

Lab 2.1. - LCA document analysis

Duration

45 min

Groups

Pairs

Evaluation

None

1. Instructions

We have spent the lecture discussing what a LCA is, is not, or should be. Now let's read a real LCA report:

Sánchez, Baur & Eguren. "Life Cycle Assessment of the Fairphone 5." Fraunhofer IZM (2024).

https://www.fairphone.com/wp-content/uploads/2024/09/Fairphone5_LCA_Report_2024.pdf



- Work in pairs.
- Answer each question with a section and page number from the report.
- The executive summary (pages 8-13) and Chapters 3-6 cover almost everything.
- Do not try to read all 83 pages: navigate with the table of contents or the search function.

2. Questions

Q1. Goal, audience & critical review

Who commissioned the study and who carried it out? What are its stated goals? Was it critically reviewed by an independent party? Why does that matter?

Q2. Functional unit & reference flow

Find the baseline functional unit. Split it into **action verb** + **performance level** + **condition & duration of use**. What "reference service life" does it assume, which other lifespans are modelled, and how do the authors justify the 3-year baseline?

Q3. Scope & system boundaries

Which life-cycle stages are covered? (Sketch the cradle-to-grave diagram for the Fairphone 5.) From Chapter 4, give one **foreground** process modelled with primary / supplier data and one **background** process modelled with a generic database dataset.

Q4. Attributional or consequential?

Which approach does the study follow, and where does it say so? Then find at least one analysis in the report that is really answering a "what changes if...?" question (e.g. switching an energy source, repairing instead of replacing).

Q5. Data quality (pedigree)

The report grades datasets on three “representativeness” criteria — name them. Quote one place where the authors themselves flag a dataset with weak temporal or geographical correlation.

Q6. Cut-off

What exclusion / cut-off criterion did the authors actually apply? Does this mean they over- or underestimate the impacts?

Q7. Allocation & recycling

The Fairphone 5 contains recycled aluminium, copper, indium... Which end-of-life allocation approach is used in the baseline (cut-off 100:0, substitution 0:100, or 50:50)? In plain words: who carries the burden of producing the recycled input, and does the phone get a credit for the materials recovered from it at its own end of life?

Q8. Amortisation & hotspots

Give the total cradle-to-grave carbon footprint over the 3-year functional unit and the production share. What is the most impactful phase, module, and component group inside that module? What does a 10-year lifetime do to the yearly emissions, and why is the effect so large? How does this connect to lecture 1's sufficiency vs efficiency distinction?

Q9. Impact assessment: beyond carbon

List the impact categories reported. Midpoint or endpoint? Any normalisation or weighting? For climate change, state the reference substance, the time horizon, and the source of the characterisation factors. Finally, find a result where the “worst” module or phase *depends* on which category you look at (e.g. ADP elements vs climate change). What does that say about compressing an LCA into one CO₂ number?

Q10. Uncertainty, sensitivity & “potential” impacts

Pick two sensitivity analyses from Chapter 6 (display modelling, IC modelling, allocation, battery energy mix...) and report the range of results each produces. Does the report ever call the Fairphone 5 “sustainable”? Quote how the authors describe what their scores are and are not.

3. Bonus: comparing two reports

Q11. Same product category, two very different documents

Skim Apple's **MacBook Pro 14-inch Product Environmental Report** (October 2024): https://www.apple.com/id/environment/pdf/products/notebooks/MacBook_Pro_14-inch_PER_Oct2024.pdf

1. Can the two headline carbon numbers be compared directly? Why or why not?
2. Which document lets a reader **reproduce** the result, as ISO 14044 reporting requires?
3. What does each study miss that the other captures?