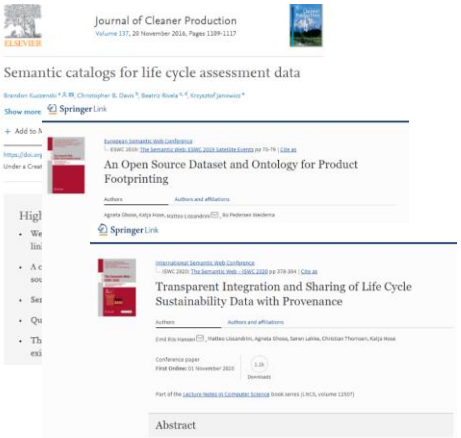
Database





ecoinvent

LCA Ontology



Kuczenski, B., C. B. Davis, B. Rivela and K. Janowicz (2016). "Semantic catalogs for life cycle assessment data." Journal of Cleaner Production **137**: 1109-1117.
Ghose, A., K. Hose, M. Lissandrini and B. P. Weidema (2019). An Open Source Dataset and Ontology for Product Footprinting. The Semantic Web: ESWC 2019 Satellite Events, Cham, Springer International Publishing.
Hansen, E. R., M. Lissandrini, A. Ghose, S. Løkke, C. Thomsen and K. Hose (2020). Transparent Integration and Sharing of Life Cycle Sustainability Data with Provenance. The Semantic Web – ISWC 2020, Cham, Springer International Publishing.

Examples of digital solutions for models

Empa
Materials Science and Technology

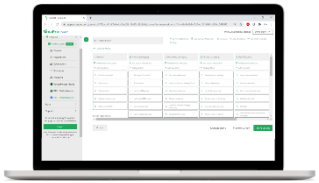
Computation and models

Brightway2

LCA Collaboration server

LCA CS

SimaPro Share
SimaPro Collect



spheraCloud

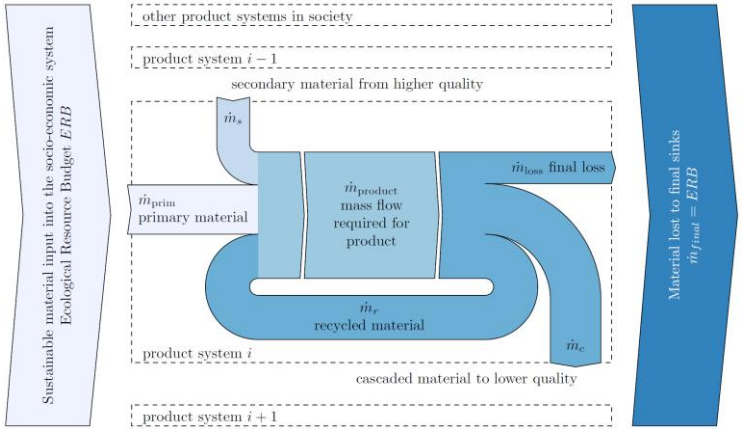
LCM 2021

- Digital Twin
- Semantic BIM model
- Industrial Symbiosis Marketplace

Resource pressure method

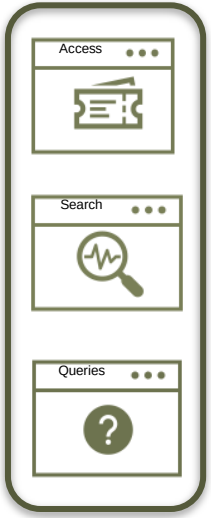
(*Accessible impact model*)

Desing, H., G. Braun and R. Hischier (2021). www.doi.org/10.1016/j.resconrec.2020.105179
Desing, H., G. Braun and R. Hischier (2021). www.doi.org/10.1017/sus.2020.26



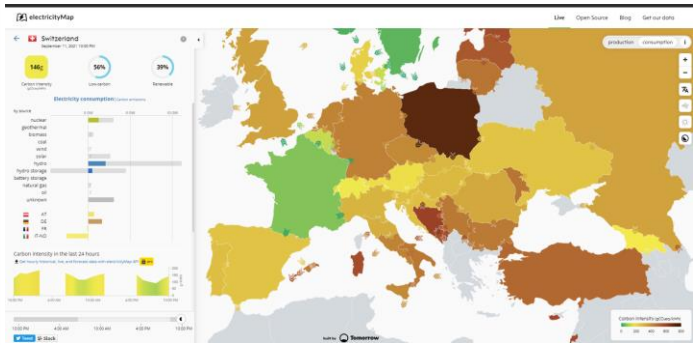
- Includes circular economy & planetary boundaries in single indicator with some value choices
- Tailored quantitative method for design phase
- Aims at minimizing resource consumption and its associated environmental implications

Examples of digital solutions for interfaces



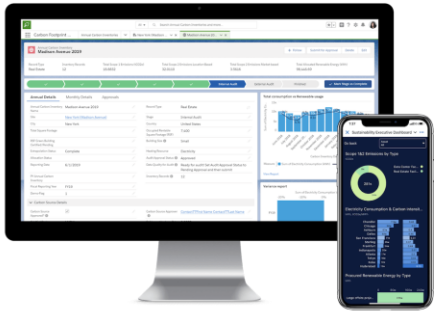
Electricity map

https://www.electricitymap.org/map



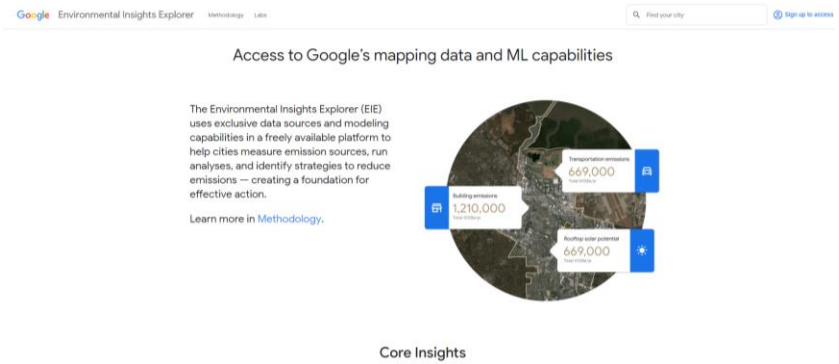
Sustainability cloud

https://www.salesforce.com/products/sustainability-cloud/overview/



Environmental Insights Explorer

https://insights.sustainability.google/

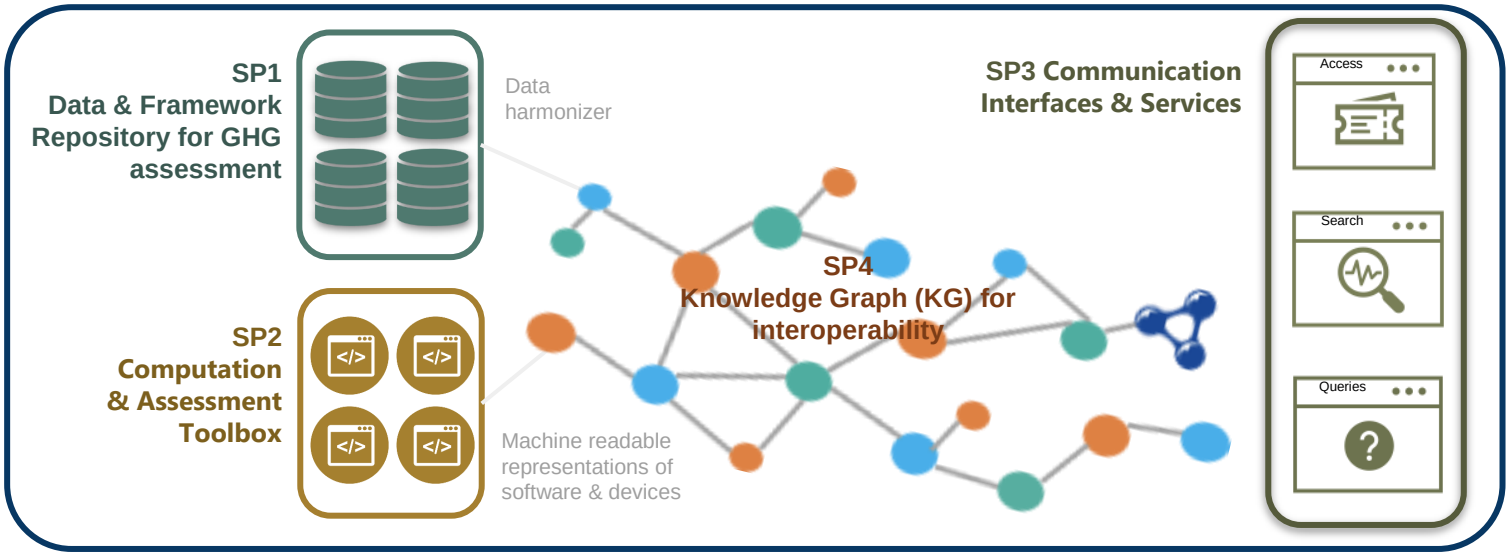


Digital ecosystem

The WISER Innosuisse flagship proposal

Web of Interoperable Digital Services (WIDS)

... acting as an open, inclusive and transparent digital ecosystem



- Create connections between different actors & assessment tools → 1. Reaching wider audience
- Provide the "translation dictionary" between actors → 2. Manage different contexts & trust
- Enable and promote community-based developments → 3. Lower the costs of access to knowledge

Potential partners for the digital ecosystem

Empa
Materials Science and Technology

digitalswitzerland

Microsoft

ICT sector
- Cross-industry initiative
- Computer scientists
- Developers
- …

Universität St.Gallen

Hes·so VALAIS WALLIS

DATA CENTER EFFICIENCY

SWICO

zhaw

PAUL SCHERRER INSTITUT PSI

ABB

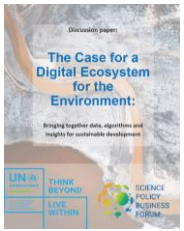
EY Building a better working world

Businesses
- Designers
- Marketing
- Accounting (Audits)
- …

Environmental experts
- LCA experts
- Climate scientists
- Biologists
- …

Empa
Materials Science and Technology

econvent



https://un-spbf.org/big-data/the-case-for-a-digital-ecosystem-for-the-environment/

Government
- Countries
- Cities
- UN
- …

Ville de Lausanne

STADT SCHAFFHAUSEN

Stadt Winterthur

Society
- Individuals
- NGOs
- Consumer associations
- …

Challenges of the digital ecosystem

Empa
Materials Science and Technology

- More scrutiny on LCA results (tackle current shortcomings)
- Transdisciplinary exchanges
- “As simple as possible, as complex as necessary”
- Identifying value for the decision-makers
- Developing a working business model for the digital ecosystem
- Acceptable level of access to data
- Viable automation level (where do we need human efforts/analysis)

Conclusion

Image by OpenClipart-Vectors from Pixabay

Thank you for your attention

For questions/ideas/comments: dib@empa.ch