COMMUNITY TALKS

GOING GREEN TRAININGS

Exploring environmental metrics

LCA, EPD and PEF

18 April 2024 • 10:30-11:30 • Online

REGIO GREEN TEX

Webinar Procedures

The webinar is recorded and will be shared - in parts or entirely – with all consortium partners. By staying connected you agree to this. If you would not like to appear on the recording, please keep your camera and microphone off at all times.

Mute your microphone

Disconnect video

Type questions in the chat

Raise your hand when you wish to speak

When you are invited to speak, unmute mic and show video (if possible)

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Agenda

Introduction
Charlotte Denis, Textile ETP

Exploring environmental metrics: LCA, EPD and PEF
Diego Peñaloza, RISE

Q&A

Conclusion
Charlotte Denis, Textile ETP

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COMMUNITY TALKS

GOING GREEN TRAININGS

Online animation activities play a pivotal role in sustaining the engagement of SMEs within the digital ecosystem. To stimulate interaction, the RegioGreenTex Community Talks **promote the latest progresses and results of the project, and well as encouraging dialogue and knowledge sharing in the textile sector.**

The 'Going Green Trainings', a component of the RegioGreenTex Community Talks, offer advisory green support to SMEs in the textile sector, carefully tailored to address sustainability concerns. Led by experts from RISE, these webinars provide practical training across six distinct areas of sustainability.

The Going Green Trainings are part of WP4 (T4.2 Green advice/advisory support to SMEs) and are managed by RISE, with support from OVAM, Euramaterials, Citeve, Eurofins, Ateval, AEI Textils, CS-Pointex, NTT, EURATEX, and Textile ETP.

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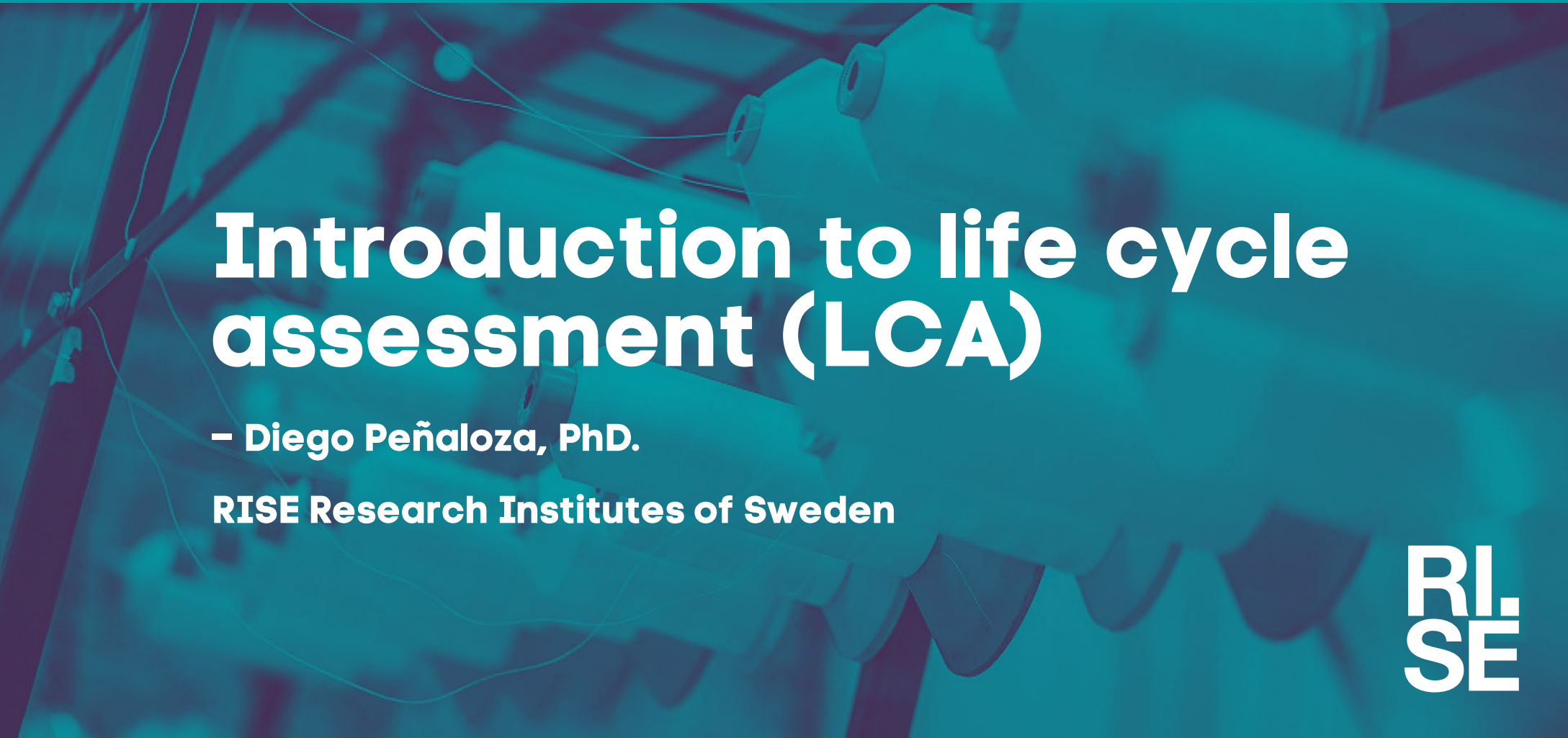
REGIOGREENTEX WEBINAR
2024-04-18



Introduction to life cycle assessment (LCA)

– Diego Peñaloza, PhD.

RISE Research Institutes of Sweden

About me

- Working with LCA and Social LCA over 14 years
- Mostly construction, biomaterials and textiles
- 15+ EPDs
- Several EU projects (tExtended, CISUTAC, New Cotton,…)

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Topics

- The basics of LCA
- LCA and communication
- Environmental product declarations (EPD)
- Product environmental footprint (PEF)
- Q & A

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The basics of LCA

The four phases according to ISO 14040/44

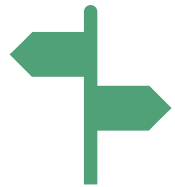
Life cycle assessment, LCA

LCA considers the entire life cycle of a product, from raw material extraction and acquisition, through energy and material production and manufacturing, to use and end of life treatment and final disposal.

ISO 14040/44:2006

Drivers for LCA

Learn



Decision making

Improve

Communicate

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Four stages of an LCA

1. Goal and scope definition
2. Inventory analysis
3. Impact assessment
4. Interpretation of results

Iterative process

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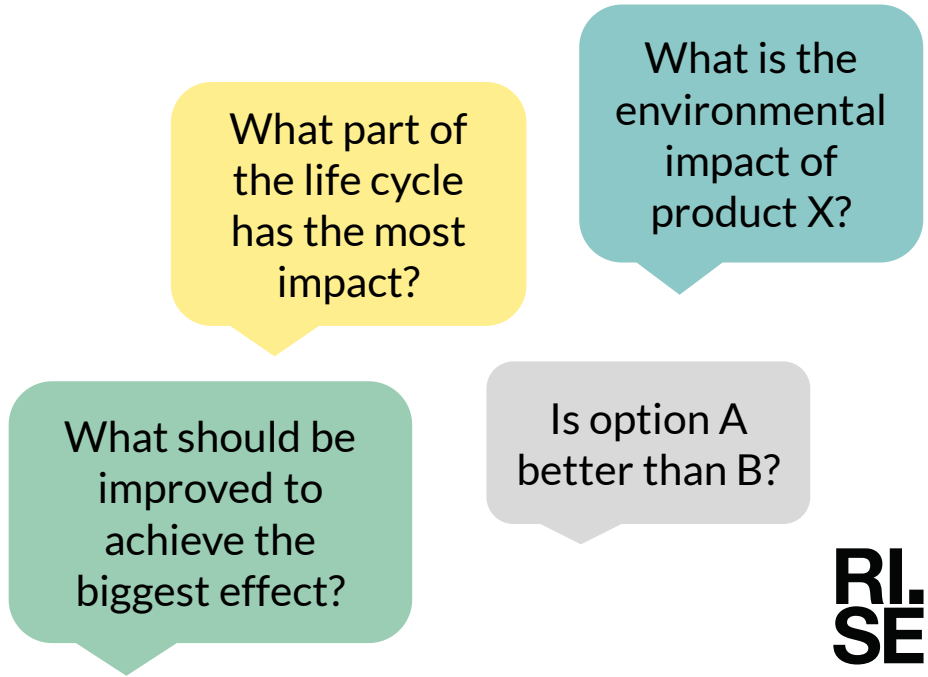
1. Goal and scope definition

- Why is the life cycle assessment performed?
- How will the results be used?
- Who is the target audience?



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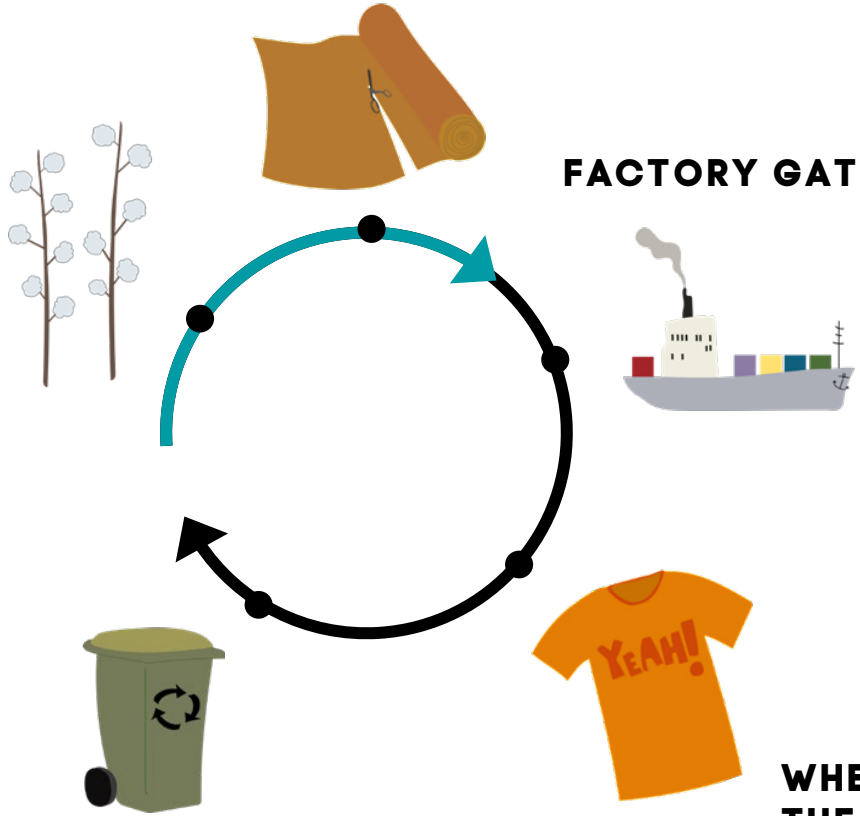
System boundaries

WHERE DOES THE CRADLE START?



FACTORY GATE

WHERE DOES THE GRAVE END?

Functional unit

- Is the calculation basis for the analysis
- Should be consistent with the goal
- Should contain a quantitative measure

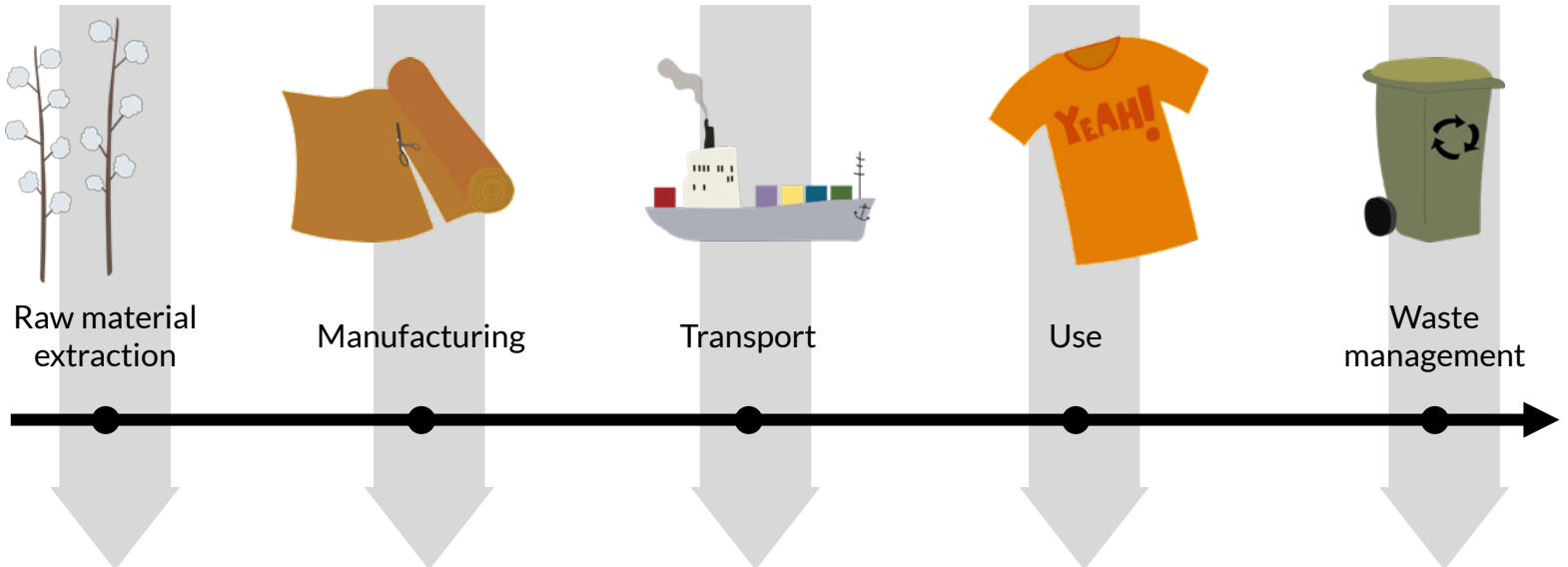
Functional unit

0.1 kg CO_2-ekv per tonkm

Unit for environmental impact category
(climate impact)

2. Inventory analysis

INPUTS: Resources such as raw materials, energy, materials, chemicals, land and water



OUTPUTS: Emissions to air, water and land. Waste and by-products

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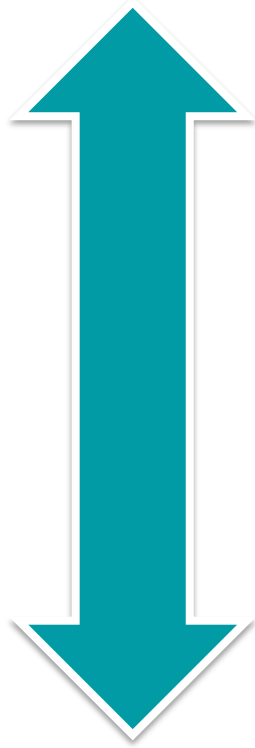
Data quality in LCA

Specific data
Collected on-site, for key processes, average annual values

Estimations, assumptions, educated guesses

Generic data
From databases and literature, upstream and downstream processes most often

Proxy data



High data quality

Data collection is often time consuming!

Low data quality

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Methods for handling allocation

During the inventory, complications often arise such as:

- The studied system produces **more than one** product
- The studied product is made from **recycled material**

Two main approaches for handling this:

Allocation

System expansion

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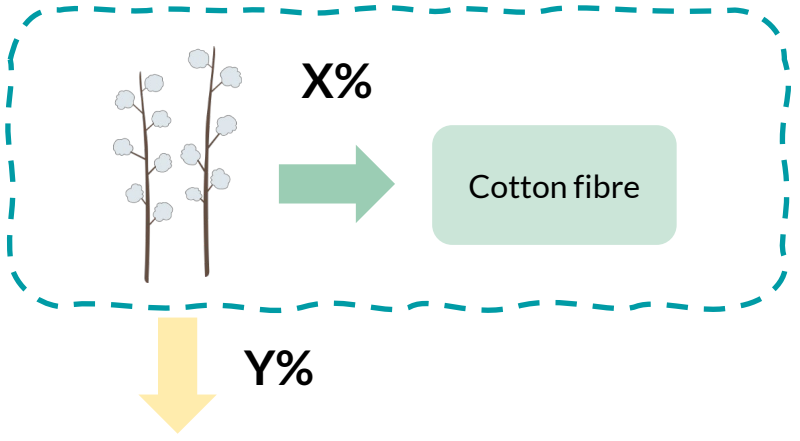
Allocation
(= distribution of emissions)



Allocation based on

- Physical relationship (mass, volume, energy content, pieces)
- Economic relationship

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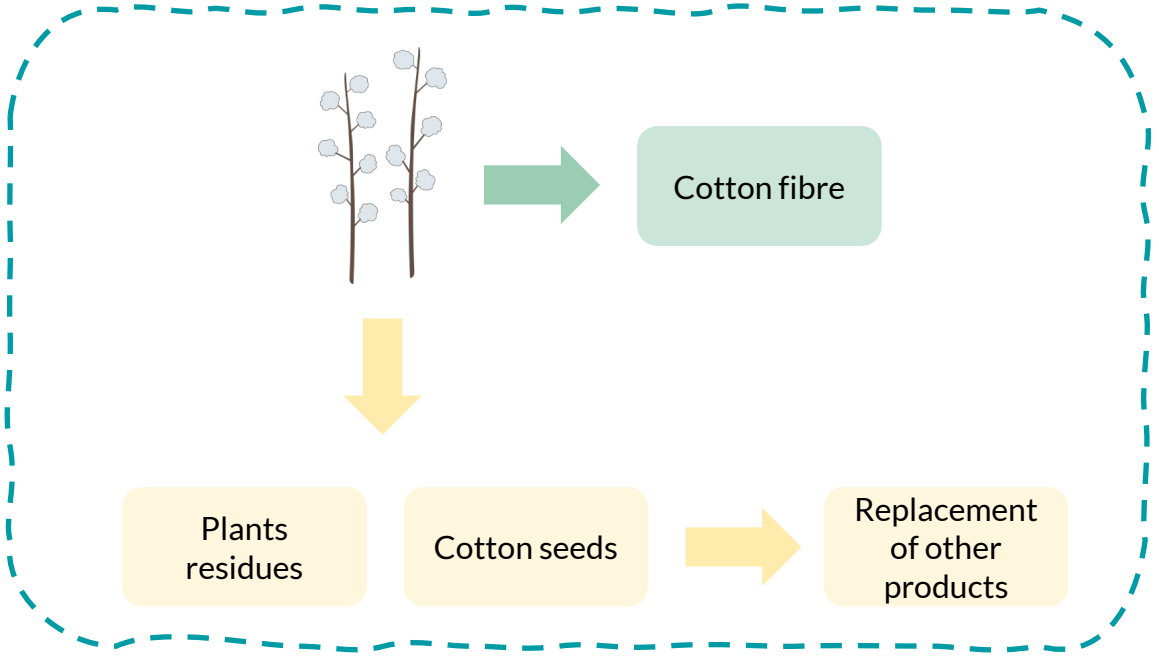
System expansion (= avoided emissions)

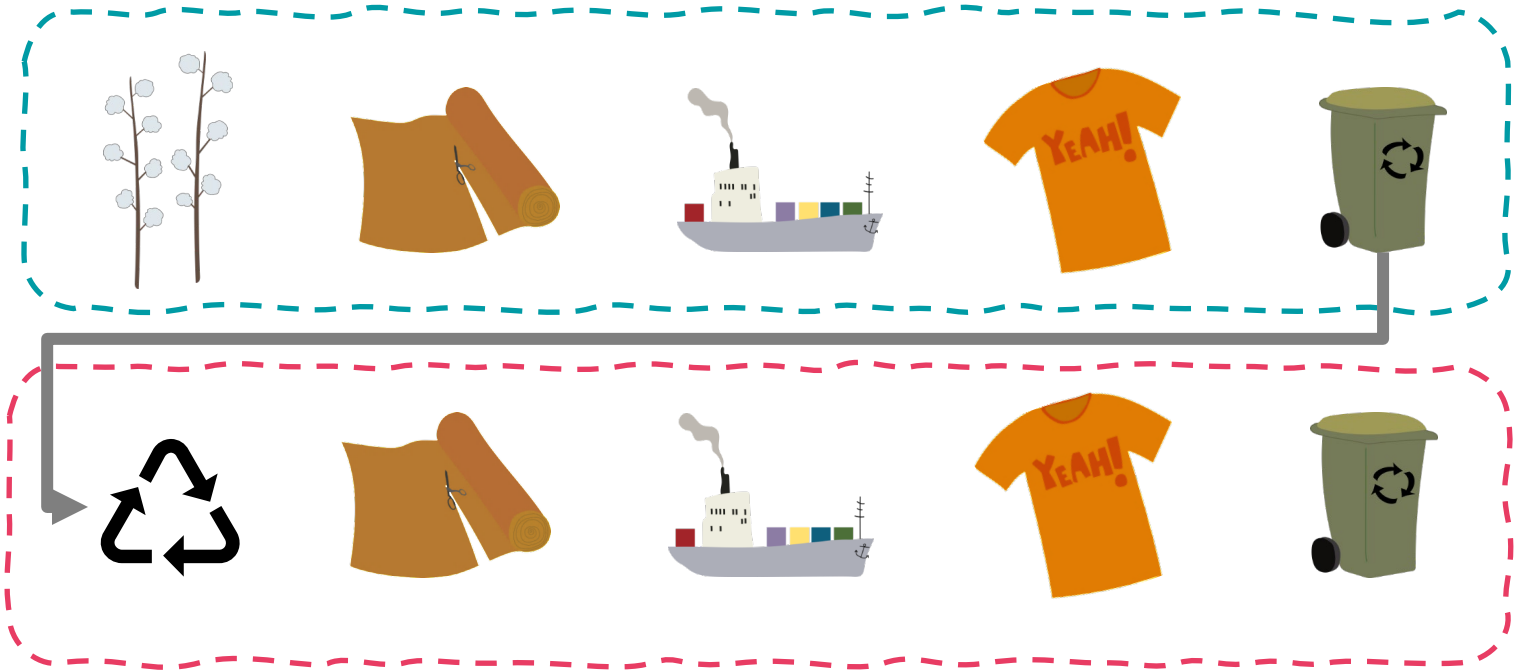


System expansion

- System boundaries widen to also include substitution of other product or material

Allocation at recycling

Cut-off method (“polluter pays principle”)

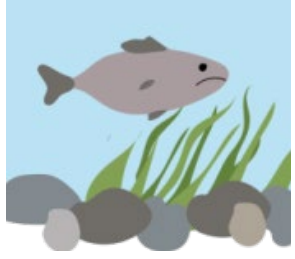


For additional analysis and variants: https://www.lifecyclecenter.se/projects/modeling-of-recycling/

3. Impact assessment

CLIMATE IMPACT

ACIDIFICATION



EUTROPHICATION

WATER USE

...

Impact categories (examples)

Impact category

- Global warming
- Eutrophication
- Water depletion

Indicator

- Global warming potential (fossil, biogenic, land use)
- Eutrophication potential (marine, freshwater, terrestrial)
- Water use, water deprivation

Method

- IPCC (kg CO_2 eq)
- ReCiPe, accumulated exceedance (kg P eq, kg N eq, mol N eq)
- AWARE (m^3 world eq deprived)

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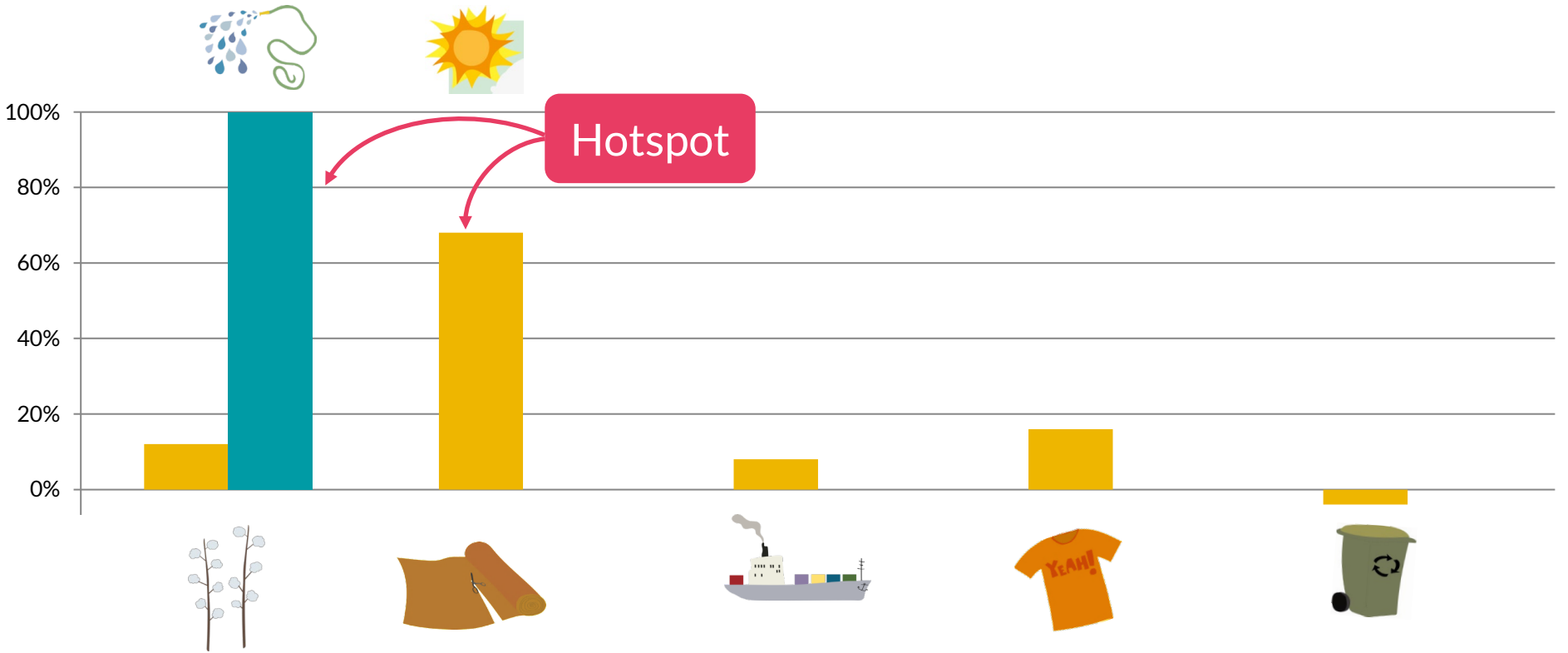
4. Interpretation of results



Mistra Future Fashion D2.6. Roos et al. 2015

LCA and communication

Communication LCA results to the public

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Customizing LCA

Methodology

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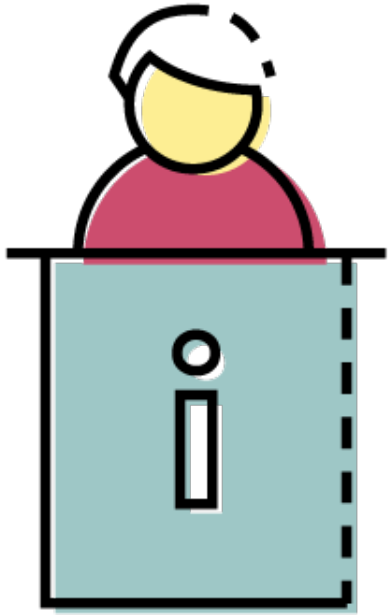
Communication of LCA results



- Additional requirements for comparative assertions to be disclosed to the public (ISO 14044)
  - Data quality
  - Sensitivity analysis
  - **Critical review**, review panel
  - LCIA indicators
  - Reporting
- Results / declarations with no comparative assertions usually require third-part **verification**
  - Environmental product declarations (EPD)
  - Product environmental footprint (PEF)

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Environmental Product Declaration (EPD)

What is an EPD?

- Voluntary and transparent declaration of a product's life cycle environmental impact
- Life cycle assessment as foundation
  - Sectorial specific rules, consensus
- Published openly
  - Result and method (no sensitive data)
- Comparable (within the same product category)
- Third-part verified
- "Business-to-business"
- Excellent data source for other assessments
  - E.g. climate declarations of projects

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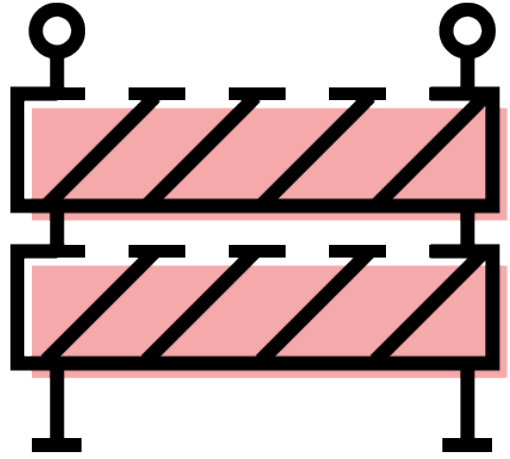
What an EPD is not

- Eco-labelling
- Measure for ”green” products
  - Or ”greener” products
- But…
  - Products / manufacturers with higher impacts often avoid declaring it
- Not always a full life cycle assessment
- Easy or quick to develop



Important concept: Program operators

- Independent organizations that manage, administer and oversee EPD development
- ISO standards allow anyone to create one
  - Been around since the 90s
  - There are 40+ globally
  - Most often one operator per country
- Responsible for developing sectorial common LCA rules for specific product categories

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Important concepts: Program operators

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Important concept: Product category rules (PCR)

- Common rules for LCA of one product category
  - Ensure comparability
  - Base for third-part verification
- Establishes rules for:
  - Functional / declared unit
  - Complementary technical information (e.g. density, etc)
  - Indicators that must be declared
  - Processes that must be included (upstream, core, downstream)
  - Data quality (e.g. which processes require specific data)

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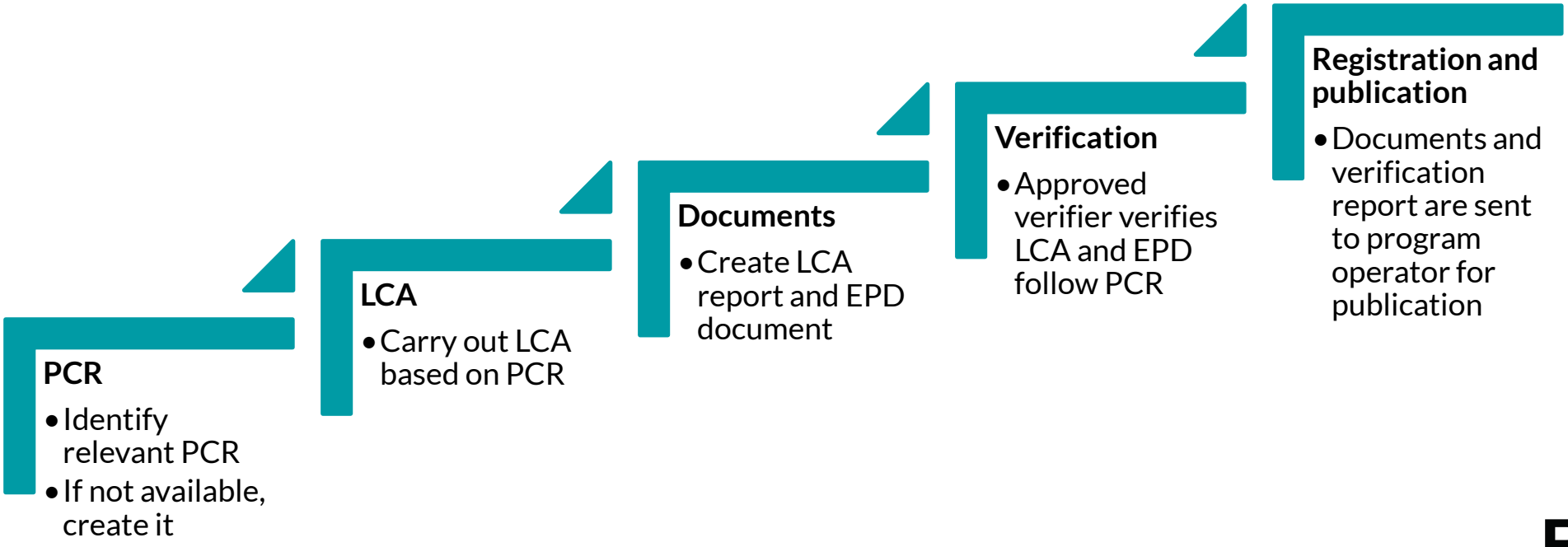
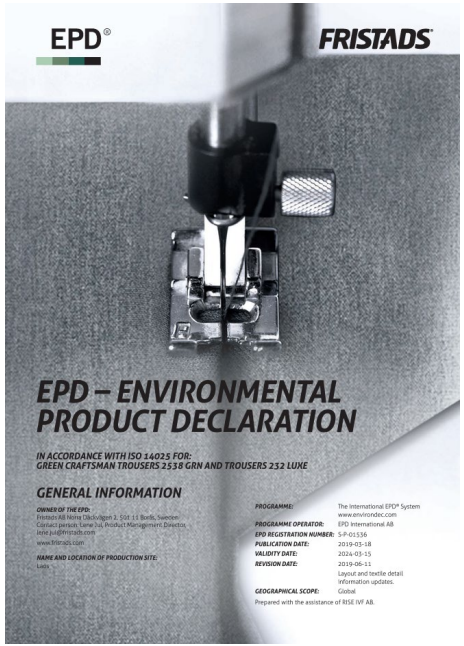
EPD process - overview



EPD process – the practical



- Who?
  - EPD owner
  - LCA consultant
  - Independent verifier (lists, e.g. here)
- What about confidentiality?
  - LCA report; only available for consultant, EPD owner and verifier.
  - EPD document; publicly available.
- How long is an EPD's validity?
  - Five years, must be updated if significant changes occur

EPD process – documents

- LCA report
  - Contains all data, information, method description, results and interpretation
  - By consultant
  - Free report layout
  - Confidential
- EPD document
  - Summary of method and results, product and company information
  - Generic layout available
  - May modify layout, not content
  - EPD owner is responsible after publication (e.g. updates)

Product Environmental Footprint (PEF)

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Environmental Footprint (EF)

The EU's initiative for a harmonized method for calculating the environmental impact of a product, service or organization from a life cycle perspective.

- **Product Environmental Footprint (PEF)**
  - Specific method requirements for different product categories
- **Organization Environmental Footprint (OEF)**
  - Specific method requirements for different sectors

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Product-specific rules

- Like EPD, has product-specific rules
  - Product Environmental Footprint Category Rules (PEFCR)

Circular Footprint Formula (CFF)

- Formula to model recycling (materials and energy) and waste management
- Also considers the proportion of recycled materials used
- Divides the environmental burden/credit of recycling between the supplier and the user of the recycled material

Material

$$(1 - R_1)E_v + R_1 \cdot (AE_{recycled} + (1 - A)E_v \times \frac{Q_{Sin}}{Q_P}) + (1 - A)R_2 \cdot (E_{recyclingEoL} - E_v^* \cdot \frac{Q_{Sout}}{Q_P})$$

Energy

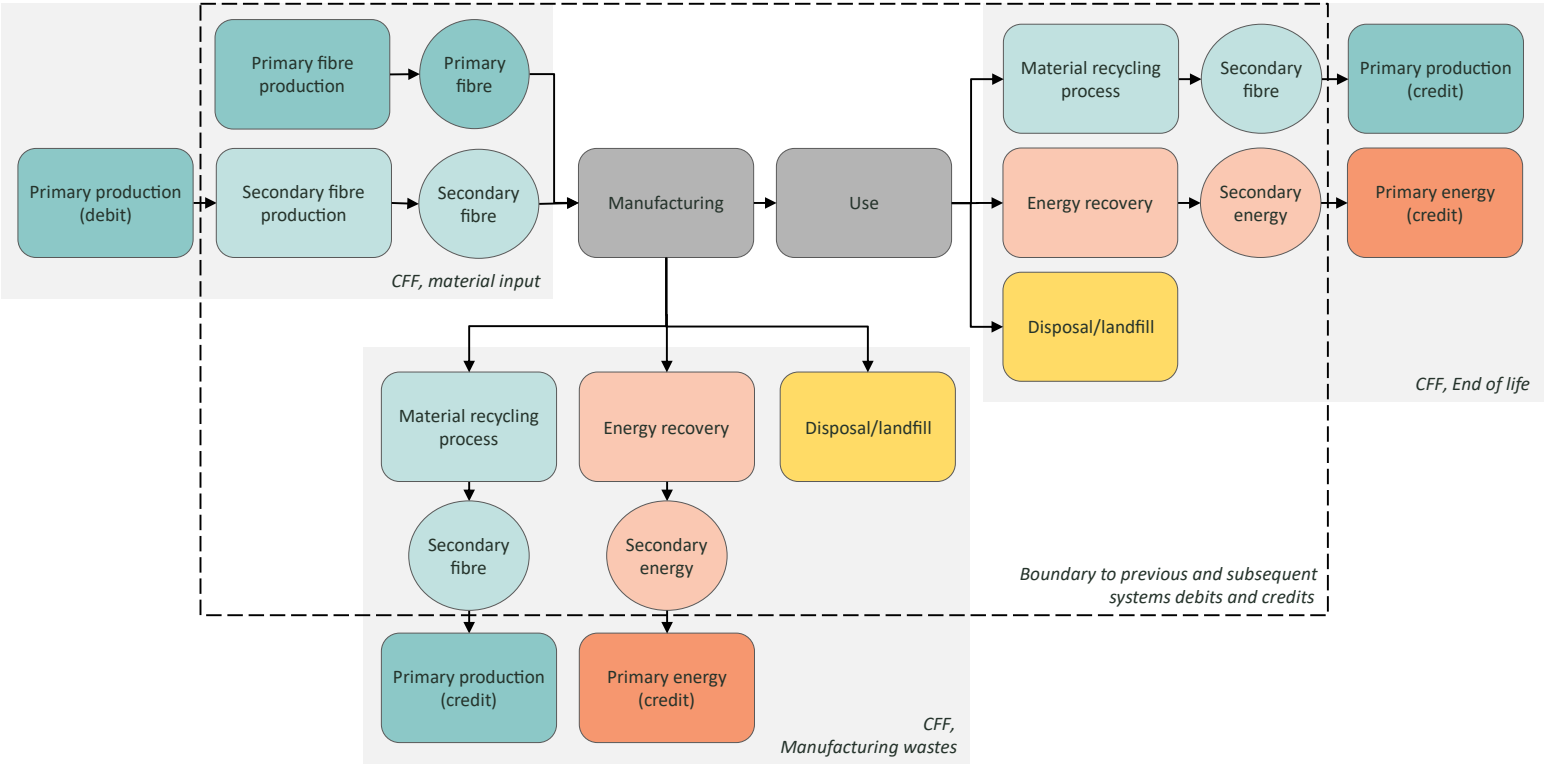
$$(1 - B)R_3 \cdot (E_{ER} - LHV \cdot X_{ER,heat} \cdot E_{SE,heat} - LHV \cdot X_{ER,elec} \cdot E_{SE,elec})$$

Disposal

$$(1 - R_2 - R_3) \cdot E_D$$

CFF = Material + Energy + Disposal

Circular footprint formula



16 environmental impact categories

Climate change	Particulate matter	Eutrophication, terrestrial	Resource use, minerals and metals
Ozone depletion	Acidification	Land use	Human toxicity, non-cancer
Ionising radiation	Eutrophication, freshwater	Water scarcity impact	Human toxicity, cancer
Photochemical ozone formation	Eutrophication, marine	Resource use, fossils	Ecotoxicity, freshwater

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Possible applications within the EU

Eco-design for Sustainable Products Regulation (ESPR)

- Extension of the Eco-design Directive to include environmental sustainability and more product groups
- Design of sustainable products (both requirements for performance & information)

Proposal for a Directive on Green Claims

- Support environmental claims in a credible and reliable way (avoid greenwashing)

PEFCR – Apparel and footwear

- Draft, under public consultation
- Specific rules and default values
  - E.g. intrinsic durability, uses and product duration, default datasets, etc
- Impact categories
- Allocation rules
- Mandatory company-specific data
- Distribution and EoL scenarios

Summary!

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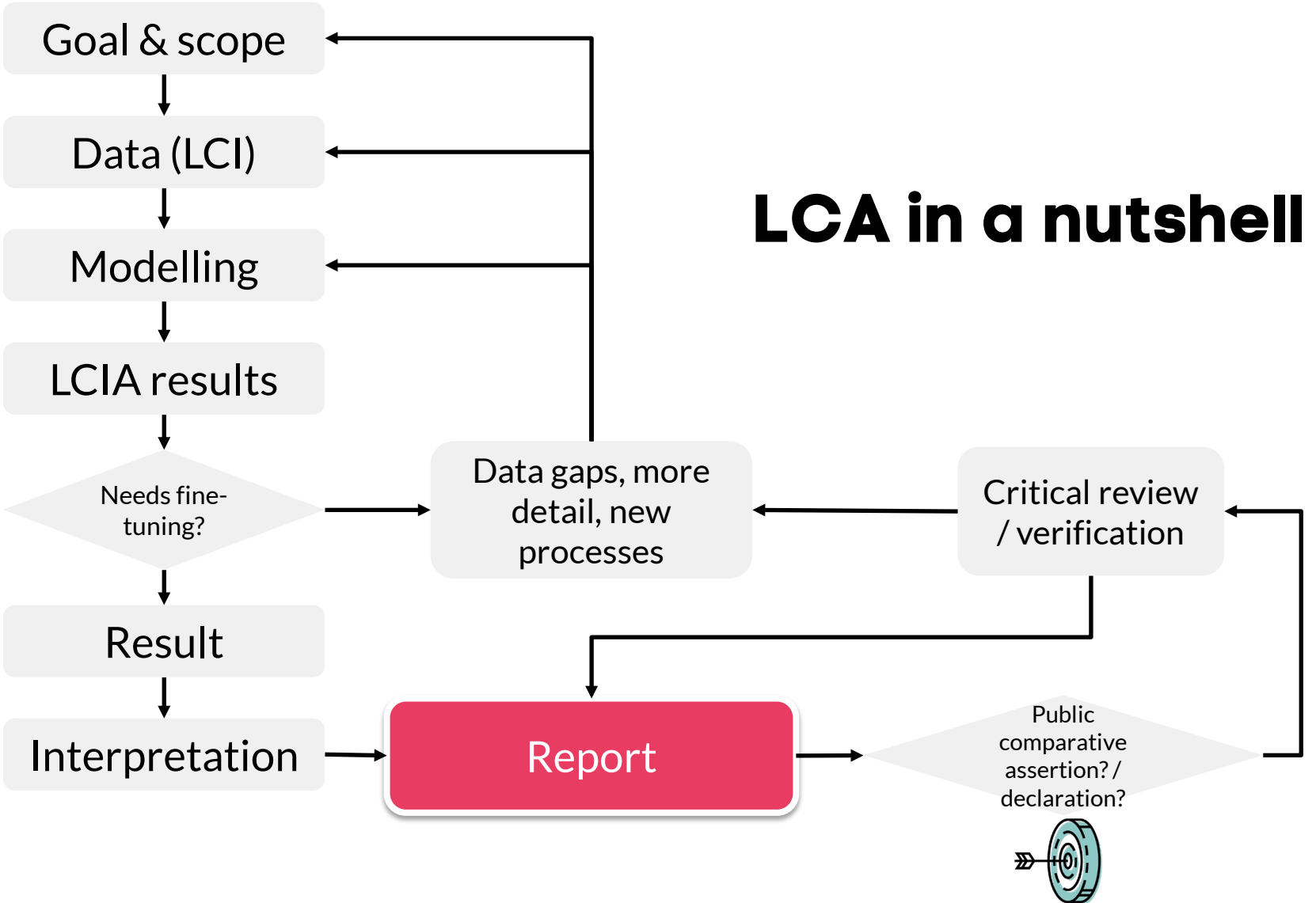
LCA in a nutshell



Thank you!

Further questions:

Diego.Penaloza@ri.se

Q&A

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Thank you

For more information about the RegioGreenTex Community Talks, contact: charlotte.denis@textile-platform.eu

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COMMUNITY TALKS

Navigating Textile Sustainability

with a comprehensive taxonomy on recycling methods and a channelling decision tree of post-consumer textiles

23 May 2024 • 10:30-11:30 • Online

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Integrating open dataset & AI models for textile sorting

6 June 2024 • 10:30-11:30 • Online

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