SWEDISH LIFE CYCLE CENTER

Environmental footprint in Swedish industry

Webinar 2023-10-26

Agenda

Introduction part 1

Environmental footprint update

Q&A

Short break

Introduction to part 2

Case studies

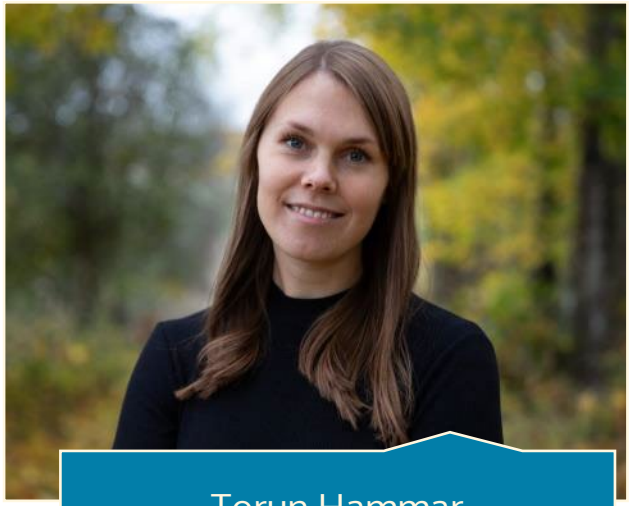
Closing words

Q&A

Main speakers

Björn Spak

Swedish Environmental Protection Agency

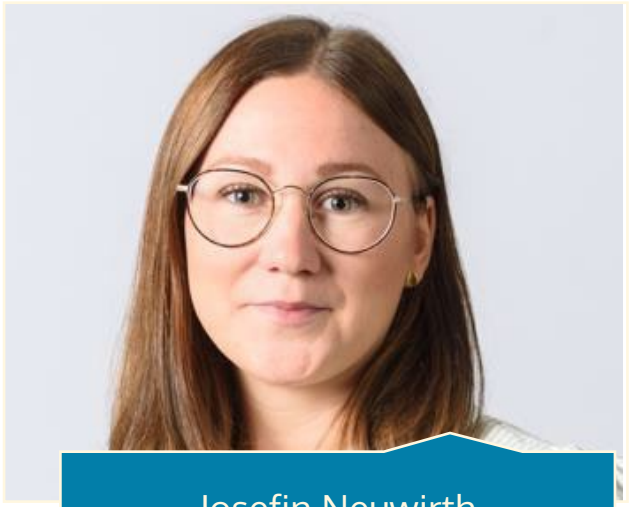


Torun Hammar

RISE

Erika Kloow

IVL



Josefin Neuwirth

IVL

Information and guidelines

MUTE YOUR MICROPHONE

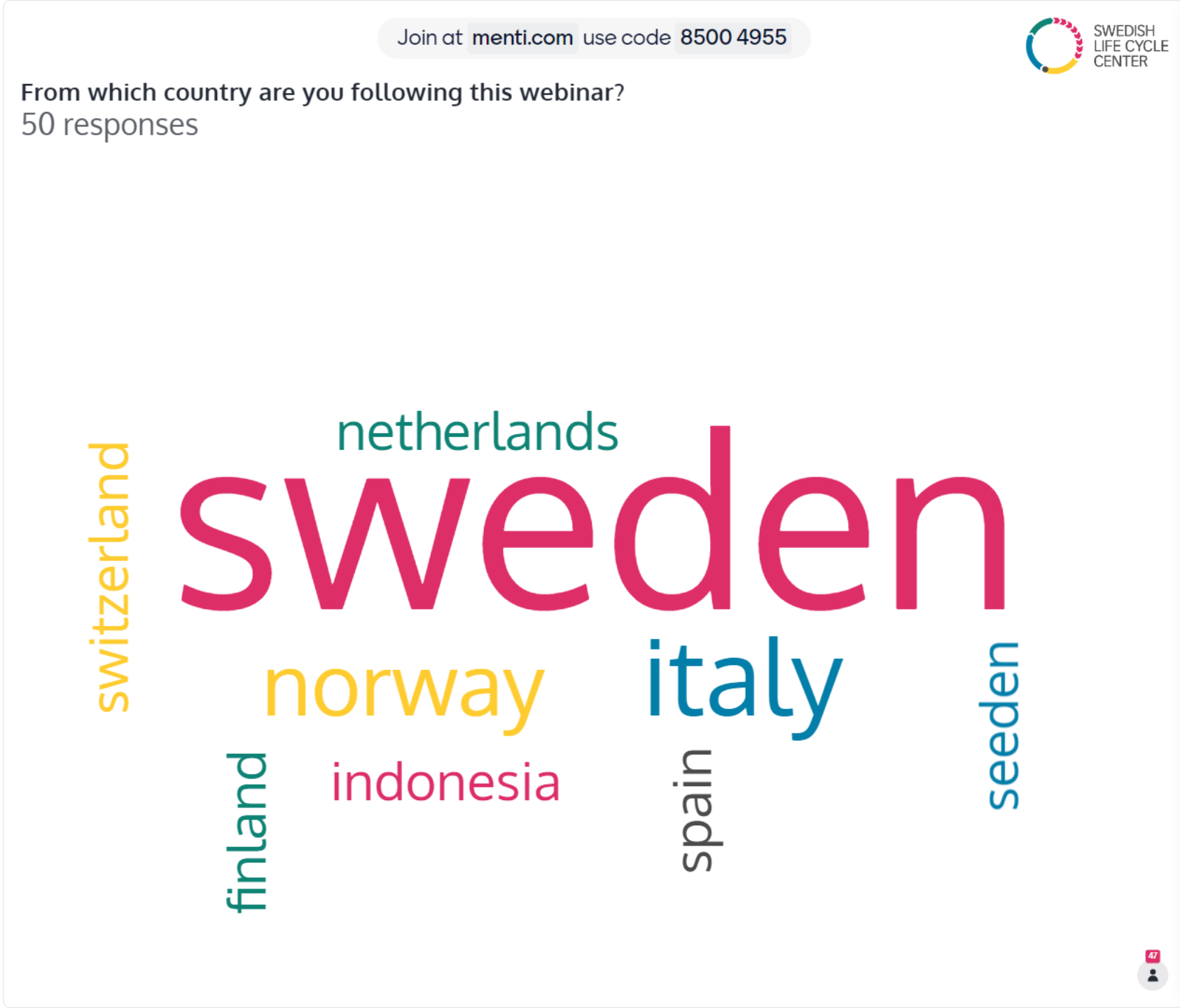
USE Q&A DURING PRESENTATIONS

PRESENTATION CAN BE FOUND HERE:
HTTPS://WWW.LIFECYCLECENTER.SE/EVENTS/

RECORDING WILL BE AVAILABLE ON YOUTUBE

Menti

Use code 8500 4955



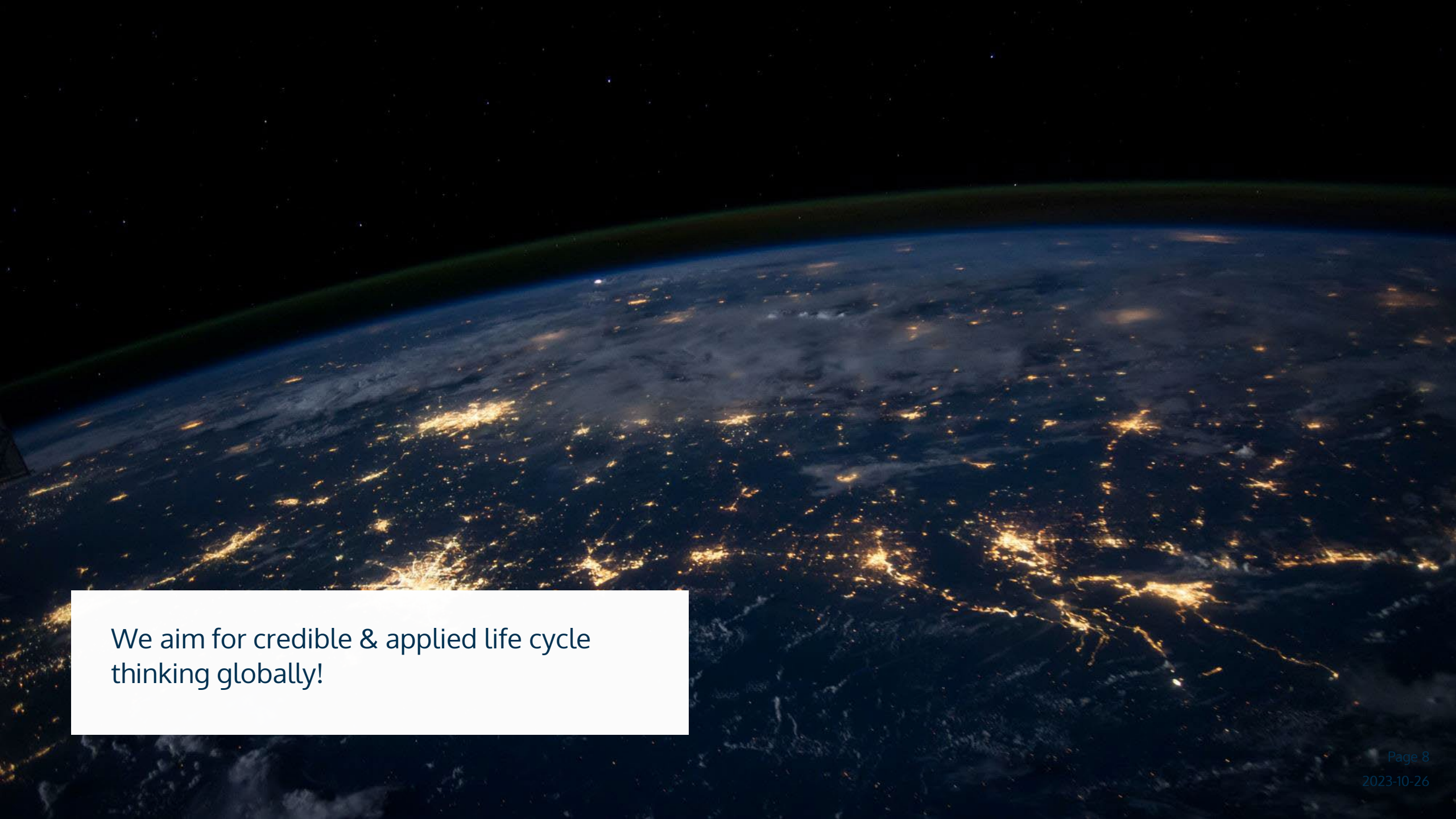
Environmental footprint in Swedish industry

- Increased understanding
- Understand effects of implementation
- Contribute to development

- Funded by Vinnova

VINNOVA
Sweden's Innovation Agency

Case studies, expert group meetings and more



We aim for credible & applied life cycle thinking globally!

Partners


CEVT

CHALMERS

Electrolux

essity

Höganäs

ivl
SVENSKA
MILJÖINSTITUTET

KTH
VETENSKAP
OCH KONST

LULEÅ
TEKNISKA
UNIVERSITET

NATUR
VÅRDS
VERKET

RI.
SE

SCANIA

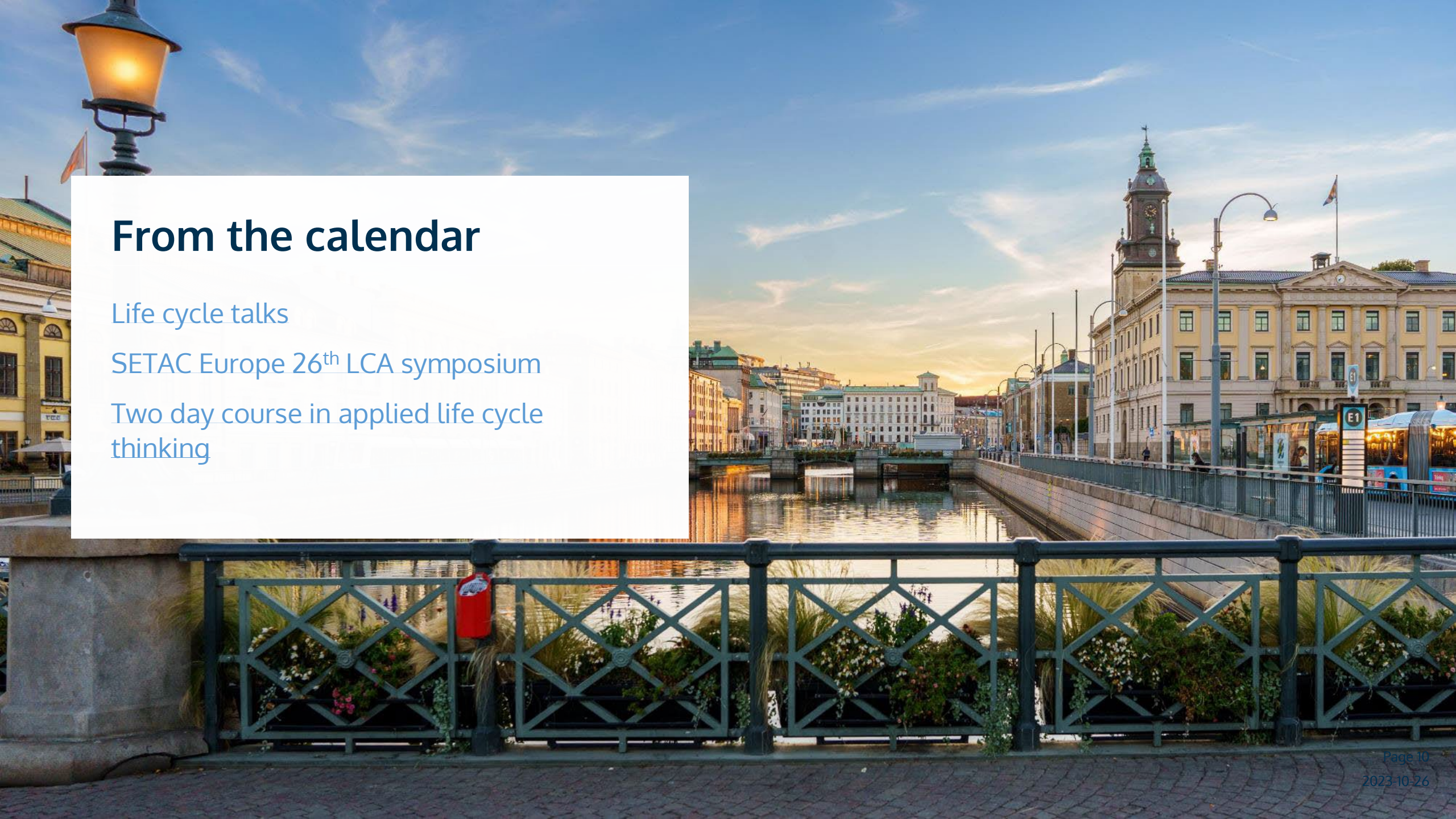
SKF

SLU

VATTENFALL

VOLVO

VOLVO



From the calendar

Life cycle talks

SETAC Europe 26th LCA symposium

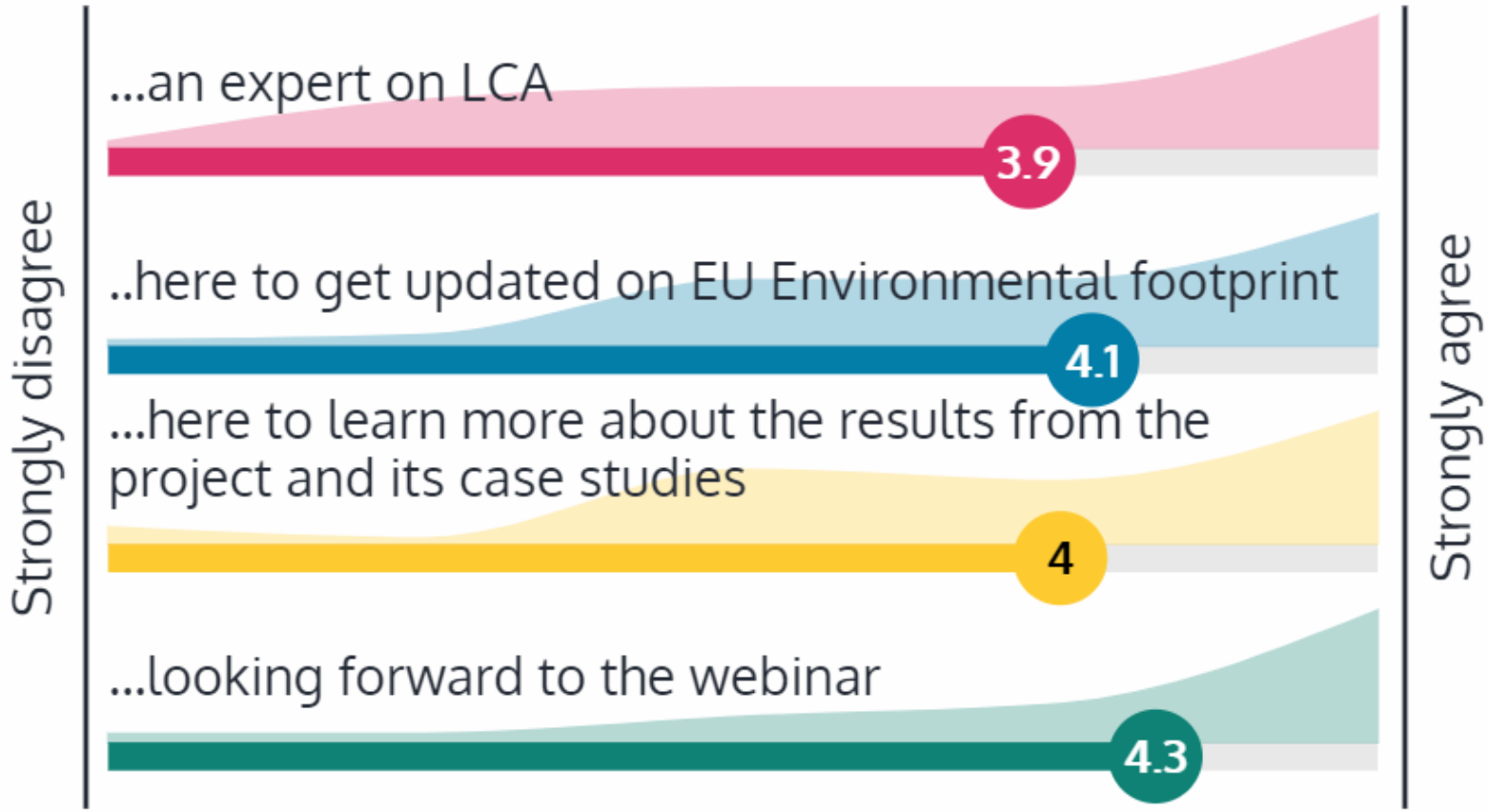
Two day course in applied life cycle thinking

Menti

Join at menti.com use code 8500 4955

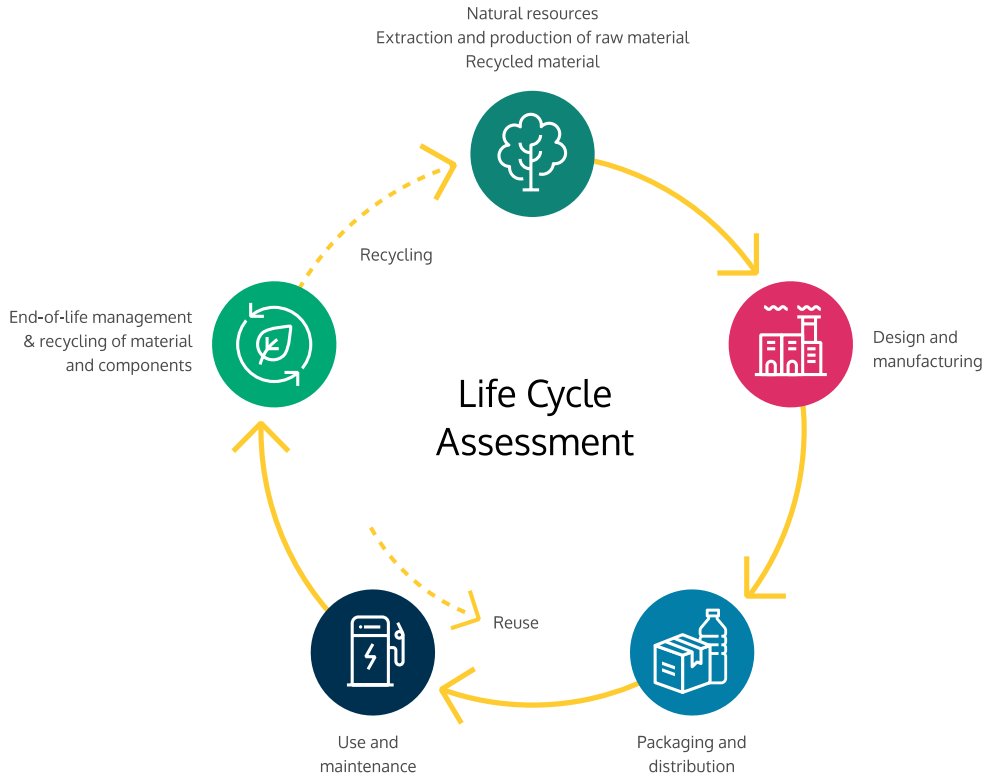
SWEDISH LIFE CYCLE CENTER

I am...



What is Environmental Footprint

Methods for measuring and communicating the life cycle environmental performance of products and organisations of the European Commission.



PEF and OEF

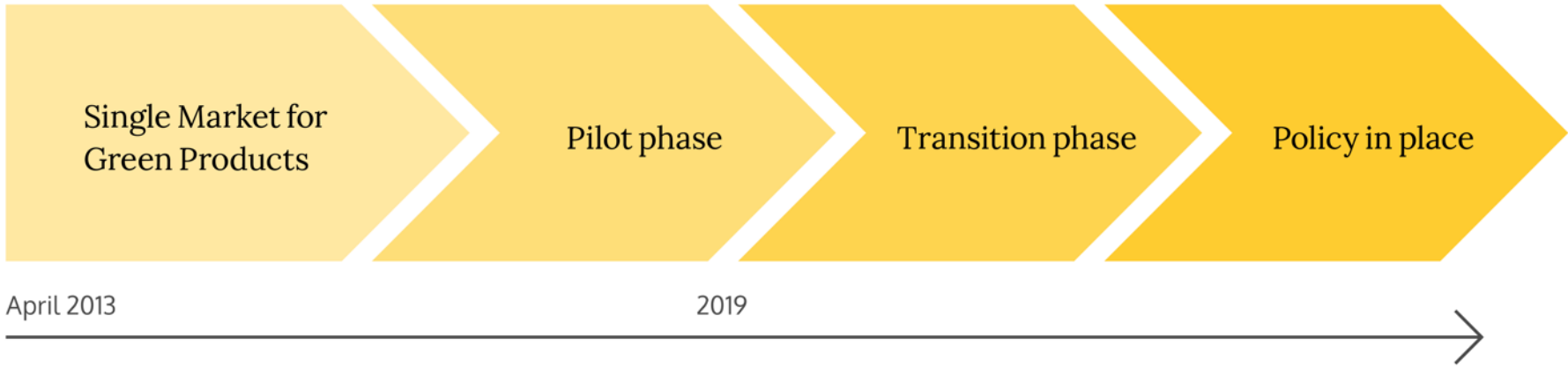
To carry out a PEF and OEF compliant study, product category and sector guidelines have been or are being developed

PEFCR - Rules to calculate the relevant environmental information of the organisations belonging to the sector in scope.

OEFSR - Rules to calculate the relevant environmental information of products belonging to the product category in scope.

The aim of EU Environmental footprint is to improve the environmental performance of products, services and organisations in the European market through a combination of market pressure and policy instruments, using information that is reliable, comparable and verifiable

The Environmental Footprint process of the European Commission, from the Single Market from Green Products initiative in 2013 until today and ahead.



Björn Spak

Swedish Environmental Protection Agency

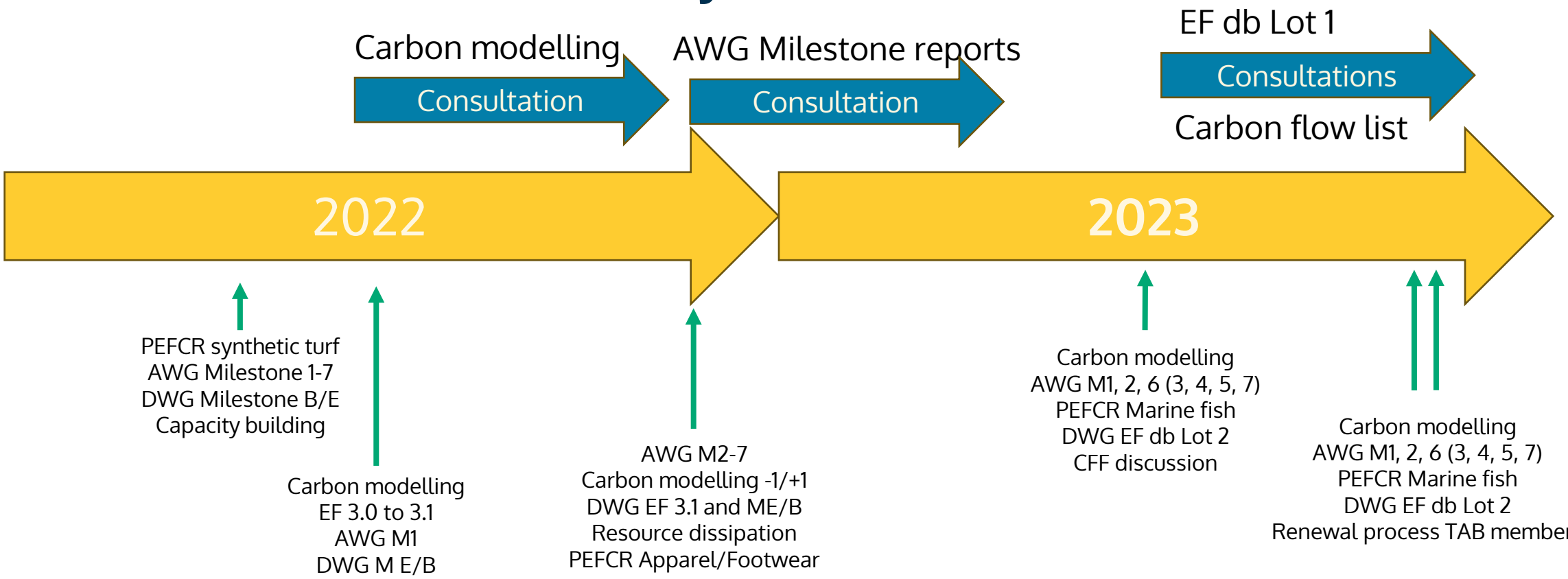
Update of current status of the EU environmental footprint and its implementation and connections to other EU legislation

SWEDISH LIFE CYCLE CENTER

Environmental footprint

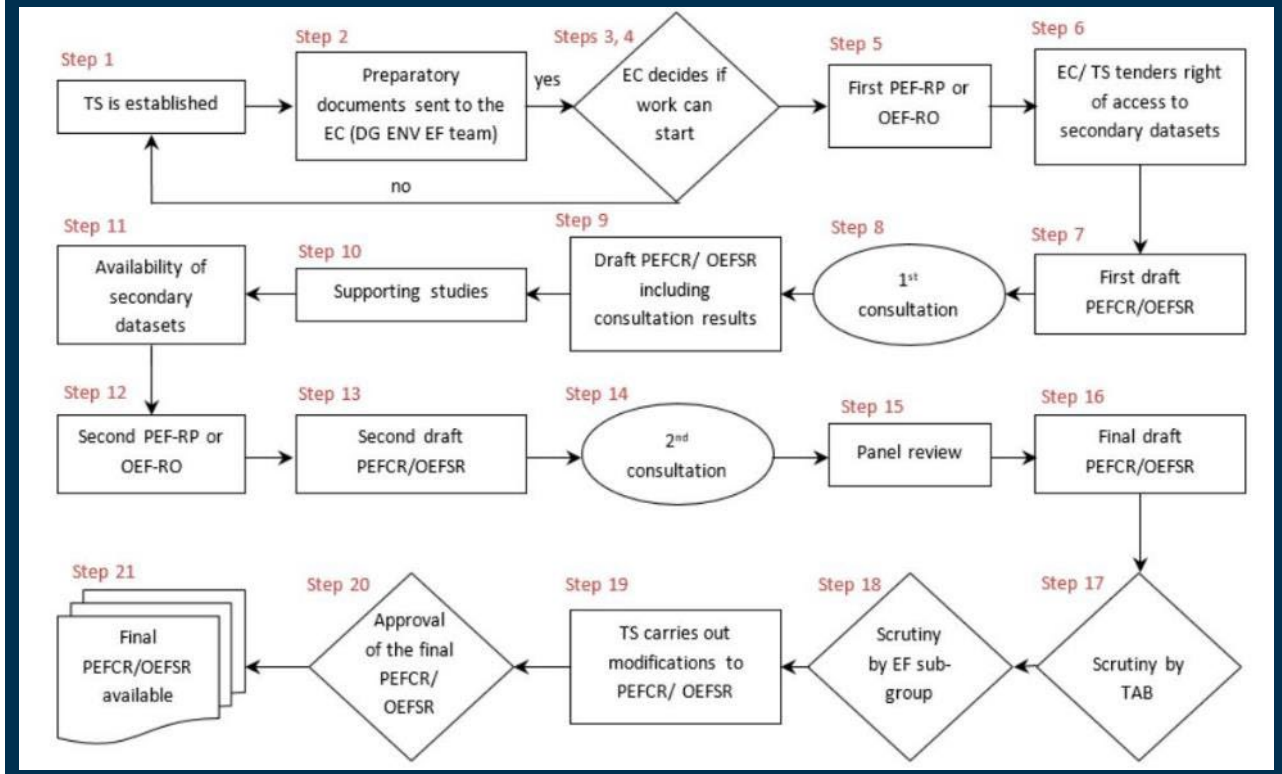
Methods, data and implementation into legislation

Technical Advisory Board 2022-2023



PEFCR development

- PEFCR-development
  - Apparel & Footwear
  - Marine fish
  - Synthetic turf
  - Cut flowers and potted plants
  - Flexible packaging
- PEFCR-update
  - Pilot-phase PEFCRs



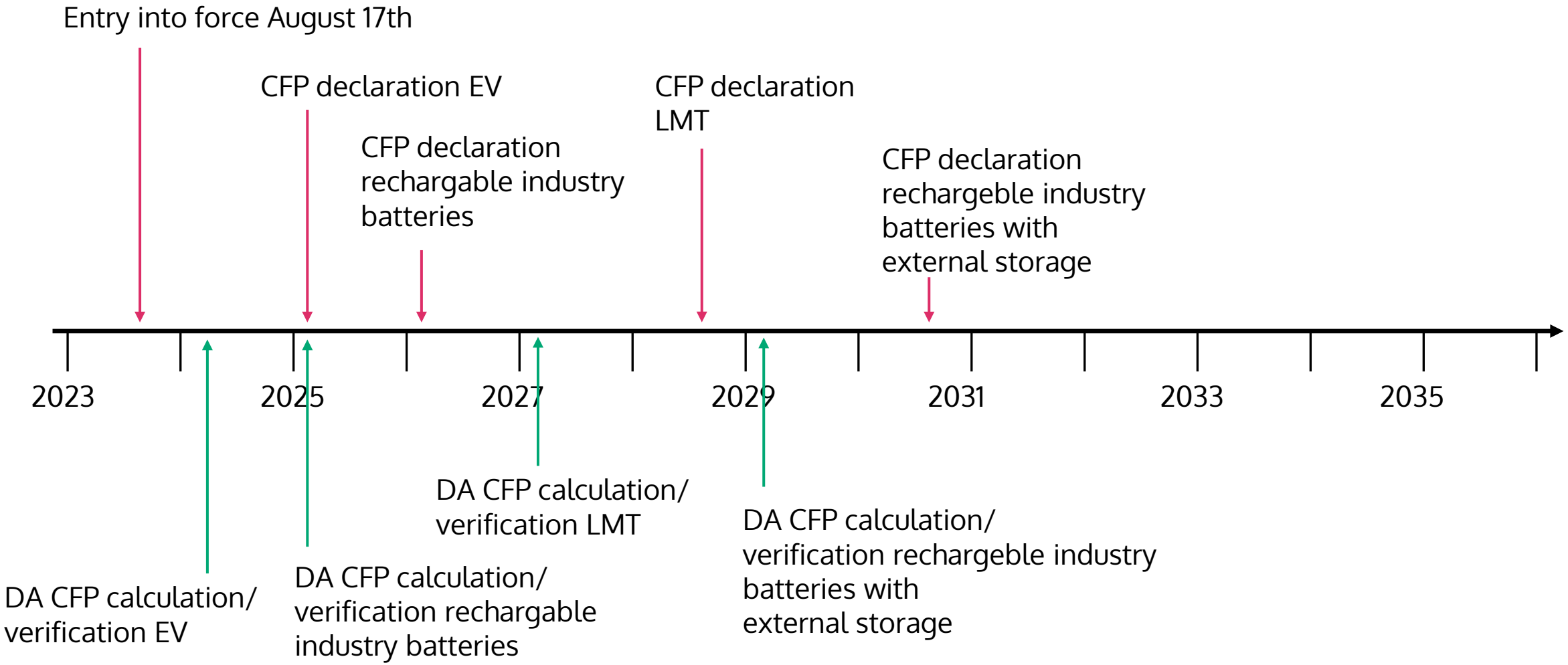
EF implementation in Battery regulation and Solar PV product regulation

Both acts refers to EF/PEFCRs

- Battery regulation adopted August 17th 2023
  - Carbon footprint declaration delegated/implementing acts
    - Delegated acts (DA) for calculation and verification
      - Member states and other stakeholders concerned over electricity modelling
    - Implemented act for format of declaration
    - DA for carbon footprint performance levels
    - DA for maximum carbon footprint threshold values
- Solar PV product regulation under current Ecodesign Directive
  - Pilot phase PEFCR partially incorporated into draft regulation
  - Development halted over dispute on electricity modelling
- These texts will likely influence EF development and/or other implementation

For more information about the Center, see operational plan, stage 10.

Battery regulation CFP declaration



EF implementation in other frameworks/acts

Ecodesign regulation (ESPR)

- Currently in trialogue, high priority for Spain
- EF may be used in DAs
  - "Preparatory study" going on for textiles
  - "Preparatory study" being prepared for iron/steel (intermediary products)

Ecodesign directive MEErP

- Methodology for Ecodesign of Energy-related Products – screening LCA
  - Database, impact assessment methods and EoL-modelling adopted to EF

Farm-to-fork – Framework for Sustainable Food Systems

- EF-based Consumption Footprint suggested as indicator

For more information about the Center, see operational plan, stage 10.

Other frameworks/acts

Carbon Removal Certification Framework

- Influences carbon modelling in EF

Taxonomy

- Weak link to EF

Construction Product Regulation revision

- EN 15804 over EF

CBAM

- Relates to ETS rather than EF

For more information about the Center, see operational plan, stage 10.

Questions?

Short break

Back at 13:53

Case studies

Torun Hammar

RISE – Research Institutes of Sweden

Case study circular footprint formular with focus on materials used in batteries

SWEDISH LIFE CYCLE CENTER

Case study: Application of the Circular Footprint Formula within the automotive industry

Environmental footprint in Swedish industry
– increased understanding and implementation

2023-10-26

Overall aim of case study

The aim of the case study was to better understand the consequences of implementing the circular footprint formula (CFF) within the automotive industry in Sweden

Case study group

- RISE Research Institutes of Sweden
- Volvo Car Corporation
- Höganäs AB
- CEVT

How was the case study performed?

Study circle

- Reading and discussing relevant literature and documentation
- Identifying challenges in interpretating the CFF, and developing suggestions for how to clarify the existing documentations and guidelines

Practical testing

- Both in a developed Excel tool for a simplified product example and in selected LCA software
- Evaluating the results compared to using another end-of-life allocation method
- Evaluating data availability

Evaluating the overall implications of implementing the circular footprint formula in the Swedish automotive industry

What is the circular footprint formula (CFF)?

Formula for allocating the environmental burden or benefit of material recycling, energy recovery and disposal between products life cycles

CFF = Material + Energy + Disposal

Circular Footprint Formula

Material

Connected to input

Connected to output

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

Primary material in

Secondary material in

Secondary material out and replaced primary material (credit)

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

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

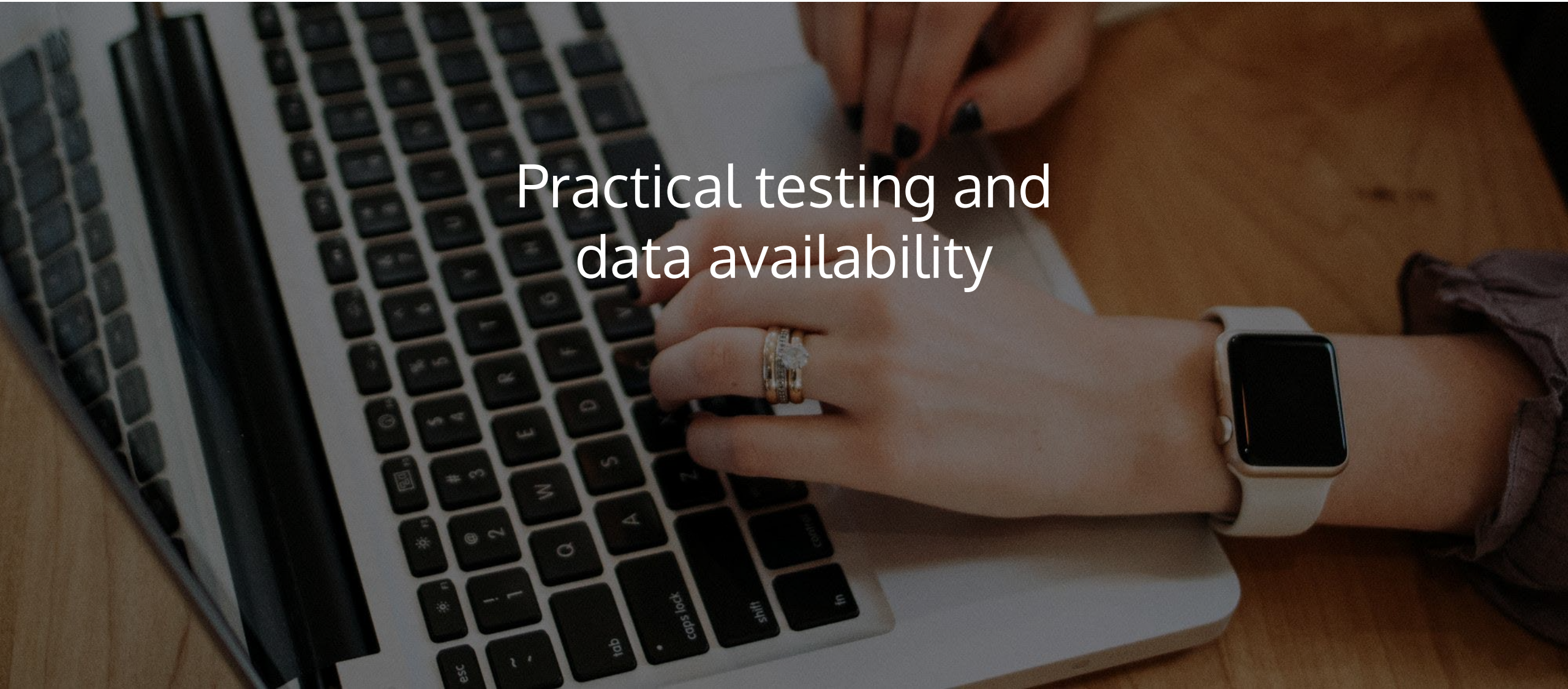
Challenges in interpretating the CFF

- Main challenge connected to how pre-consumer materials and post-consumer materials should be handled

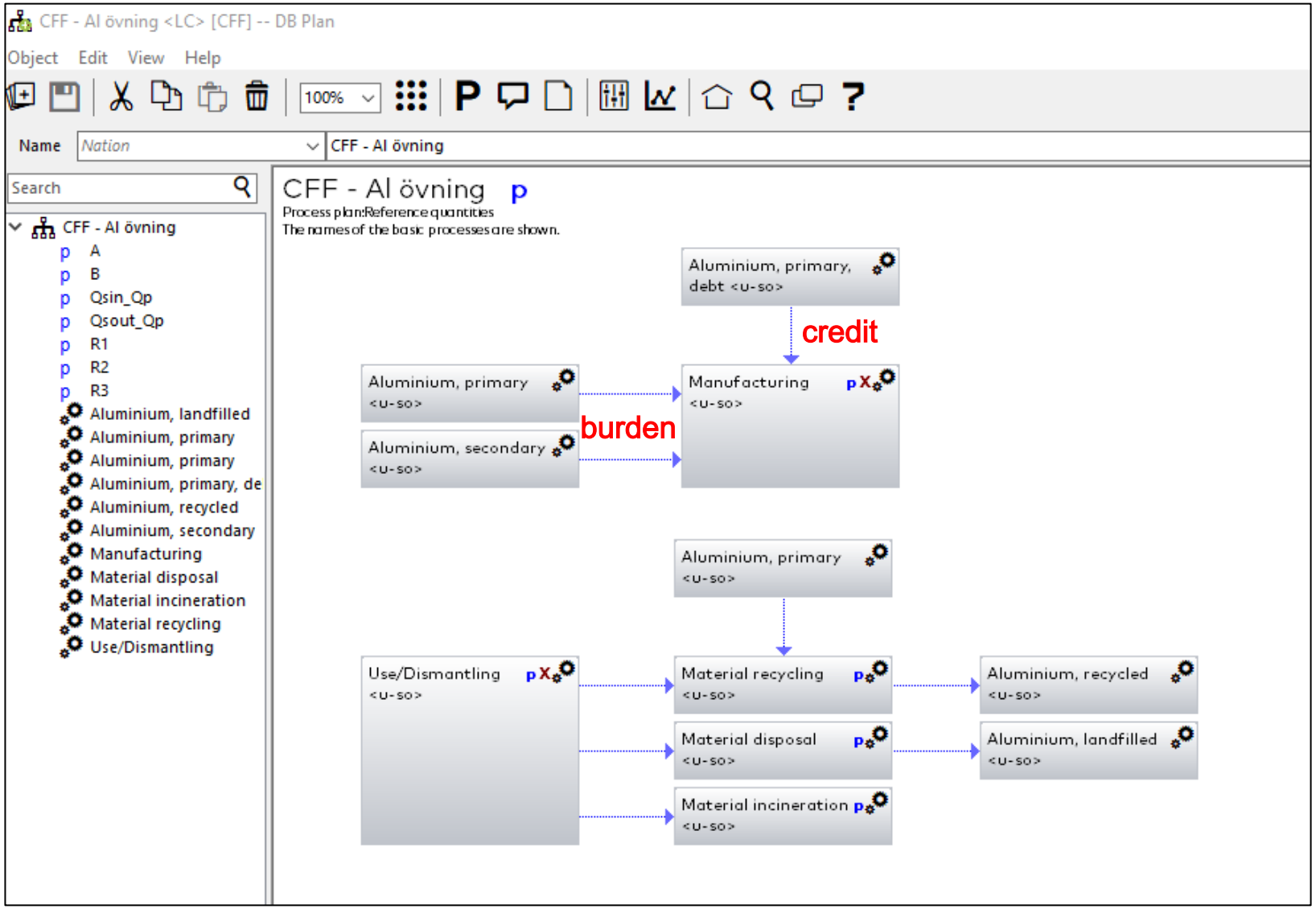
Post-consumer material	Material derived as waste stream at products end of life, after use by households, commercial, industrial or institutional facilities.
Pre-consumer material	Material derived as waste stream from manufacturing process.

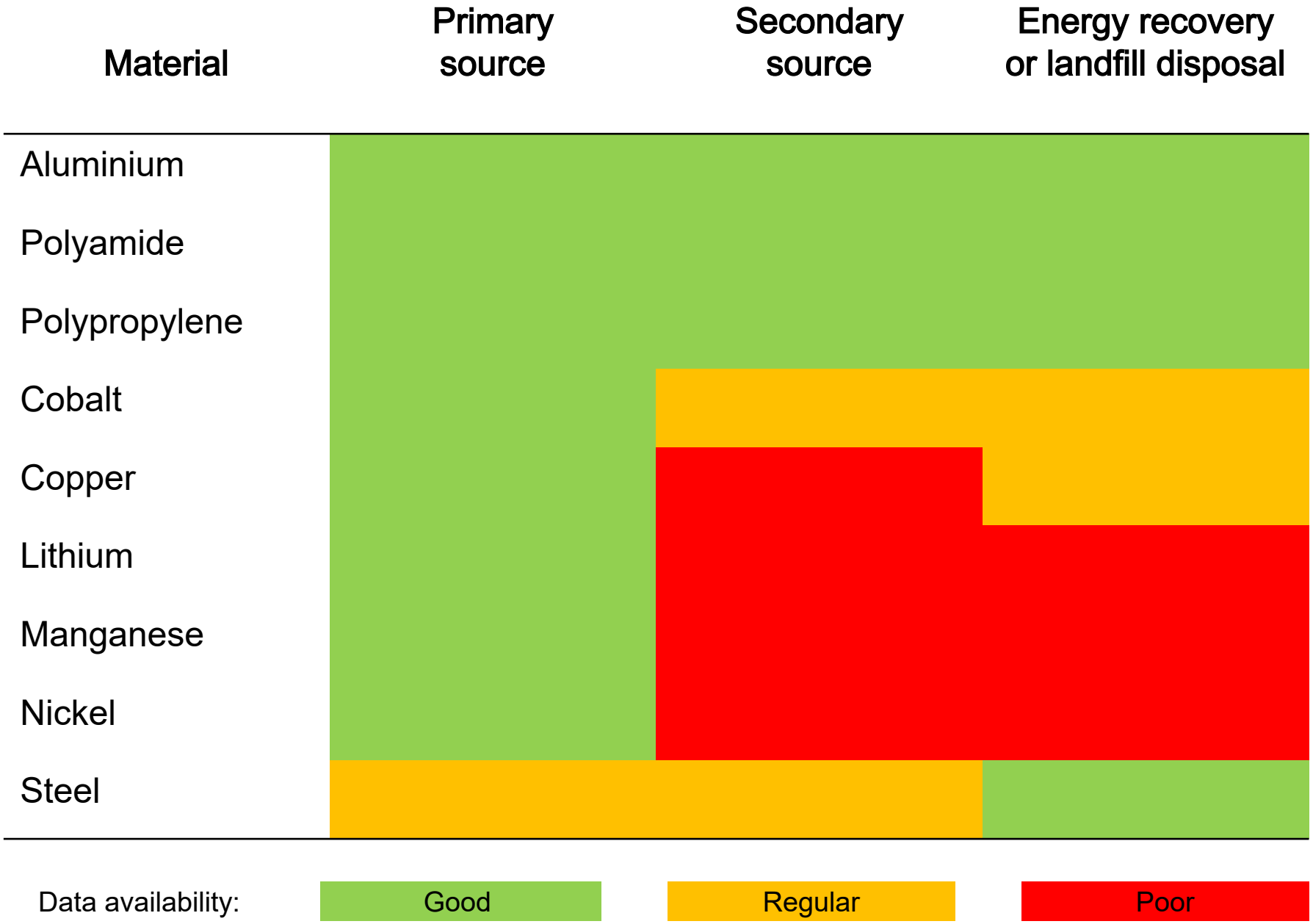
- R1 (recycled content), R2 (proportion of material being recycled), quality parameters, emission factors

SWEDISH
LIFE CYCLE
CENTER



Practical testing and data availability


CFF - Al övning <LC> [CFF] -- DB Plan
Object Edit View Help
100%
Name Nation CFF - Al övning
Search
CFF - Al övning
p A
p B
p Qsin_Qp
p Qsout_Qp
p R1
p R2
p R3
Aluminium, landfilled
Aluminium, primary
Aluminium, primary
Aluminium, primary, de
Aluminium, recycled
Aluminium, secondary
Manufacturing
Material disposal
Material incineration
Material recycling
Use/Dismantling
CFF - Al övning p
Process plan:Reference quantities
The names of the basic processes are shown.
Aluminium, primary, debt <u-so>
credit
Aluminium, primary <u-so>
Aluminium, secondary <u-so>
burden
Manufacturing <u-so>
Aluminium, primary <u-so>
Use/Dismantling <u-so>
Material recycling <u-so>
Material disposal <u-so>
Material incineration <u-so>
Aluminium, recycled <u-so>
Aluminium, landfilled <u-so>


Material
Primary source
Secondary source
Energy recovery or landfill disposal
Aluminium
Polyamide
Polypropylene
Cobalt
Copper
Lithium
Manganese
Nickel
Steel
Data availability:
Good
Regular
Poor

SWEDISH
LIFE CYCLE
CENTER

Conclusions and recommendations

Conclusions and recommendations (1/3)

- A benefit with the CFF is the possibility to give incentives for both using recycled materials as input, and that materials leaving the system throughout the whole value chain are recycled. The CFF is thus a useful tool for internal decision-making regarding e.g. material selection.

Conclusions and recommendations (2/3)

Pre-consumer vs. post-consumer materials

- Clearer definitions on how different types of secondary materials should be handled are recommended. In particular, clarifications regarding pre-consumer materials are needed.
- The CFF should ideally reflect and give incentives for using post-consumer materials over pre-consumer materials, since pre-consumer materials can be results of inefficiencies in manufacturing processes.
- Pre-consumer materials are generally considered more high-value materials than post-consumer materials, and should therefore in many cases not give the same credit as post-consumer materials (from replacing primary materials), which is not clearly reflected in the formula.

Conclusions and recommendations (3/3)

Practical feasability of implementing the CFF

- Data availability was identified as most difficult, including asking suppliers to supply data according to the CFF, due to the risk of different interpretations and/or use of data sources resulting in non-comparable results.
- Therefore, until the CFF becomes mandatory, the cut-off approach will likely be continually used when asking suppliers for data and for publicly shared LCA results.
- Lastly, recommendations from this case study are to clarify guidelines on data selection, ensure compatibility with existing databases and provide open access data for making the PEF and CFF more widely applicable.

SWEDISH
LIFE CYCLE
CENTER

Thanks!

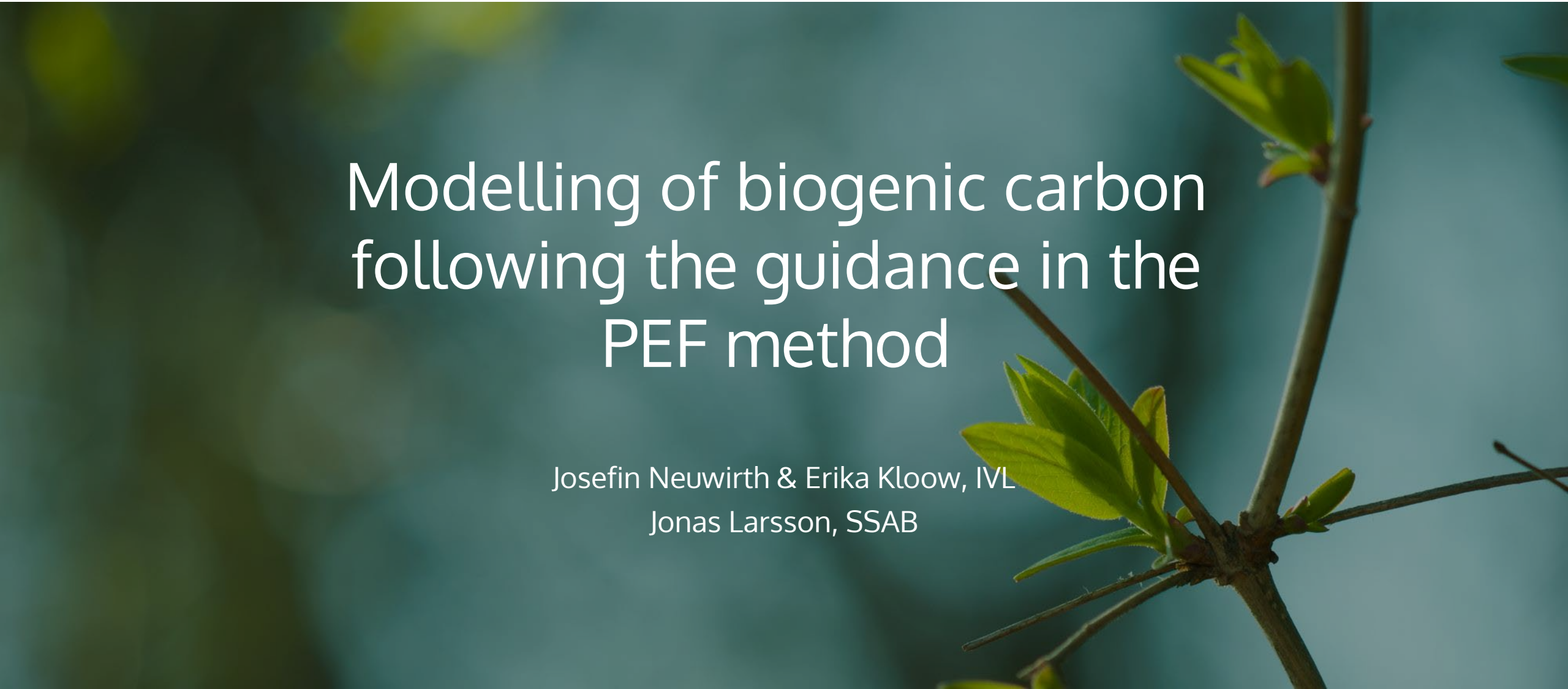
Questions?

Erika Kloow and Josefin Neuwirth

IVL - Swedish Environmental Research Institute

Case study biogenic carbon in interlinked product systems and in long living products

SWEDISH LIFE CYCLE CENTER



Modelling of biogenic carbon following the guidance in the PEF method

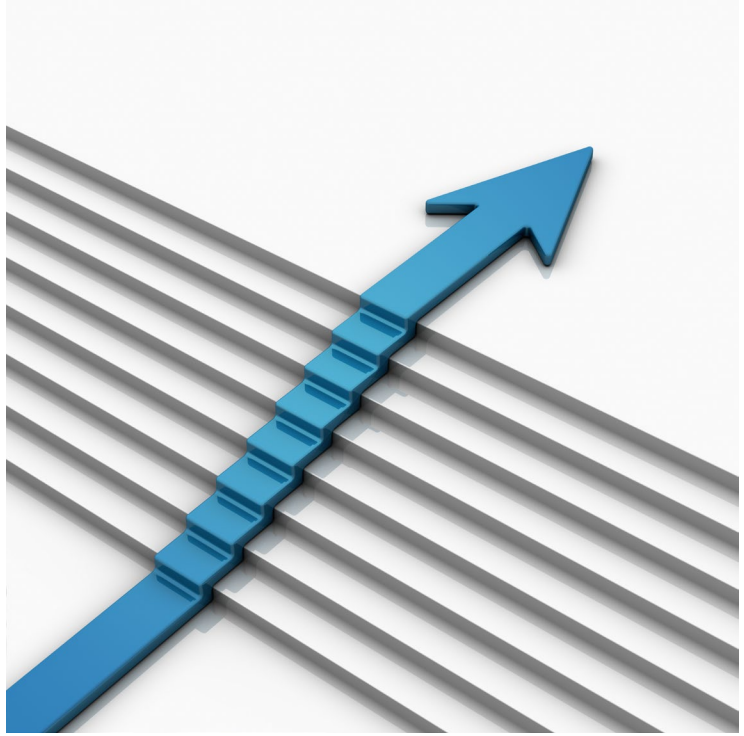
Josefin Neuwirth & Erika Kloow, IVL
Jonas Larsson, SSAB

Project aim

The overall aim of this case study was to better understand the consequences of using the PEF method to model the climate change impact with focus on biogenic carbon content in interlinked product systems and long living products.

Working procedure

1. Guidance: *PEF, PEFCR:s, EN 15804 (standard for construction products)*
2. Case study products: *SSAB Fossil-free™ steel and scrap-based steel*
3. Defining scenarios
4. Modelling potential climate change impact
5. Conclusions



Guidance in the PEF method

Modelling of biogenic carbon

- The PEFCR shall specify if a 'simplified modelling approach' should be used. A simplified approach means no inclusion of emissions or uptakes of biogenic CO_2 in the study.
- If a simplified approach is not used, all the biogenic CO_2 flows shall be modelled. However, the characterization factors (CF) for biogenic CO_2 are set to zero within the EF impact assessment method.
- 'Physical content and allocated content' of biogenic carbon shall be reported as additional information for intermediate products.

Allocation

- Circular Footprint Formula (CFF) shall be used to model recycled input and product going to recycling.
- There is no specific guidance on how to treat biogenic carbon in the material when allocating burdens and credits between product systems.

Time

- All emissions and removals shall be considered as emitted 'now'. There is no discounting of emissions over time.

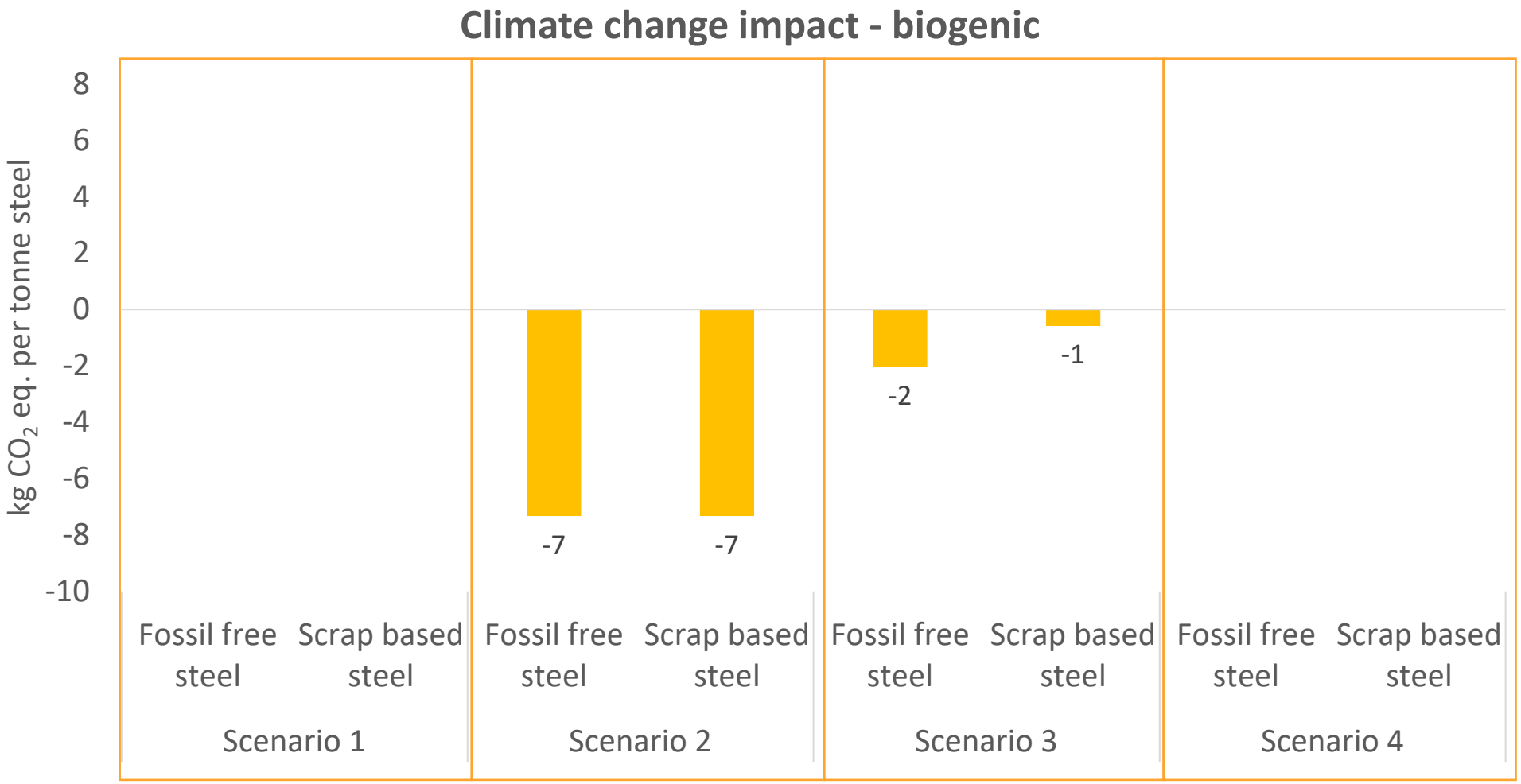
Modelling scenarios: biogenic carbon in product

- 4 modelling scenarios
- Aim to capture the most relevant modelling scenarios

Methodological aspect	Scenario 1: PEF with bio CO_2 CF* set to 0.	Scenario 2: PEF with bio CO_2 CF* -/+1	Scenario 3: PEF with bio CO_2 CF* -/+1 and bio C content allocated to primary production	Scenario 4: EN 15804
Bio C modelling	Yes	Yes	Yes	Yes
Bio CO_2 CF*	0	-/+1	-/+1	-/+1
Allocation	CFF	CFF	CFF	Cut-off
Allocation of bio C in the product	No	No, handled as material inherent property	Yes, the bio C is allocated to the primary production	No, handled as material inherent property
Time	No discounting of emissions over time			

*CF = characterisation factor

Results differ between modelling scenarios



- Total result
- Allocation factor set to 0.2
- An A-factor < 0.5 - the formula focuses on recyclability at EoL

PEF with bio CO_2 CF set to 0

PEF with bio CO_2 CF -/+1

PEF with bio CO2 CF -/+1 and bio C content allocated to primary production

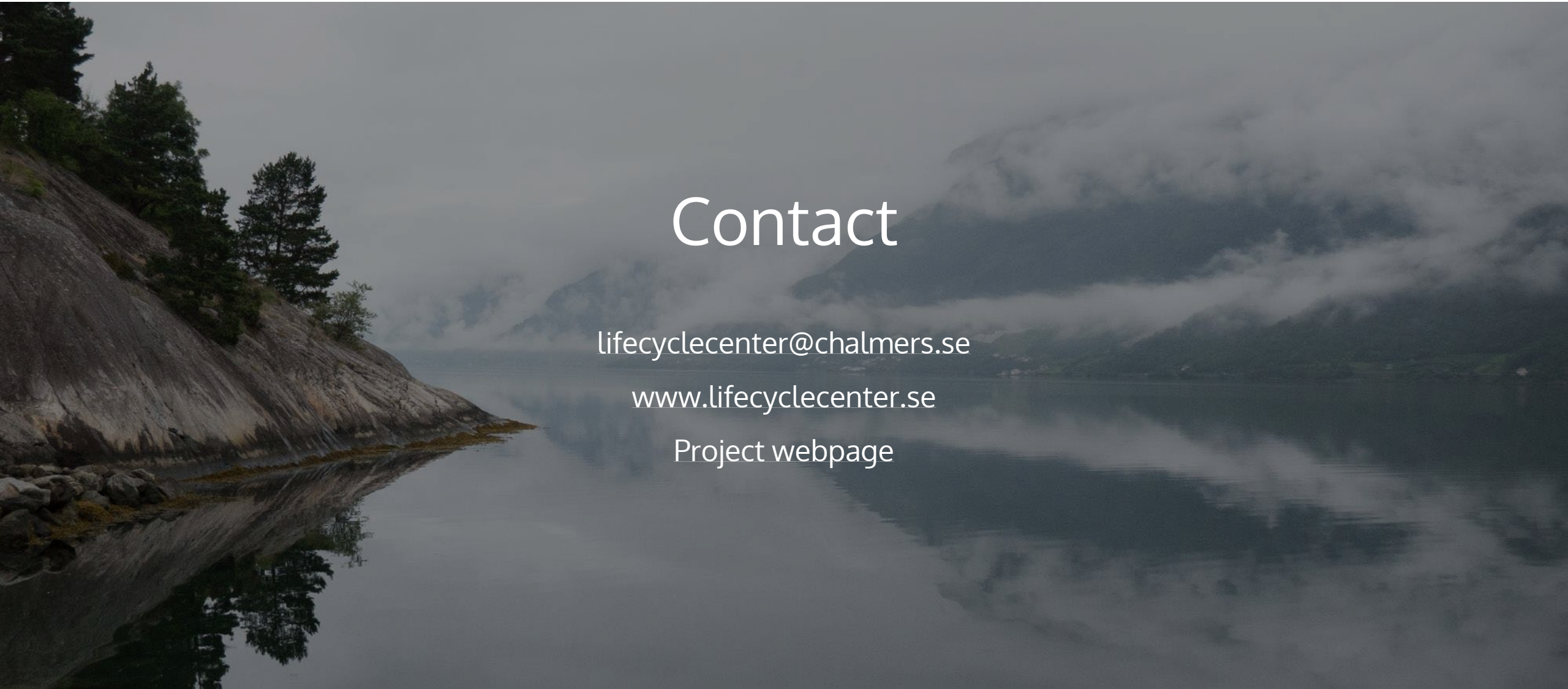
EN 15804

Conclusions

- Modelling of biogenic carbon content in interlinked product systems: not clearly defined in the PEF method
- Guidance in PEF and PEFCRs: Two approaches for modelling biogenic CO_2 are possible (simplified approach vs. modelling)
- Guidance on time: not possible to capture differences in the modelling for long-living vs short-living products
- Circular footprint formula (CFF): takes time to understand and results are difficult to analyse
- Standards not harmonised

Questions?

SWEDISH
LIFE CYCLE
CENTER



Contact

lifecyclecenter@chalmers.se

www.lifecyclecenter.se

Project webpage

Menti

Join at menti.com use code 8500 4955

SWEDISH LIFE CYCLE CENTER

What are important steps to take now?

23 responses

Understanding the need and demand for PEF, if it will ever be relevant.

Complexity vs Simplicity will be critical to wide adoption of LCIA

assess the robustness of the EF Methods for policymaking

Making invalid PEFCRs valid again.

Harmonizing the electricity modelling between PEF

Standard and approach harmonization

Further tests of the feasibility of Environmental Footprint methods as it is required by upcoming EU policy

Highligt problems with PEF to TAB in order to get them resolved for better implementation

Somehow ensure that the identified challenges get heard by the PEF development work

Close data gaps

Clarify guidelines & rules

harmonization

Inform/Reach related actors and decision makers

Up-stream adaptation, working with suppliers from multiple tiers

Bombarde pef helpdesk