The role of the ETSI LCA standard for ICT in European and global environmental policy

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Why are sustainable businesses successful?

- Market advantage
- Funding
- Image of the industry
- Quick adaption to regulations
- Reduce exposure to energy price
- Sustainable/smart solutions are already technically possible...so the future is already here

Global100.org based on GRI shows this trend of Clean Capitalism
Sustainability assessment methodologies

Huge number of methods

- >200, e.g.
  - Exergy
  - Emergy
  - MIPS
  - Weighting from LCIA in LCA
  - Global Reporting Initiative
  - Dow Jones Sustainability Index

- Few methods are actually used *within* companies
- Life cycle based method&tools such as LCA are used internally!
- Threshold values defining the road to sustainability?
Operators methodologies with links to LCA

- **The Eco-Rating (ER)**
  - Indicates the relative sustainability of mobile phones
  - Basic LCA is \( \approx \frac{1}{3} \) of ER

- **Eco-efficiency index**
  - Bits/Joule
  - CO\(_2\)/TeraByte

- **Scope 3 calculations**
  - Product LCA support, PCF upstream

DOI 10.1007/s11367-012-0469-9, Scope 3 emissions
Vendors methodologies with links to LCA

- Internal usage is well-known
  - Quick-LCA
  - System Integration LCA
  - Holistic LCA
  - LCA-based design
  - Streamlined tools

\[
GWP_{PWB} = A \left[ \alpha + \beta L + \gamma f(\text{finish}) \right] + \text{error}
\]

Joyce, T. et al. (2010)

- \(A\) = area of PWB
- \(L\) = layers in PWB
- \(F\) = function for surface finish

\(\alpha, \beta, \gamma\) are regression coefficients obtained from large sample
Why ETSI LCA standard?

- **Further harmonization**
  - Step towards standardizing sustainability in ICT
  - Especially for system boundaries
  - Choice of appropriate product system
  - Remedy broad and inconsistent use of LCA of ICT
  - Ensure a *very high* quality, transparency, credibility of an LCA of a ICT/electronic system!
  - The ETSI compliant performer is to demonstrate "hawk’s eyesight" of the system/analysis at hand

Frequent PROBLEMS with electronics/ICT LCAs using ISO 14040 14044

- Inconsistent use of
  - Functional unit
  - System boundary
  - Allocation methods

→ Mess for policy making and Guidance of research direction

- Transparency can be achieved with ISO but quality not ensured

Comparability between "external" LCA studies

- Not achieved...PCRs would achieve this
LCAs without ETSI LCA standard

“Result shows that there is better performance made by the latest smart phone when compared with the old 2G phone.”

“For TVs: The production phase has the highest impact”

- Example of mobile phones and TV
  - Without ETSI
    - Questionable conclusions
    - Reasonableness?
  - With ETSI
    - Understood what is included and excluded
    - Understood how material allocation was made
    - Basic functional unit
  - Not all LCAs of ICT performed without ETSI std are of low quality!
LCA with ETSI LCA standard

- **Example of mobile phone**
  - With ETSI
    - Understood what is included and excluded
    - Understood how material allocation was made
    - Basic functional unit

![Graph showing raw material acquisition and use with CO2e emissions](image)

- **Total result**: <43 kg CO2e
- **Study year**: <2012
- **Operating lifetime**: <2 years
- **Production**:
  - Assembly location: <global average>
  - Transports: <included>
  - Support activities: <excluded>
- **Use**:
  - Use location: <World>
  - Transports: <excluded>
  - Support activities: <excluded>
  - Infrastructure: <excluded>

**Raw Material Acquisition (A)+Production (B)+EoLT (D) + Use (C)**
LCAs without ETSI LCA standard

“embodied energy HALF(!!) of lifetime energy of base station.”

- Example of base station
  - Without ETSI
    - Questionable conclusions
    - Reasonableness?
  - With ETSI
    - Understood what is included and excluded
    - Understood how material allocation was made
    - Basic functional unit
    - Not all LCAs of ICT performed without ETSI std are of low quality!

ETSII LCA: Idea CED(GJ) 10 years for a 711W BTS

- RMA+ P+Eo LT
- Use

The above base station estimation seems to be “accepted” in the academic world
How does the ETSI LCA standard help measure overall ICT footprint?

- **Industry progress**
  - The annual average for manufacturing impacts reported consistently

- **Level playing field for LCA**
  - Logic due to the increased usage and importance of ICT and the demand of environmental impact estimations are increasing.
  - The practitioner gets an “exact” guide what is recommended to include if applicable to the system under study…and what is optional
ETSI LCA Standard Answers EU Mandate M/478

- EU technical standards in the field of greenhouse gas emissions
  - Create a European standard that will support policies and measures set up for moving towards a global low emissions economy
  - Towards an overall measurement methodology of the carbon and energy footprints of the ICT sector
Support EPD® Product Category Rules

- Where could the ETSI LCA standard have been useful for Home and Soho Gateways?
  - General system boundaries, YES
  - Declared Unit, YES
  - Determining the scope of the PCR, NO
  - Upstream&Core&Downstream Processes, YES
  - Cut-off Rules, YES
  - Data Quality Rules, YES
  - Use Phase Scenario, NO
  - End Of Life Scenario, NO
Support EU Product Environmental Footprint Category Rules

- Where can ETSI LCA standard be useful?
  - Search for previous PCR
  - Determining the scope of the PEFCR
  - Definition of the product model for the PEF screening
  - PEF Screening (impact assessment, interpretation and conclusion, report) HERE when the Screening LCA is performed
  - Draft PEFCRs based on PEF screening
Ways forward

- **Eco-Rating**
  - Add ETSI LCA elements in Basic LCA for further diversification between devices

- **Government**
  - For electronic devices: Request Equipment LCAs compliant with the ETSI LCA standard – ISO is not enough

- **Product Category Rules**
  - Needed for more streamlined LCAs and for comparability products
  - ICT Sector can use ETSI LCA standard as basis for PEFCR within the EU PEF Guide

WARNINGS:
Standardization PCR may lead to Oversimplifications

Peer-reviewed LCA studies of electronics need another review...

Especially SMEs benefit from clear rules
SUMMARY

- **ETSI LCA standard has an important role in environmental policy**
  - Support the quantification of ICT Sector footprint
  - Measure that ICT stay on its highly Energy Efficiency path
  - Supporting claims of green superiority
    - Basis for PCRs and PEFCR
    - Support Eco-Rating Basic LCA
  - Fair carbon tax setting
  - Collaboration with other SDOs such as ITU

Robust!
Precise!
Strict!
Credible!

It depends on the situation whenever this quality is required

- Beyond order of magnitude precision
- Relation between Raw Material Acquisition/Production/Use/EoLT
Thank you
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Green calculations of life cycles
e.g. CO$_2$ and CH$_4$

Quantifiable/Measureable performance/functions