EU Environmental Footprint – industrial experiences & updates on the policy process

November 30, 9.00-11.30

Arranged within the project Environmental footprint in Sweden – increased competence and communication

SWEDISH LIFE CYCLE CENTER

VINNOVA
Sweden's Innovation Agency

Environmental footprint in Sweden

- Coordinate Sweden's work on Product Environmental Footprint (PEF)
- Engage Swedish actors in PEF
- Give Swedish actors a better understanding of the methodological issues in PEF and the PEF policy development
- Impact the PEF method development

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Aim of webinar

1) insights in the Product Environmental Footprint process and ongoing method development
2) learnings from industrial case studies

Agenda

- Welcome – *Sara Palander, Swedish Life Cycle Center*
- Introduction to Product Environmental Footprint – *Katarina Lorentzon, RISE*
- Updates on the EU Environmental Footprint – methodology and policy development – *Imola Bedo, European Commission and part of the Environmental Footprint team*
- PEF in Sweden – *Björn Spak, Swedish Environmental Protection Agency*
- Break
- Experiences from industrial case studies on Product Environmental Footprint
  - PEF on a steel product – *Jonas Larsson, SSAB*
  - PEF on a paper product – *Carina Larsson, Stora Enso*
  - Similarities and differences between PEF and EPD (Environmental Product Declaration) – *Sofia Poulikido, IVL*
- Learnings and insights in PEF – Panel discussion
- Reflections and ways forward – *Environmental Footprint in Sweden Project management team*

House rules!

- Keep your microphone muted!
- Time for questions – use the chat function!
- Problems with the audio? – dial in!
- Presentations are available for download (www.lifecyclecenter.se/events)
- This webinar is recorded!

Product Environmental Footprint (PEF) - the “why”, “what” and “how”

Katarina Lorentzon, RISE Research Institutes of Sweden

Why PEF?

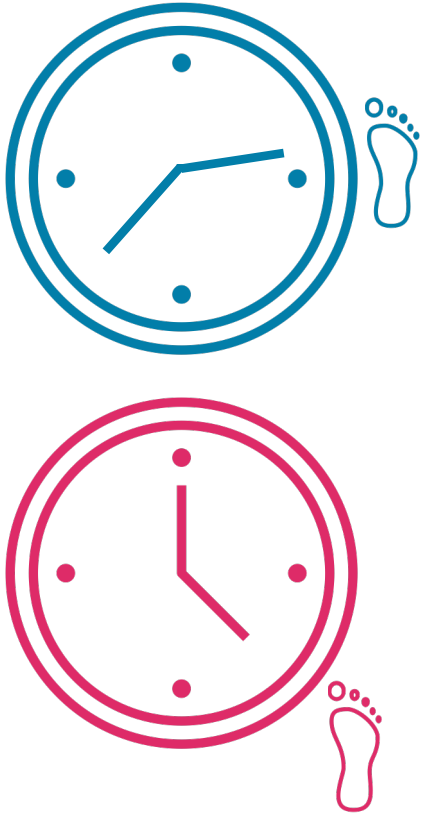

www.sustainable-cleaning.com
STARBUCKS COFFEE
C.A.F.E. Practices
DUBOKEUR
EPD
epeat
GLOBAL ORGANIC TEXTILE STANDARD · GOTS ·
GREENLINE PRINT.COM
CERTIFIED SUSTAINABLE SEAFOOD MSC www.msc.org
PEFC
PEFC/01-00-01
Audubon International
EARTHCHECK
HAND IN HAND ORGANIC RAPUNZEL FAIRTRADE
WWW.NATRUE.ORG
RAINFOREST ALLIANCE CERTIFIED
BASTA
EU Ecolabel www.ecolabel.eu
Bra Miljöval
CERTIFIED FOR SUSTAINABILITY WQA
Association for Independent Corporate Sustainability & Responsibility Research
Eco-Schools
INDOOR AIR COMFORT eurofins GOLD CERTIFIED PRODUCT
NATURENS BÄSTA
RECS Quality Standard
BIOSUISSE
FAIRTRADE
ETHICAL AWARD THE ETHICAL COMPANY ORGANISATION
KRAV
DER BLAUE ENGEL weil ressourcenschonend und emissionsarm JURY UMWELTZEICHEN
THE INDOOR CLIMATE LABEL
effinature
GREENGUARD
floor score by SCScertified
FSC
paper profile
bluesign
SAFE
geo
The Green Key
EMISSION CLASS FOR BUILDING MATERIAL M1
SUSTAINABLE FURNISHINGS COUNCIL MEMBER
BYGGVARUBEDÖMNINGEN
SundaHus
ups
CARBON NEUTRAL SHIPMENT
ups.com/carbonneutral
TCO CERTIFIED
GEV-EMICODE EC 1 very low emission
TÜV SÜD
UTZ CERTIFIED Good inside
TERRACYCLE

Aim of the PEF method

To improve the environmental performance of products and services in the European market through a combination of market pressure and policy instruments, using information that is

- reproducible
- comparable
- verifiable

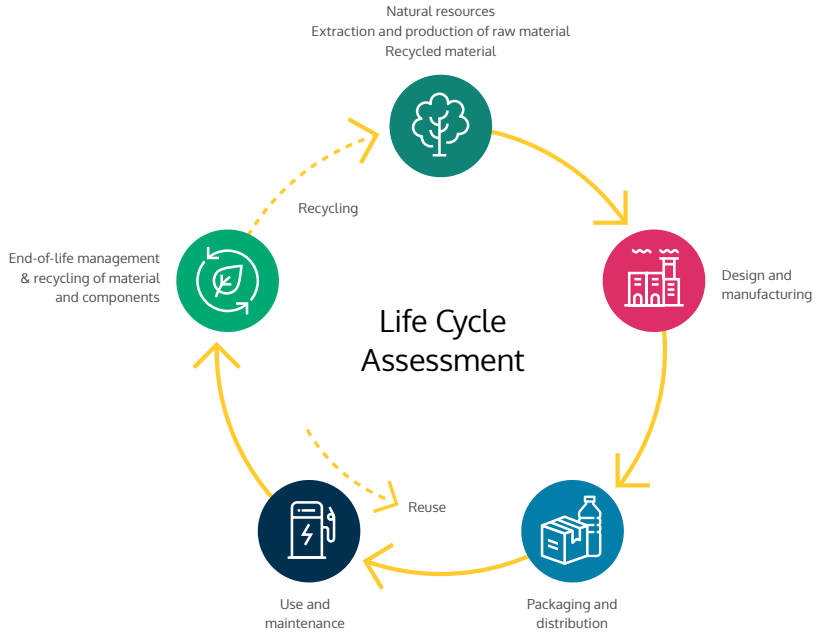
Values of using the PEF method

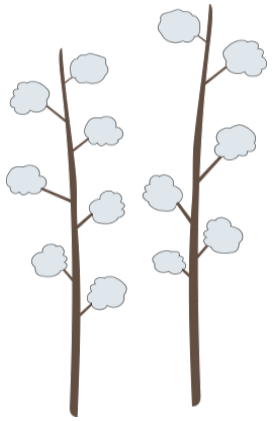
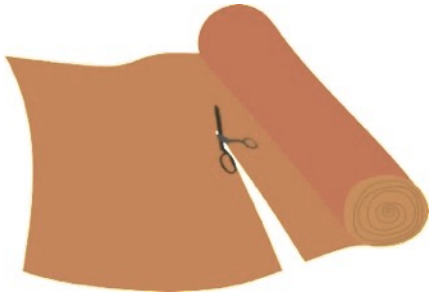
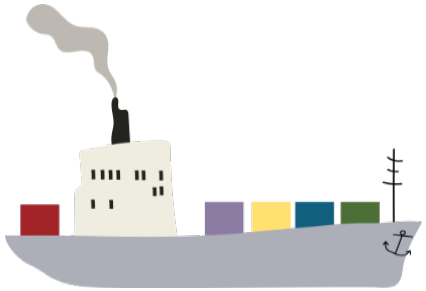


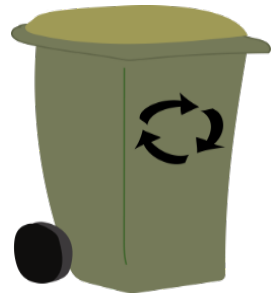
Inspired by [Whats in it for me_ 070319_ Possible applications and policy implications.pdf]

What is PEF?

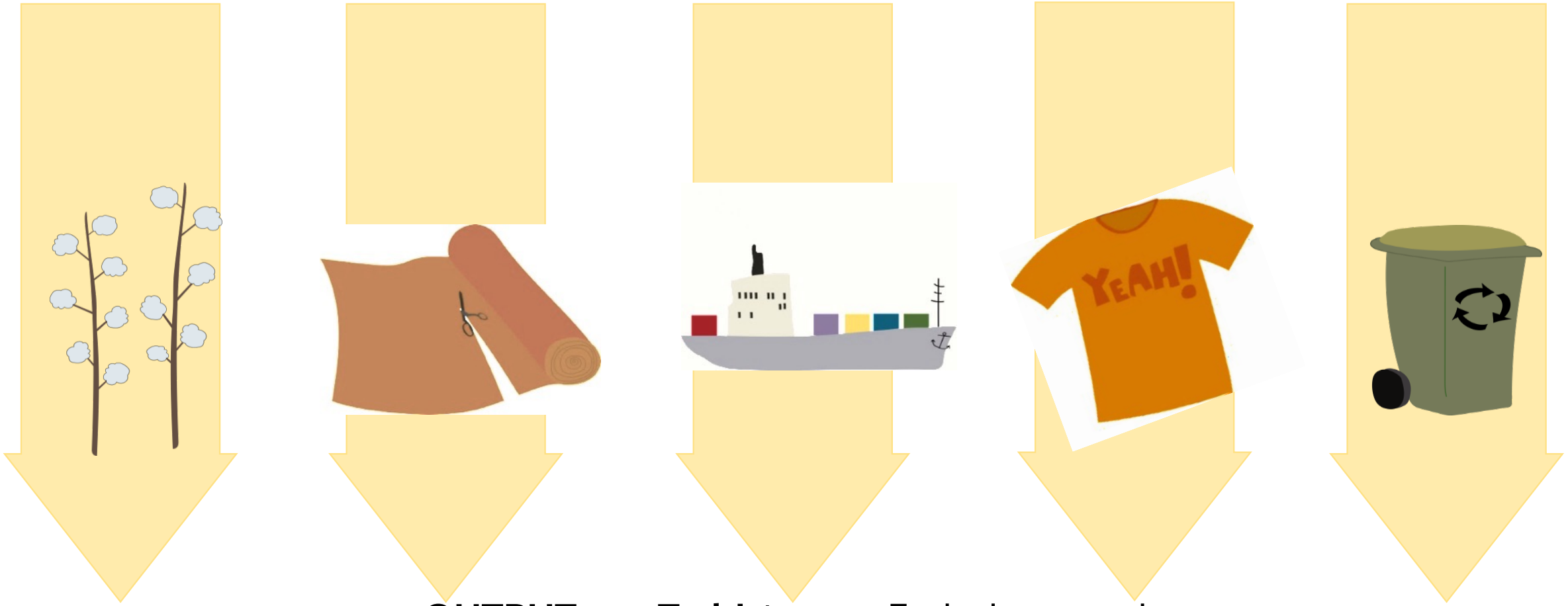
- Based on Life Cycle Assessment (LCA)
- Quantifies the environmental impacts of goods and services



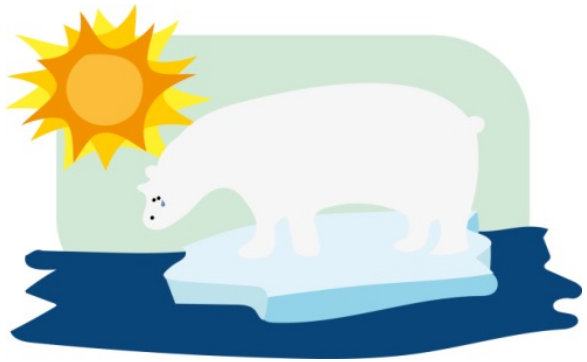
YEAH!


INPUT per T-shirt-year: Natural resources such as energy, material, water, land



OUTPUT per T-shirt-year: Emissions to air, water and soil. Waste and by-products.

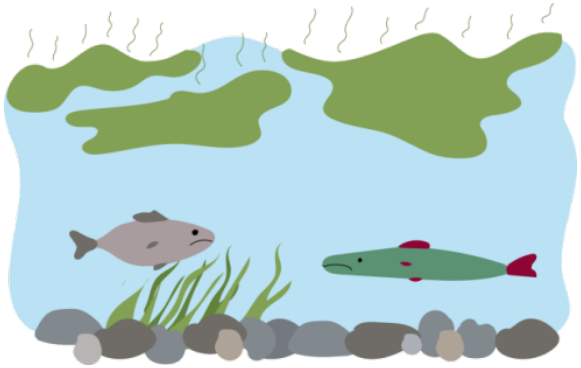
Environmental impact



Climate change

Acidification

Human toxicity

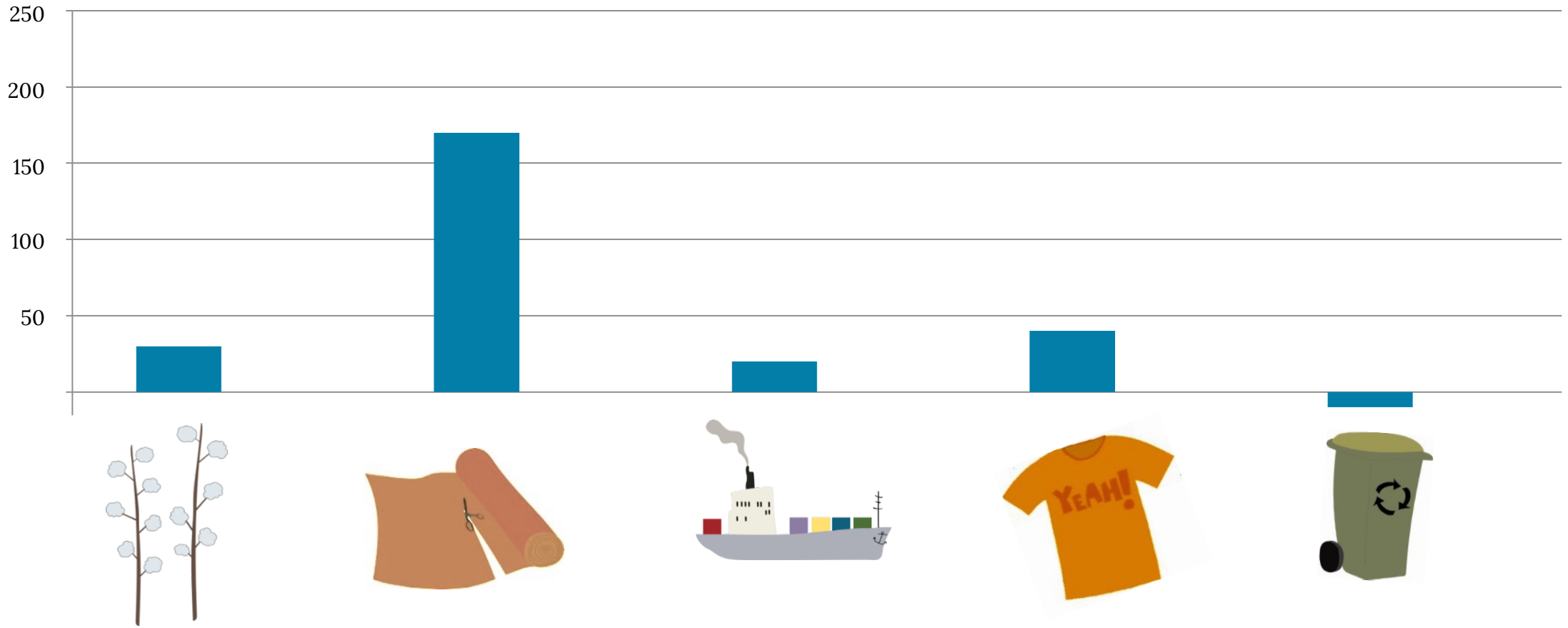


Marine eutrophication

Water use

ETC..

Climate change
(kg CO_2e/functional unit)



- Based on Life Cycle Assessment (LCA)
- Quantifies the environmental impacts of goods and services
- Builds on existing systems for environmental communication and international standards

And what is it not

- Communication aspects are not part of the PEF method – it does not prescribe any specific approach or label.

How it might look like

Source: PEF end conference 23-25 april 2018

How do you carry out a PEF compliant study?

- Product Environmental Footprint Category Rules (PEFCR) – a PEF ”recipe” for a product category

- For a specific category, the PEFCR includes e.g.
  - Scope (system boundaries, functional unit etc)
  - Relevant environmental impact categories
  - Most important impact life cycle stages

- The structure and granularity of PEFCR follows the Classification of Products by Activity (CPA) system

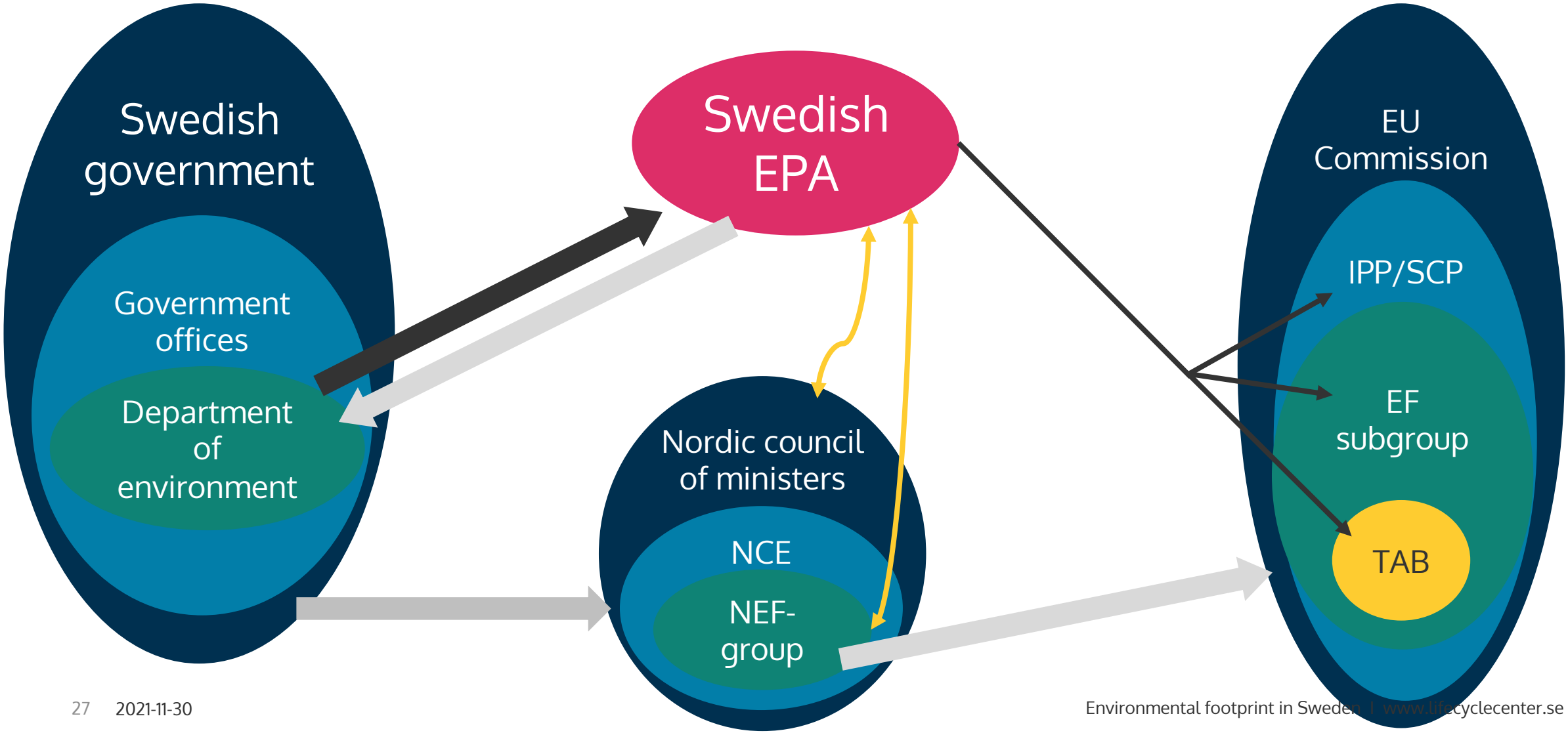
Updates on the EU Environmenatl Footprint

Imola Bedo, European Commission and part of the Environmental Footprint team

Product Environmental Footprint in Sweden - the policy perspective

Björn Spak, Swedish Environmental Protection Agency

How is Sweden working with EF?



Swedish Government positions on PEF

Sweden recognise PEF as an important tool in coming work within the framework of common EU product policy regarding information on environmental impact of products.

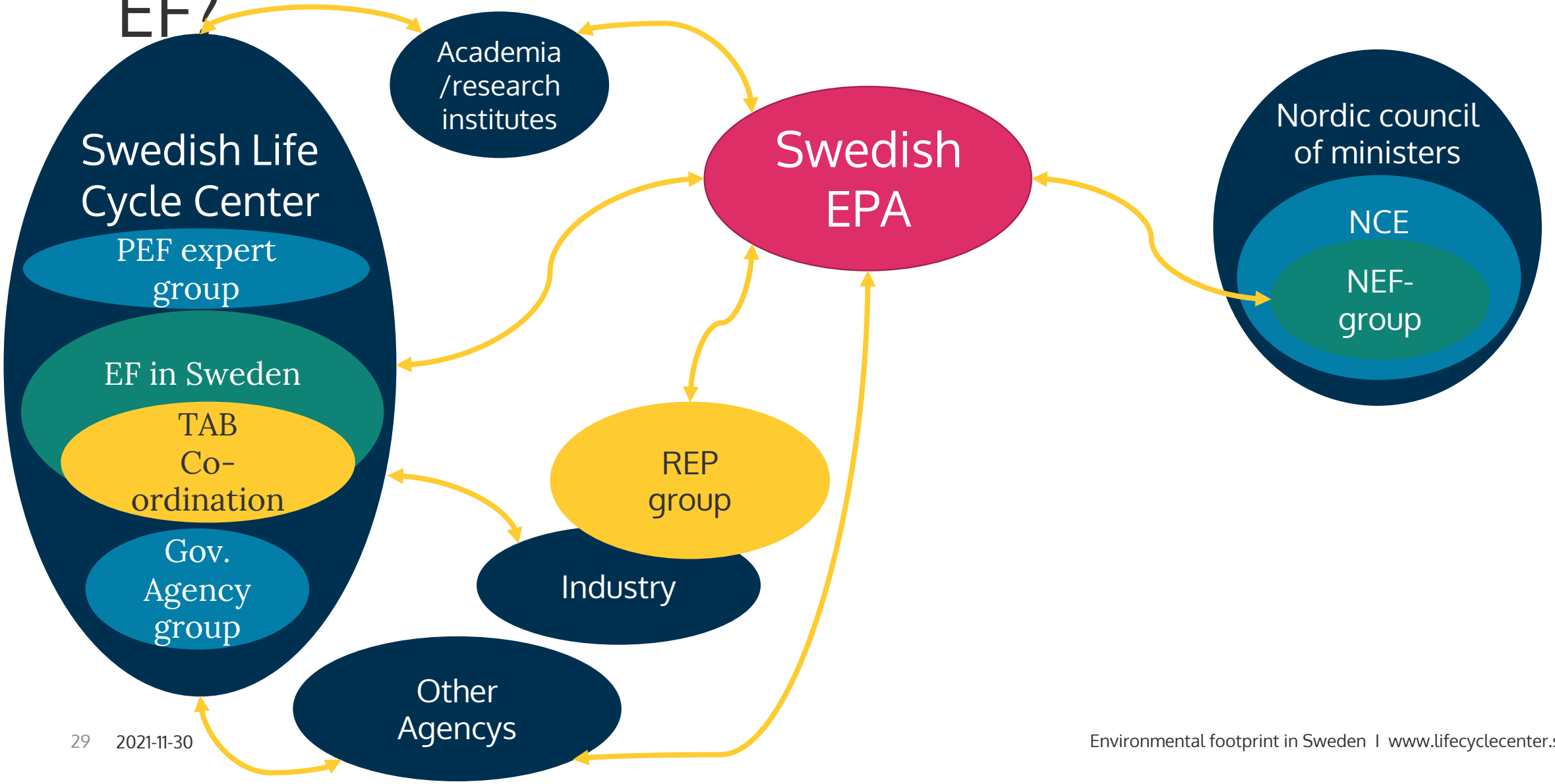
PEF is important in reaching a circular economy.

PEF has a potential to become an important tool to be used in many EU initiatives, e.g. in EU product policy, product passports and the taxonomy.

Key sectors in the Circular Economy Action Plan should be initially prioritized.

Explore the possibility of establishing horizontal requirements and further assess the possible application of eco-design principles beyond energy-related products, within or with the current Ecodesign Directive as inspiration.

How is the Swedish EPA co-operating around EF?



Questions!

Short break!
See you again
at 10:10!

Introduction to case studies

Stora Enso

Carina Larsson, Stora Enso Paper Nymölla bruk

Torun Hammar, Katarina Lorentzon, RISE Research institutes of Sweden

Background of the study

Stora Enso Paper division has prior experience in performing life cycle assessments, *e.g.* by calculating carbon footprints according to CEPIs (Confederation of European Paper Industries) Ten Toes and performing environmental product declarations according to the Paper Profile protocol (a voluntary environmental product declaration scheme with uniform reports)

However, calculations using the PEF methodology was fairly new to the company. Therefore, Stora Enso Paper Nymölla mill expressed an interest to participate as a case in the project.

Stora Enso Paper Nymölla Mill

Established:

Pulp Mill 1962
Paper Mill 1972

Production capacity:

Pulp 340 000 tonnes/year
Paper 475 000 tonnes/year

Employees: Approx. 540

The aim of the study

- Increase and share the knowledge of implementing PEF from an industry perspective through testing parts of the PEF method for one of Stora Enso's products using the environmental footprint category rules (PEFCR) for intermediate paper
- Evaluating experiences gained from testing the methodological framework

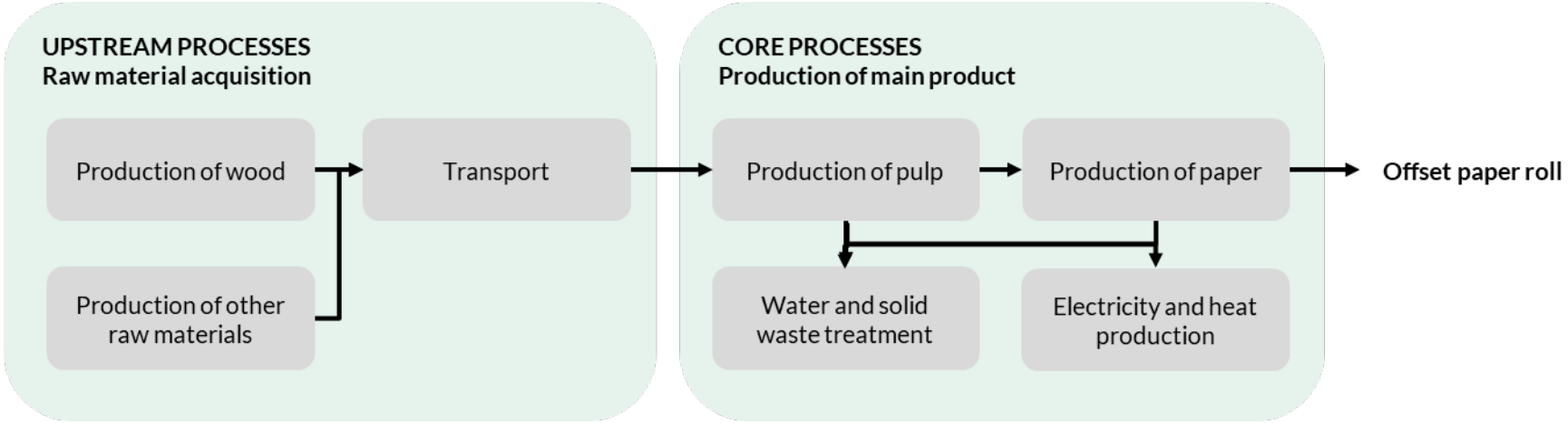
The PEF calculating tool developed by CEPI, the European association representing the paper industry, was used in the case study.

What has been studied?

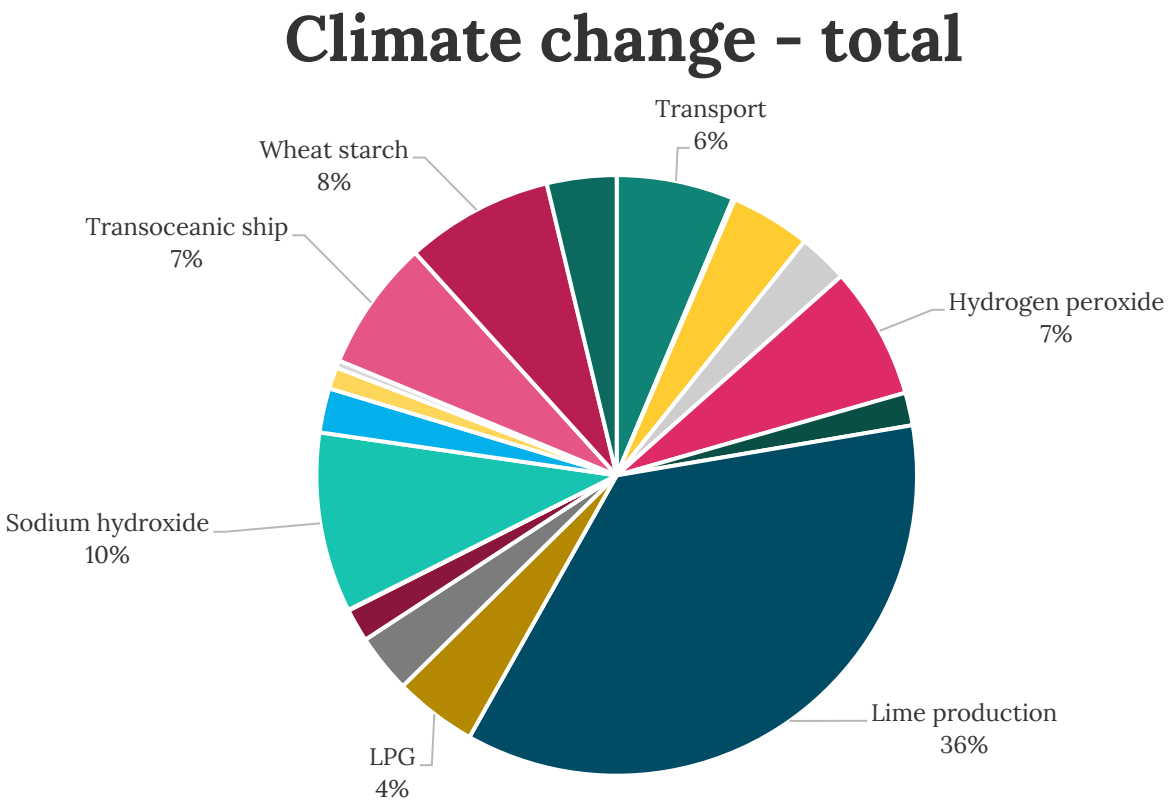
Assessed product: offset paper roll produced in an integrated pulp and paper mill of Stora Enso

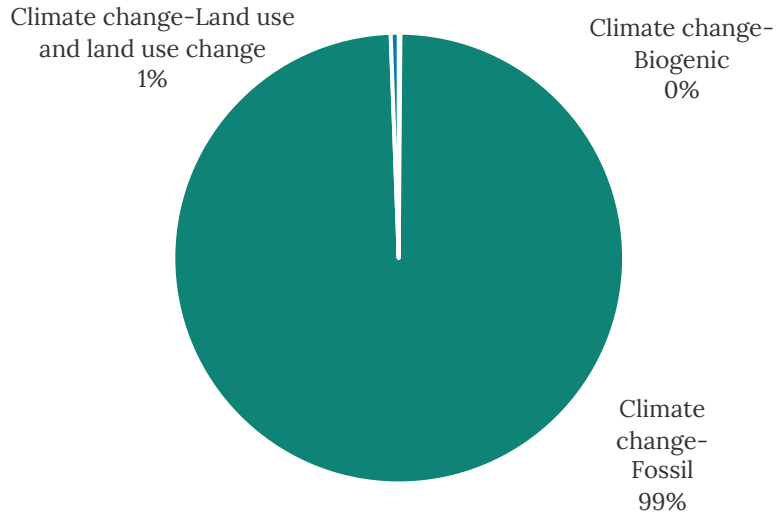
The functional unit: one metric tonne (1000 kg) of saleable paper at the paper mill gate with no duration (product lifetime) connected to it

System boundaries: cradle to gate



Results and discussion





Biogenic CO_2 accounting

Uptake: CO_2 uptake from the atmosphere through photosynthesis during biomass growth.

Release: CO_2 release to atmosphere (e.g. combustion, digestion, composting, landfilling).

	Modelling approach	Flux included in life cycle inventory		Characterization factor (CF)		Climate impact*
		Uptake	Release	Uptake	Release	
1	'Simplified modelling approach' in PEF	No	No	0	0	Equals zero
2	Modelling approach in PEF guide	Yes	Yes	0	0	Equals zero
3	EN 15804:2012+A2:2019 (core product category rules for construction products)	Yes	Yes	-1	1	Equals net zero

*$Flux \cdot CF = Climate\ impact$

Climate impact - biogenic

- Suggestions for updating PEFCR of intermediate paper (based on discussion during seminar for “followers”):
  - Remove simplified approach (option 1)
  - Change modelling approach so that biogenic CO_2 is both inventoried and attributed a characterization factor of -1 for biogenic carbon uptake and 1 for biogenic carbon leaving the system (in line with option 3)

Allocation by-product biogas

- Biogas is a by-product from digestion of waste water from pulp mill
- The PEFCR for intermediate paper does not state how to allocate the produced biogas
- Provisions from PEFCR guidance 6.3 could be applied, but not integrated in PEF tool.

=> PEF tool limited, does not include how to handle by-products like biogas and tall oil

Conclusions

- Comparison PEF and CEPI's ten toes
  - Consistent result on total climate impact
- PEF tool
  - Easy to use also for a non-LCA practitioner
  - Has some limitations
    - old datasets
    - modelling of by-products
    - some processes and raw materials are missing
  - Benchmark values would help interpretation of results

Key messages from the case study

1) To the audience
   - Important to build a network
   - PEF tool by CEPI easy to use
2) To the EU COM/development of the PEF/process towards PEF in use
   - Important with updated datasets – high focus gives fast development in the area
   - PEFCR – suggestions for possible improvements
     - Update and clarification of the description on modelling climate impact - biogenic
     - Specify how allocation modelling of biogas (as a by-product from digestion of waste water) should be handled

Next steps

As a major player in the European forest industry Stora Enso will:

- Closely follow the development of the PEF
- Keep supporting the development of the PEFCR and the update of datasets
- Keep supporting the development of the CEPI PEF tool

SSAB

Jonas Larsson, SSAB

Johan Nilsson, Lisa Hallberg, Karin Sanne, IVL Swedish Environmental Research Institute

SSAB and EPD

- First in fossil-free steel
  - SSAB is a global steel company with a leading position in high-strength steels and related services
  - SSAB will be fossil-free as a company latest by 2045
  - SSAB will introduce fossil-free steel in the market already in 2026

- In 2020, new EPDs were developed
  - Registered in the International EPD® System
  - EPDs for all product groups; hot-rolled, cold-rolled, etc.
  - Cover the entire production system in the Nordics

Main objects of comparison

I. Environmental indicators
II. Requirements for generic vs specific data and its impact on the LCA modelling of the product system
III. Allocation methods for steel scrap
IV. Transition to low carbon steelmaking; what happens to the PEF/EPD when the cradle-to-gate GWP becomes lower than the net scrap value at EoL?

I. Environmental indicators

EPD (EN15804+A2) vs PEF (EF 3.0)		Total results		Comparison:
Environmental indicators	Unit	EPD	PEF	EPD/PEF
Climate Change - total	kg CO2 eq	2 270	2 268	1.001
Climate Change - fossil	kg CO2 eq	2 267	2 267	1.000
Climate Change - biogenic	kg CO2 eq	3.0	0.6	4.9
Climate Change - land use and land use change	kg CO2 eq	0.5	0.5	1.000
Ozone depletion	kg CFC-11 eq	1.18E-10	1.18E-10	1.000
Acidification	mole H+ eq	6.2	6.2	1.000
Eutrophication aquatic freshwater	kg P eq	1.66E-03	1.66E-03	1.000
Eutrophication aquatic marine	kg N eq	1.6	1.6	1.000
Eutrophication terrestrial	mole N eq	17.1	17.1	1.000
Photochemical ozone formation	kg NMVOC eq	4.7	4.7	1.000
Depletion of abiotic resources - minerals and metals	kg Sb eq	3.63E-03	3.63E-03	1.000
Depletion of abiotic resources - fossil fuels	MJ	25 338	25 338	1.000
Water use	m3	-129	-129	1.000
Particulate Matter emissions	Disease incidences	5.79E-05	5.79E-05	1.000
Ionizing radiation, human health	kBq U235 eq	1.93E+01	1.93E+01	1.000
Eco-toxicity (freshwater)	CTUe	4.37E+03	4.37E+03	1.000
Human toxicity, cancer effects	CTUh	1.97E-07	1.97E-07	1.000
Human toxicity, non-cancer effects	CTUh	1.40E-05	1.37E-05	1.02
Land use related impacts/ Soil quality	Pt	1.34E+03	1.34E+03	1.000

A small difference due to the difference for biogenic climate change, see below

Biogenic climate change is about 5 times higher for EPD

Non-cancer human toxicity is about 2% higher for EPD. The reason why has not been investigated since an optional indicator in EPD

I. Environmental indicators: GWP bio

Applies the identical factors for:
- fossil CO2 (1)
- fossil CH4 (36.8)
- N2O (298)

EPD (EN15804+A2) and PEF (EF 3.0)

EPD (EN15804+A2)

PEF (EF 3.0)

Applies a factor of 36.8 for biogenic CH4

Applies a factor of 34 for biogenic CH4

Applies a factor of 1 for inputs of CO2 renewable resource and emissions of biogenic CO2 i.e. **considers biogenic CO2**

Applies a factor of ZERO for inputs of CO2 renewable resource and emissions of biogenic CO2 i.e. **does not consider biogenic CO2**

I. Environmental indicators: Conclusions

Almost all environmental indicators show an identical result

EPD (EN15804+A2) and PEF (EF 3.0)

EPD (EN15804+A2)

Shows a higher impact for biogenic climate change, which in this case study for steel has no influence but for LCAs involving biogenic resource inputs, emissions of biogenic CO2 and of biogenic CH4 the difference could be quite large between EPD (EN15804+A2) and PEF (EF 3.0)!

Also shows a higher impact for non-cancer human toxicity

II. Data requirements (EPD)

- Specific data shall be used primarily
- Specific data shall be used for the processes which the producer has operational control
- Generic data may be used for the processes the producer cannot influence
- Any generic data that follows the requirements in PCR 2019:14 can be used

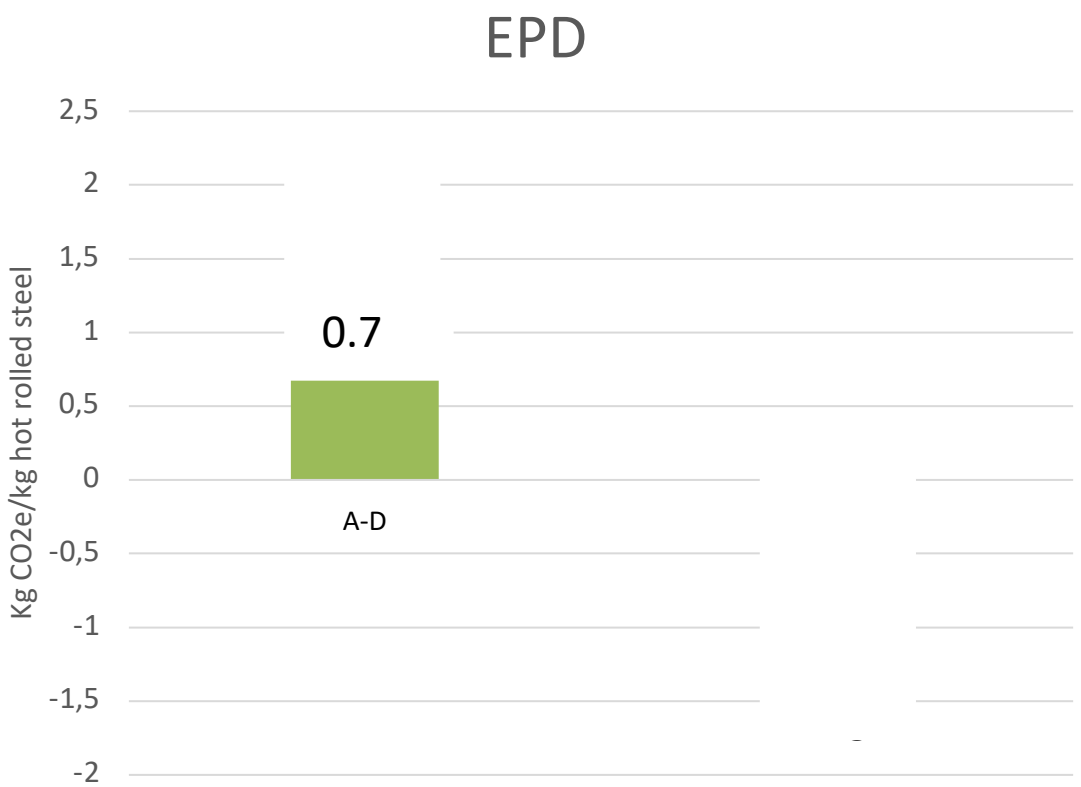
II. Data requirements (PEF)

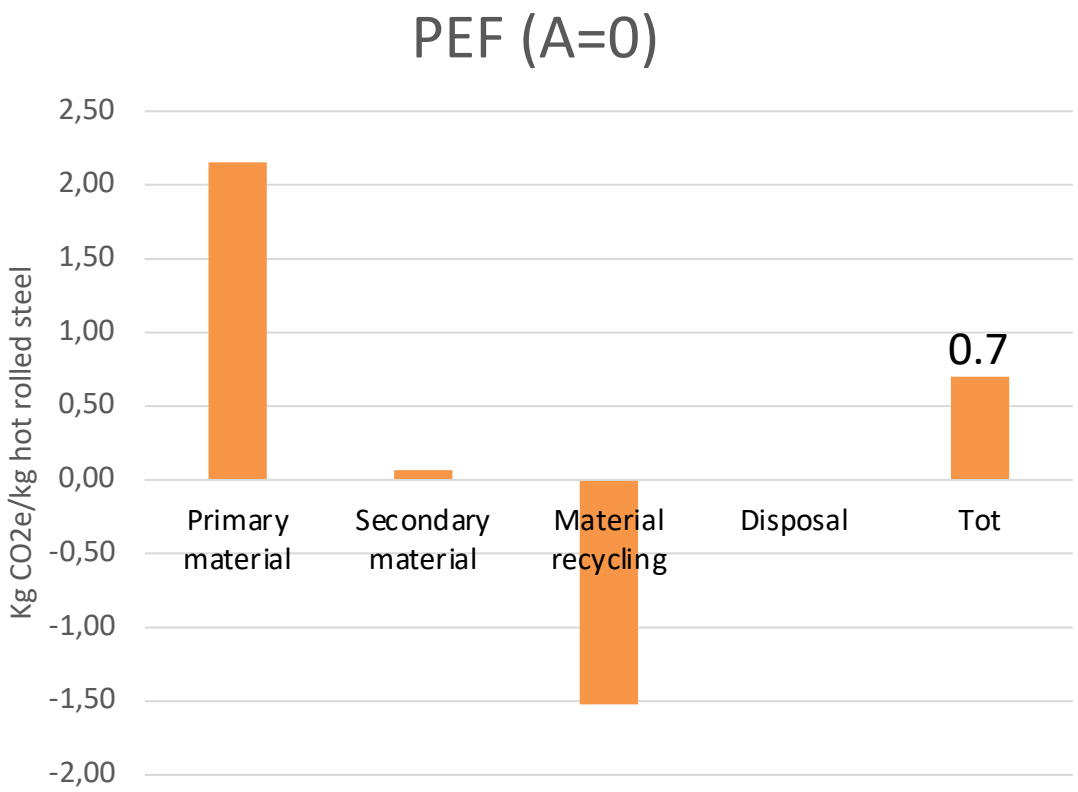
- Different requirements depending on different ”situations”
  - **Situation 1:** the process is run by the company performing the PEF study
  - **Situation 2:** the process is not run by the company performing the PEF study, but the company has access to company specific information
  - **Situation 3:** the process is not run by the company performing the PEF study and this company does not have access to company specific information
- For situation 1:
  - Specific data shall be used for all processes run by the company
  - The PEFCR provides a list of generic data that shall be used in case specific data is not available

III. Allocation methods for steel scrap

	EPD	PEF
Guidance documents	GPI, PCR 2019:14/2012:01, EN 15804 (c-PCR/prEN 17662 is under development	PEFCR for metal sheets, PEFCR guidance, Zampori & Pant (2019)
Method	Cut-off plus Module D	Circular footprint formula
Point of substitution	Room for interpretation (assumed same as PEF)	At slab
Substituted material	Room for interpretation (assumed same as PEF)	Theoretical value for steel production using 100% virgin raw material

III. Allocation methods for steel scrap



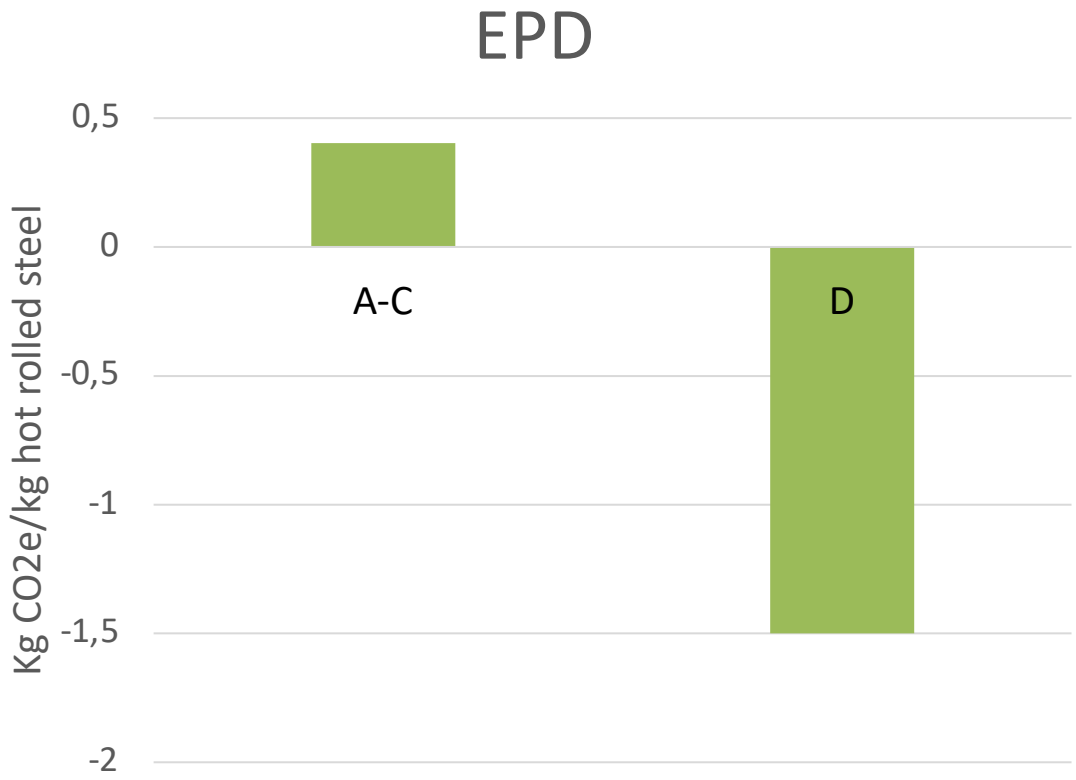


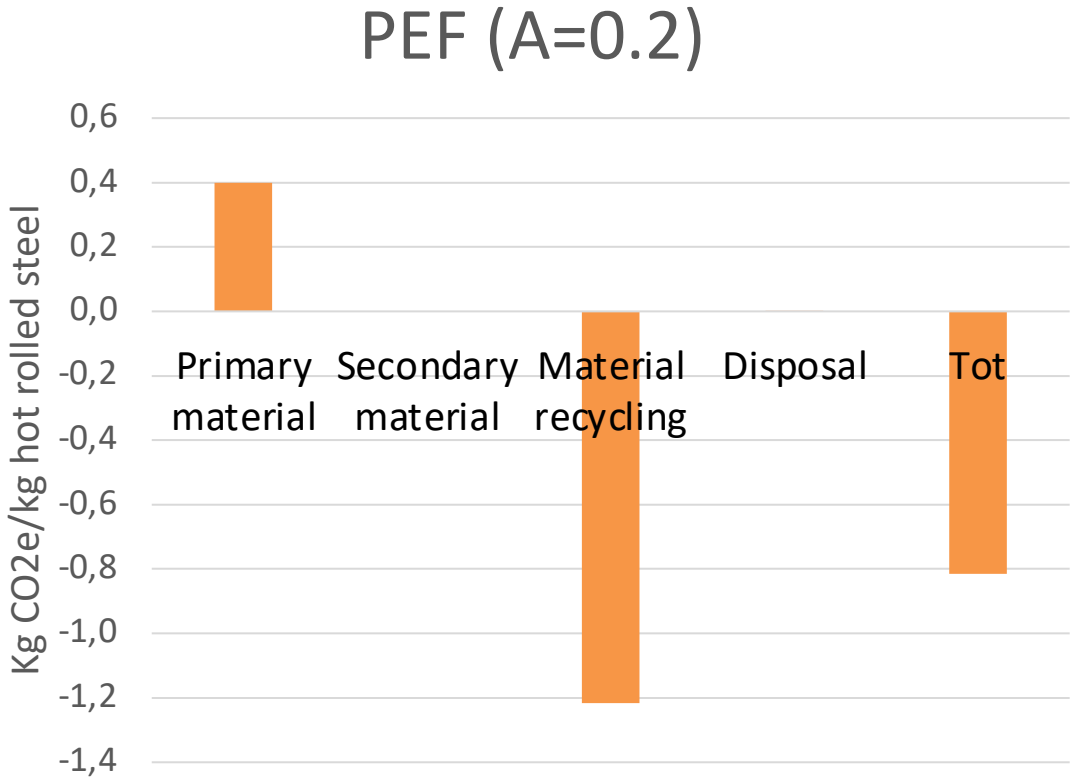
IV. iron-ore based low carbon steelmaking scenario

Assumptions

- Scope 1 and Scope 2 becomes virtually zero
- Cradle-to-gate + EoL results in carbon neutrality or even negative GWP values
- Let us assume a cradle-to-gate GWP of 0.4 kg CO2e per kg steel product, just to illustrate the calculation mechanism

IV. iron-ore based low carbon steelmaking scenario





Reflections

- When following the EN 15804 and allowing reporting on the net GWP, the result will be close to the PEF methodology

- However, in practice, the results will most likely represent two extremes when they are used as a purchasing criteria

EPD

- Focus on the cradle-to-gate (modules A1-A3)
- Cut-off approach: Promotes recycled content
- Despite the fact that recycled steel scrap is already a limited resource

PEF

- Cradle-to-gate + End-of-life
- Giving a burden to scrap input and credit of the re-collected scrap
- Focus on recycling at EoL and promotes the concepts of the circular economy

EPD vs PEF

Sofia Poulikidou, IVL Swedish Environmental Research Institute

ivl SVENSKA MILJÖINSTITUTET

Environmental footprint in Sweden
I www.lifecyclecenter.se

SWEDISH LIFE CYCLE CENTER

THE SWEDISH KNOWLEDGE CENTRE FOR RENEWABLE TRANSPORTATION FUELS

f3

Swedish Energy Agency

Content

- Short introduction to the ICON project
  - Aim & Approach
- Similarities and differences (PEF &EPD)
  - Examples from ICON project
- Concluding remarks
- Questions?

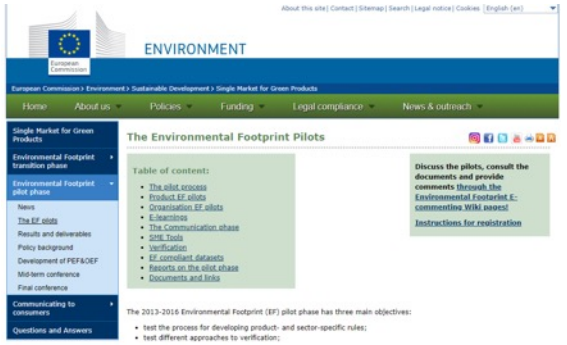
Introduction

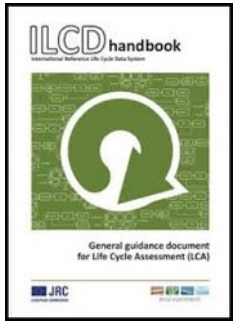
- The use of LCA and LCA related information in decision making is increasing
- Multiple requests for LCAs in various contexts (internally-externally)
- Different contexts may require different methodological approaches (different scope, system boundaries, data demands)
- This results in
  - Increased need of resources (time, budget, personnel)
  - Variations in outcome and conclusions
  - Confusion among actors

Renewable Energy Directive EU

EPD®

THE INTERNATIONAL EPD® SYSTEM





Aim & Approach

The project aims to **increase understanding on the requirements of the different LCA frameworks**, on to **what extent** the multitude of LCA frameworks **gives conflicting recommendations** for environmental improvements and on **how these challenges can be addressed** to reduce the negative impacts.

The project also aims **to make actors more prepared to actively take part in and influence** ongoing and future international efforts to harmonize LCA.

Approach →

Scope: Fuel producers

Life cycle calculations **case studies on transport fuels** using 3 different frameworks **(PEF; EPD; RED II)**

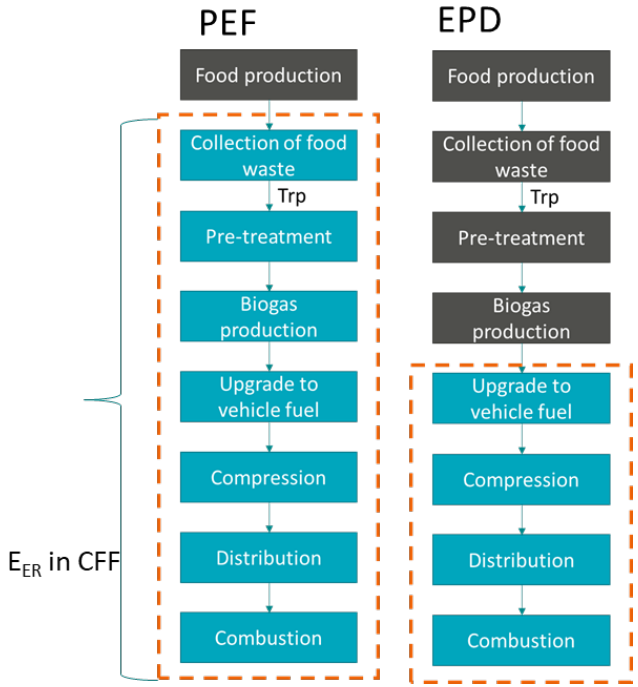
Fuels from energy crops, recycled materials or residues

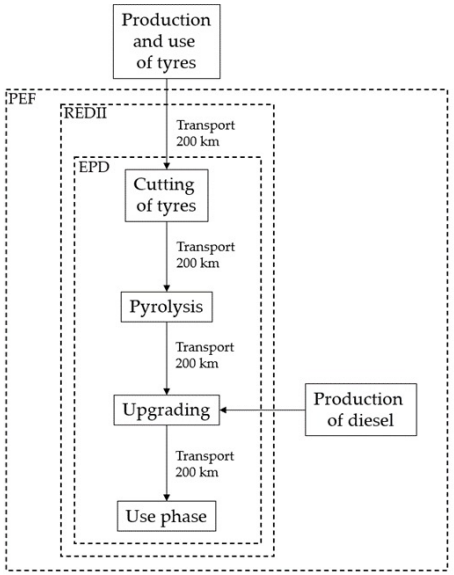
Similarities and differences (selection)

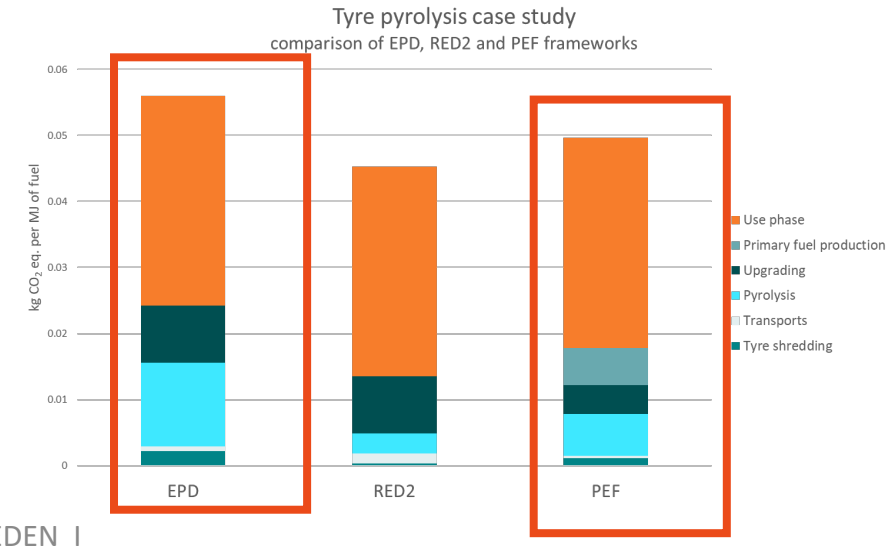
Similarities	Differences
Purpose Harmonization, Communication, Comparability	
Impact assessment – multiple impact categories	Impact assessment – different characterization factors
System boundaries – cradle to grave	System boundaries – different for certain product groups
	Multifunctional processes – allocation vs system expansion and substitution
No PCR/PEFCR for renewable fuels	

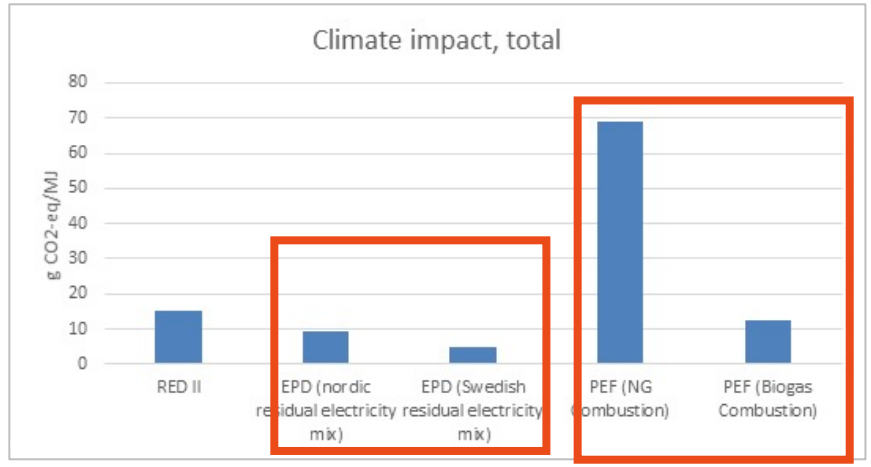
Examples from case studies

EPD and PEF require different modelling approaches and set **different system boundaries** especially for products that are based on waste streams (CFF vs Polluter pays principle)







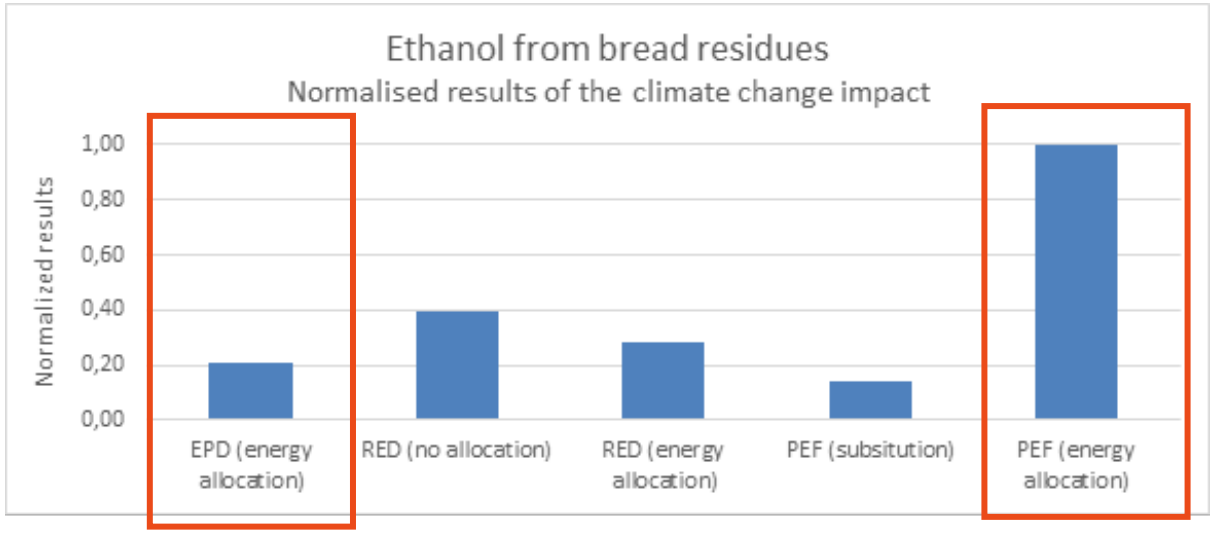


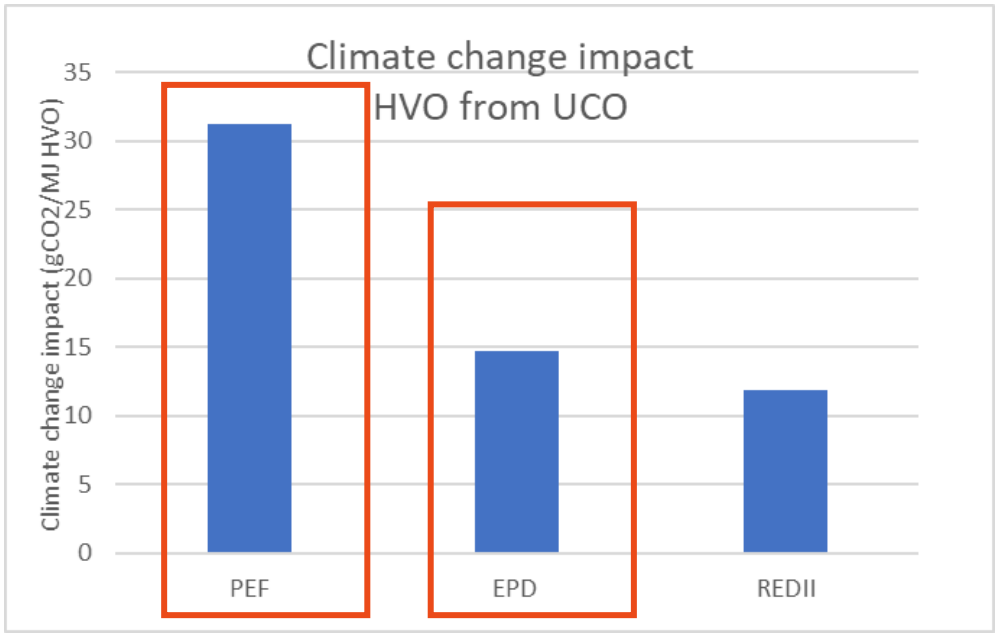
Examples from case studies

PEF tends to lead to higher impact for fuels using recycled material

The Ev factor in CFF – impact from virgin material?

OBS! No PCR/PEFCR – no clear guidance



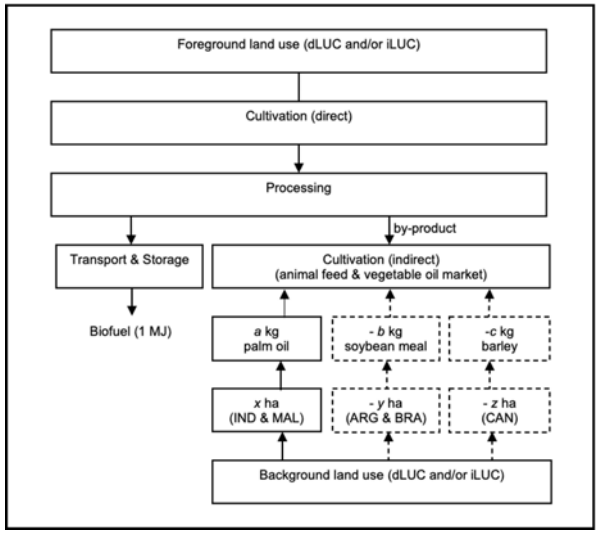


Swedish Environmental Research Institute

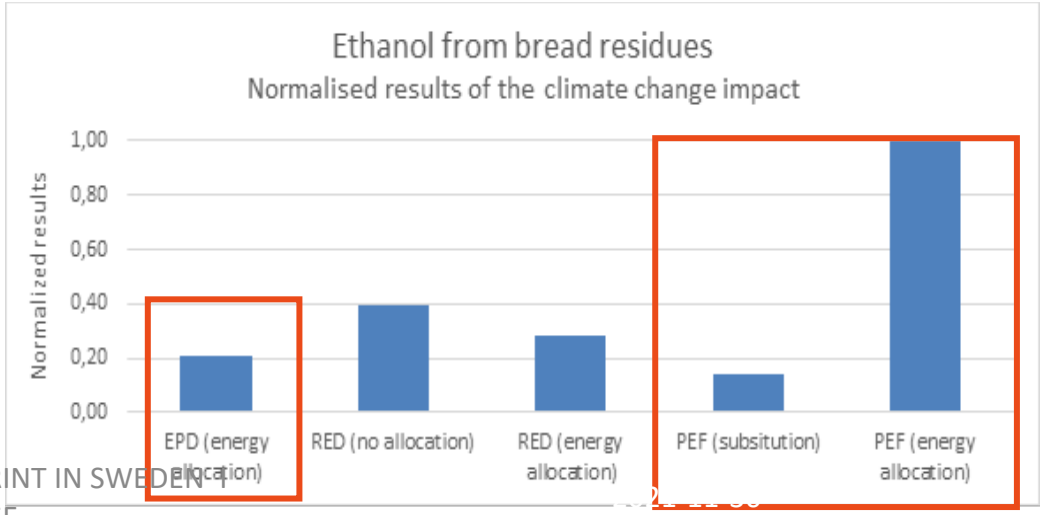
Examples from case studies

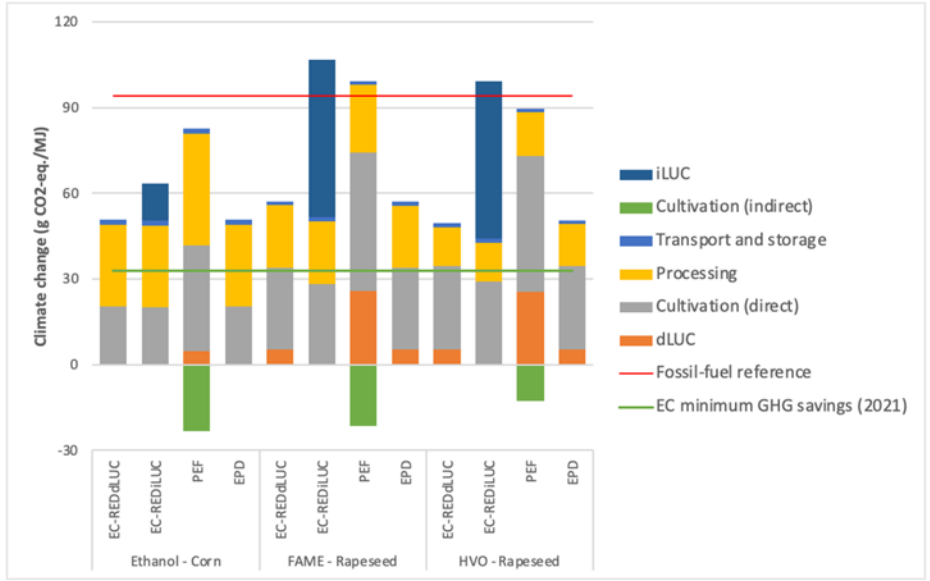
EPD and PEF treat **multifunctional processes in a different way**

In an absence of PCR/PEFCR there is room for interpretations



Source: Brandão, Azzi, Novaes, Cowie (2020)





Concluding remarks

- Same purpose – different approaches?
- Need for harmonization?
- Important that actors are informed
- Important that there is information and support
  - Need for PCR and PEFCR for renewable fuels
  - Need for PEF and CFF specific guidelines

Thank you for your attention!

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Project webinar 14th of December:
https://www.lifecyclecenter.se/events/webinar-variations-in-frameworks-for-lca-biofules/

Learnings & insights in PEF

Björn Spak, Swedish EPA
Carina Larsson, Stora Enso
Jonas Larsson, SSAB
Sofia Poulikidou, IVL
Torun Hammar, RISE

Reflections

Results & outcomes

1) Dialogues between LCA experts
2) Increased coordination
3) New collaborations and new networks!
4) Engagement of new LCA professionals
5) Engagement of non-LCA professionals

Reflections (I)

1) One number is requested!
2) PEF has increased the interest for LCA
3) Potential to simplify the documentation about PEF
4) Access to data and an available tool for testing PEF
5) Harmonization

Reflections (II)

6) Case studies are needed!

7) Industry associations are important for PEFCRs and for competence building

8) Supporting actions for SMEs

www.menti.com
code 9250 8594

An evaluation will be sent out!

1) Evaluate the webinar
2) Identify interest to continue this work

lifecyclecenter@chalmers.se

www.lifecyclecenter.se/event

LinkedIn: Swedish Life Cycle Center

https://www.lifecyclecenter.se/registration-to-public-newsletter/