

Impacts on fuel producers and customers of conflicting rules for LCA (ICON)

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Agenda

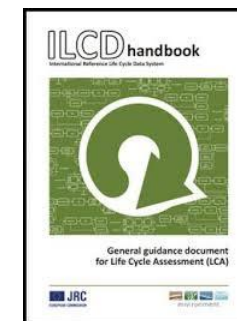
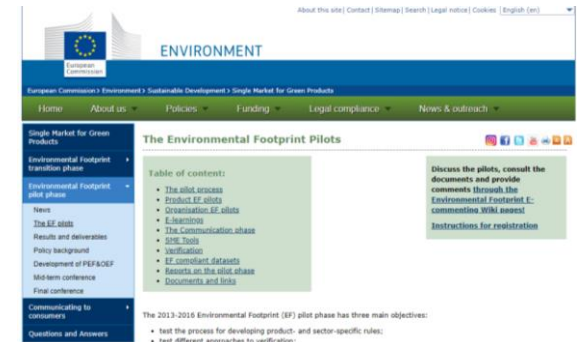
- Short introduction to the ICON project
- Overview of three LCA frameworks (RED II, PEF & EPD)
- Case studies
- Key findings
- Concluding remarks and recommendations

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



Aim & Approach

The project aims to

1. increase understanding on **the requirements of the different LCA frameworks** and on to what extent the multitude of LCA frameworks **gives conflicting recommendations** for environmental improvements
2. **suggest how methodological challenges can be addressed**
3. **inform and prepare actors to actively take part in and influence** the efforts to harmonize LCA and related frameworks

Approach



Focus on **fuel producers**

Case studies on transport fuels

Apply 3 different frameworks (**PEF; EPD; RED II**)

The three frameworks in brief...

- **Renewable Energy Directive – REDII**; **sustainability** and **GHG emissions criteria** for biofuels/bioliquids used in transport need to comply with.

General formula for estimating GHG emissions for transport fuels, biofuels, biomass fuels

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr}$$

- **Environmental Product Declaration (EPD)**: independently verified and **registered document** that communicates information about the **life-cycle environmental impact of products**. Method described in General Program Instruction and Product Category Rules (**PCR**) documents, providing rules, requirements, and guidelines for a defined product category. Different program operators.
- **Product Environmental Footprint (PEF)**: Effort **coordinated by the European Commission** on the use of common methods to **measure and communicate the life cycle environmental performance** of products and organizations. Builds on the ISO LCA standard series and ILCD. Product Environmental Footprint Category Rules (**PEFCRs**) for **specific rules and guidelines**.

	Product Environmental Footprint (PEF)	Environmental Product Declaration (EPD)	Renewable Energy Directive (REDII)
Purpose	To measure and communicate the environmental impact of products, services or companies in a coherent and harmonized way	To communicate environmental information in a way that enables comparison between products with the same function	EU's GHG emissions reporting scheme aiming to assess compliance with the emission reduction targets
Intended Audience	Business to business and business to consumer	Mainly business to business and sometime business-to-consumer	National and EU authorities
System Boundaries	Cradle-to-grave Can be case specific based on the studied system	Cradle-to-grave Can be case specific based on the studied system	Cradle-to-grave Can be case specific based on the studied system
Multifunctional process	subdivision or system expansion, allocation based on physical relationship or other relationship (includes also direct substitution)	subdivision, allocation based on physical relationship or other relationship	allocation based on energy content.
Recycling, Reuse and Recovery	Defined by the Circular Footprint Formula (CFF)	Defined by the Polluter Pays Approach	Feedstocks classified as waste and residues shall be considered to have zero GHG emission up to the collection of the waste
Environmental Impact Categories	16 default impact categories	7 default impact categories Additional can be specified in the PCR	Climate Change (expressed in g CO₂ eq.)

Case studies

- Dedicated crops
 - HVO from rapeseed oil
 - Ethanol from corn
 - Rapeseed methyl ester (RME)
- Advanced biofuels
 - HVO from used cooking oil
 - Ethanol from saw dust
 - Ethanol from bread waste and residues
- Biogas (biomethane) from food waste
- Pyrolysis oil from used tyres

Key findings on the three frameworks

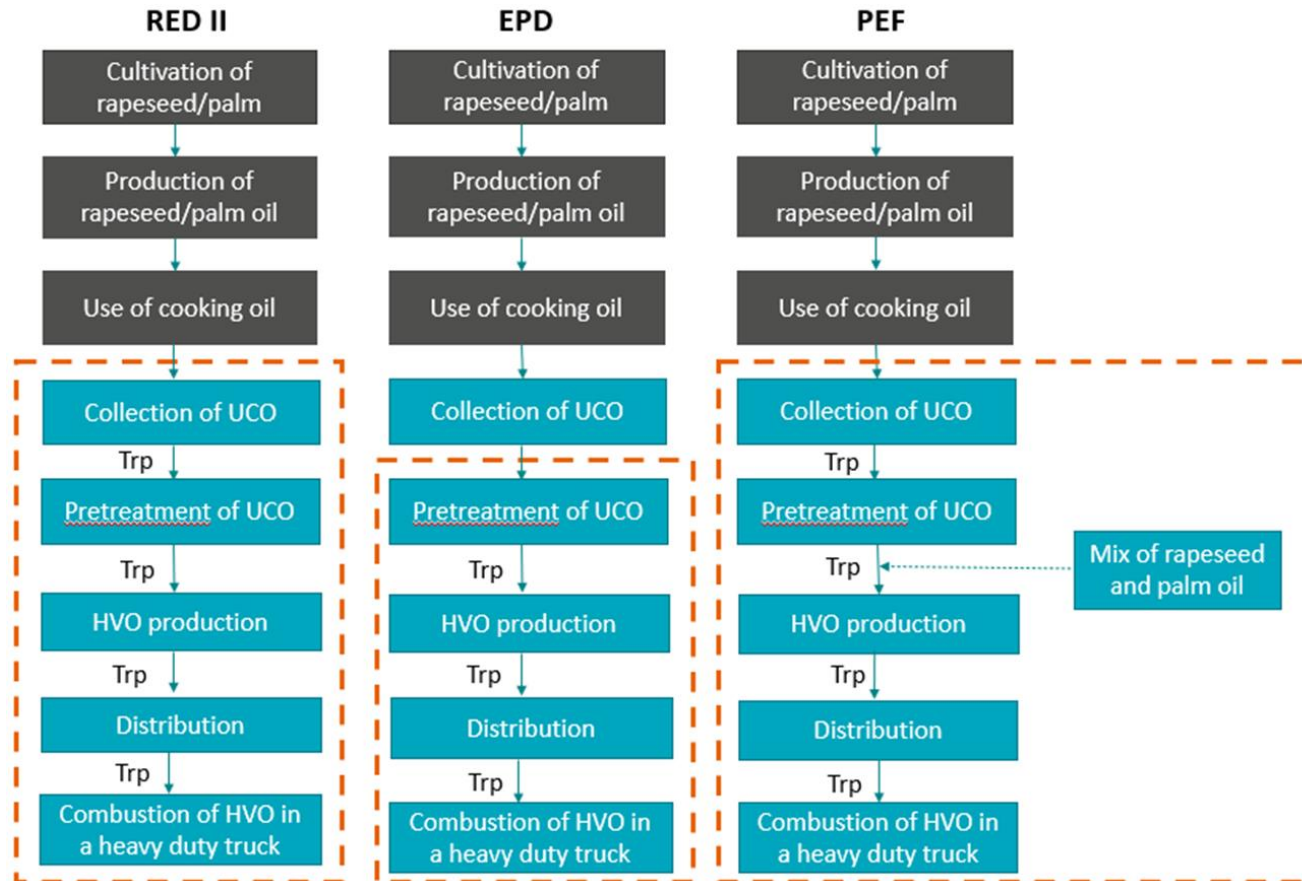
- Potentially important: modelling of waste management, land use, co-products, and electricity supply
- Open for interpretation: particularly PEF but also EPD

Potentially important for results

Modelling of...	Important when...
Waste management	Fuel produced from waste
Land-use	Fuel produced from dedicated crops
Co-products	Fuels have important co-products
Electricity supply	Fuel production based on electricity

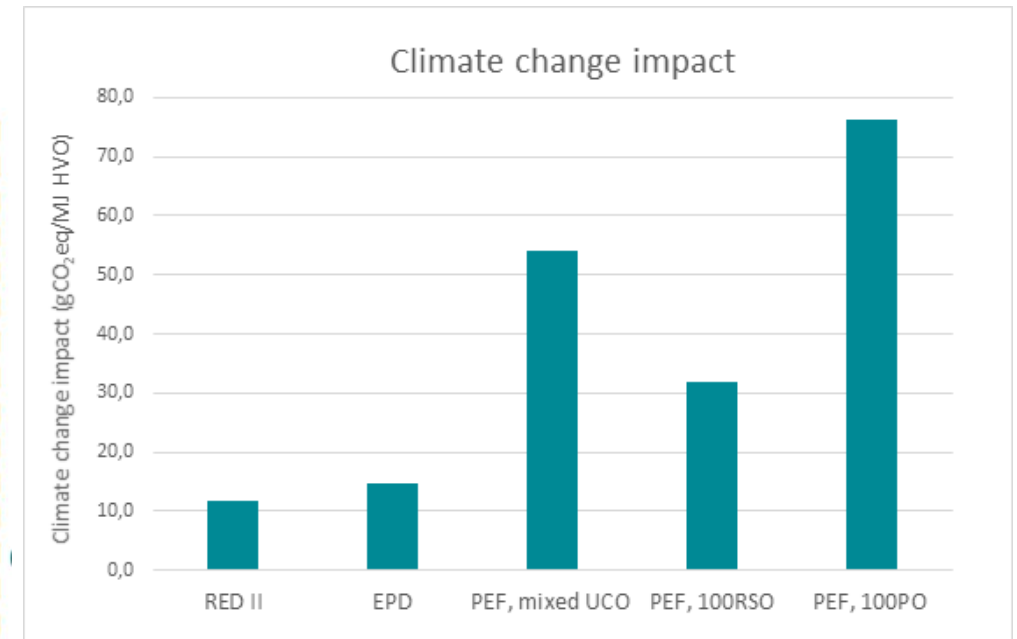
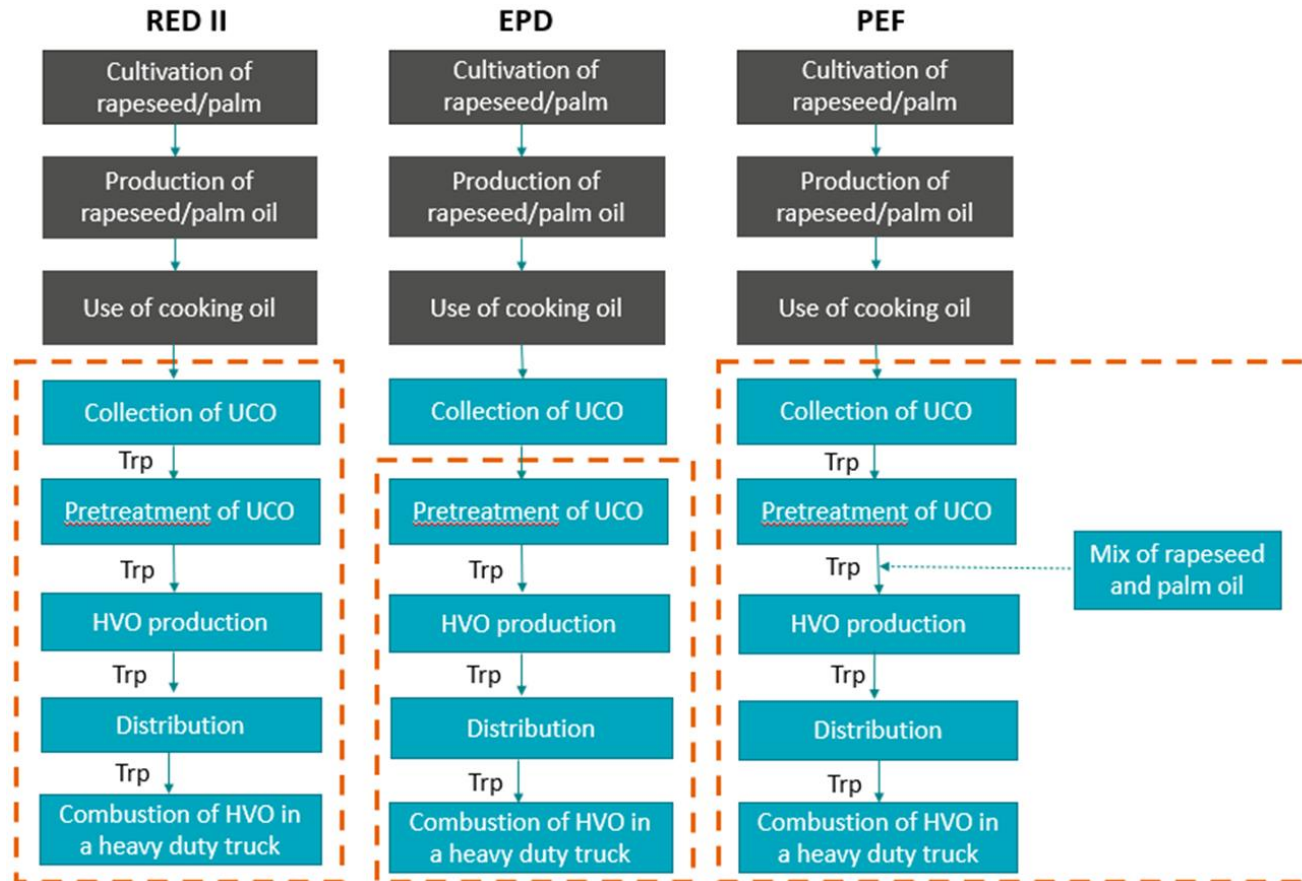
Modelling of waste management: HVO from used cooking oil

PEF:
Recycled materials carry
up to 50% of burdens
from substituted virgin
production



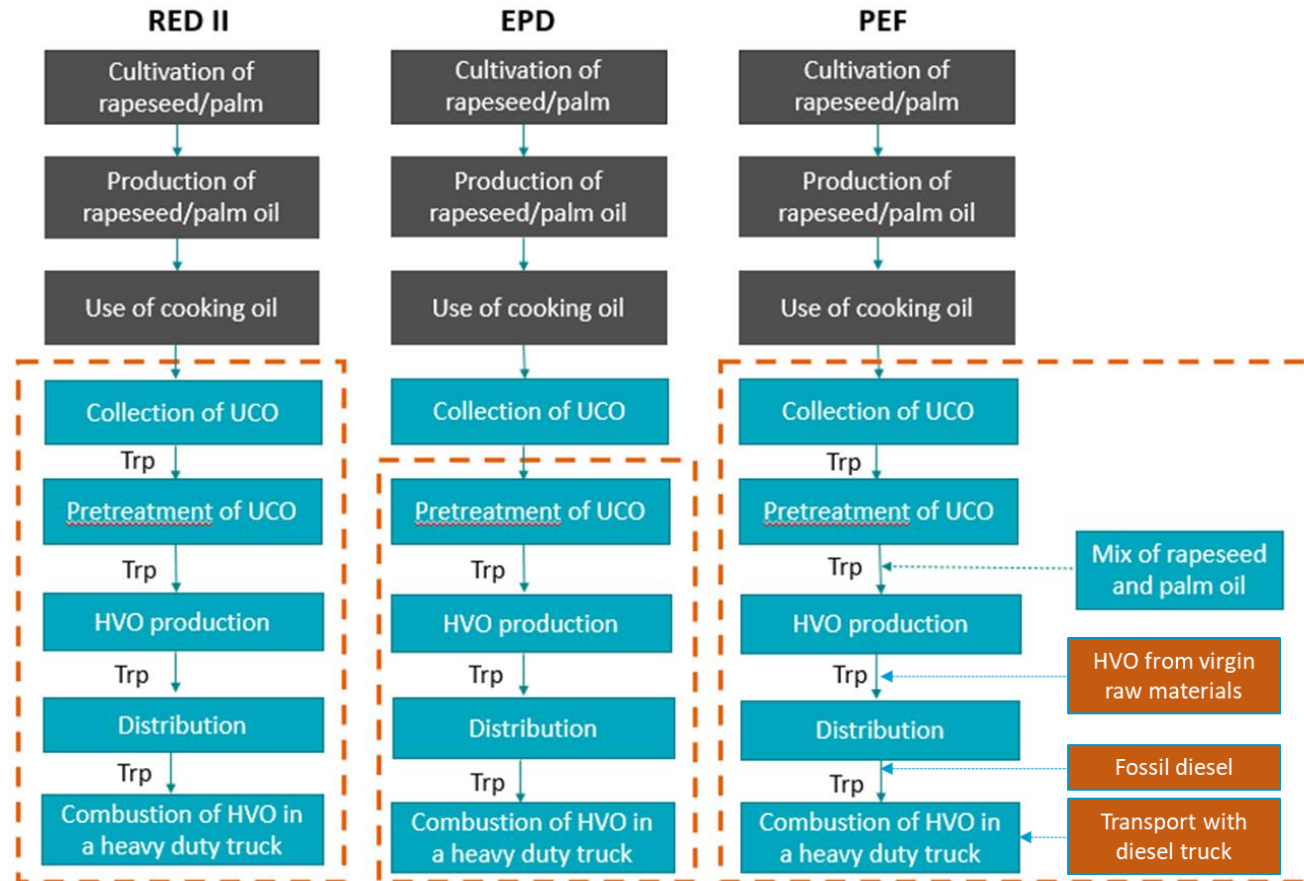
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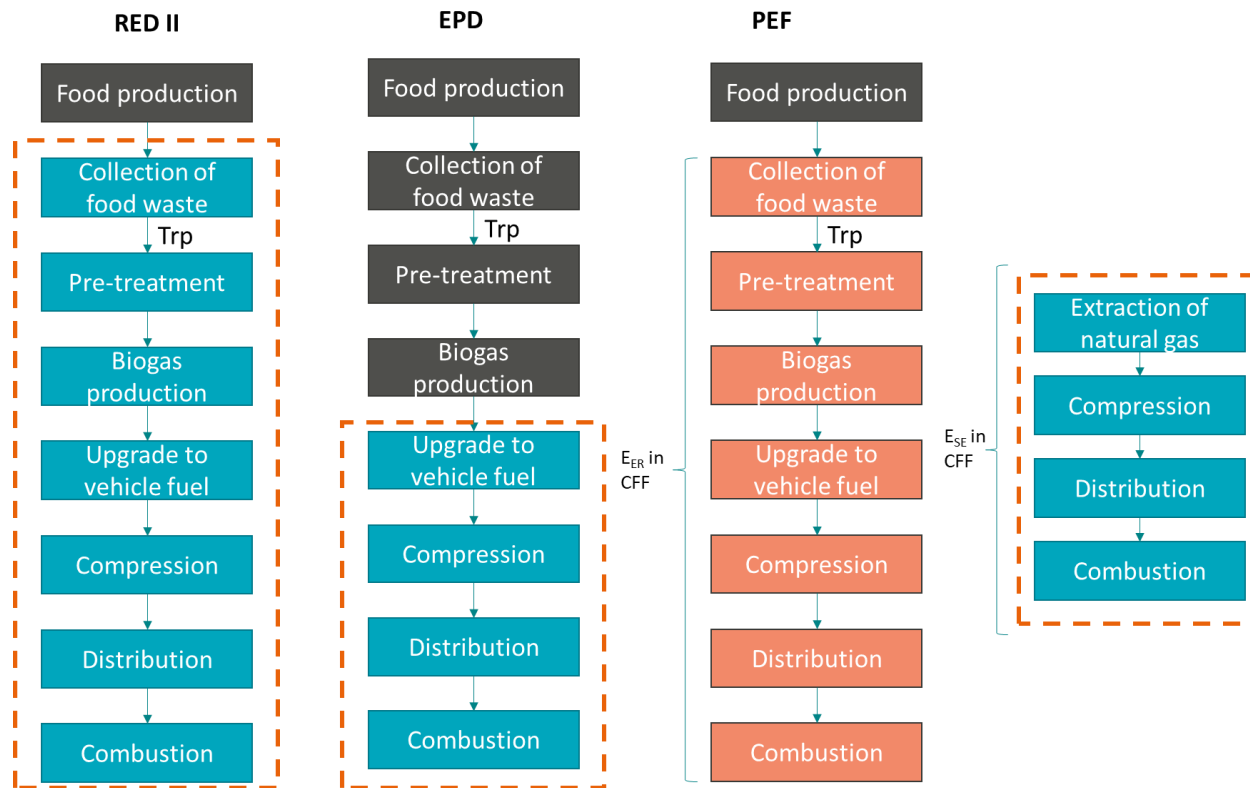
But what is substituted?

Where is the point of substitution?

Modelling of waste management: Biogas from food waste

PEF:
Biogas carries 100% of burdens from substituted virgin production

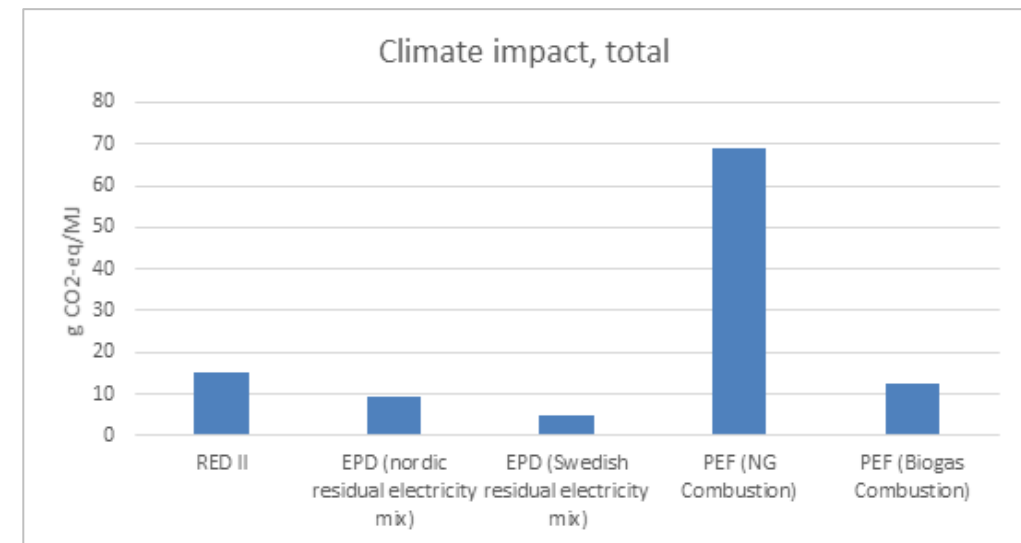
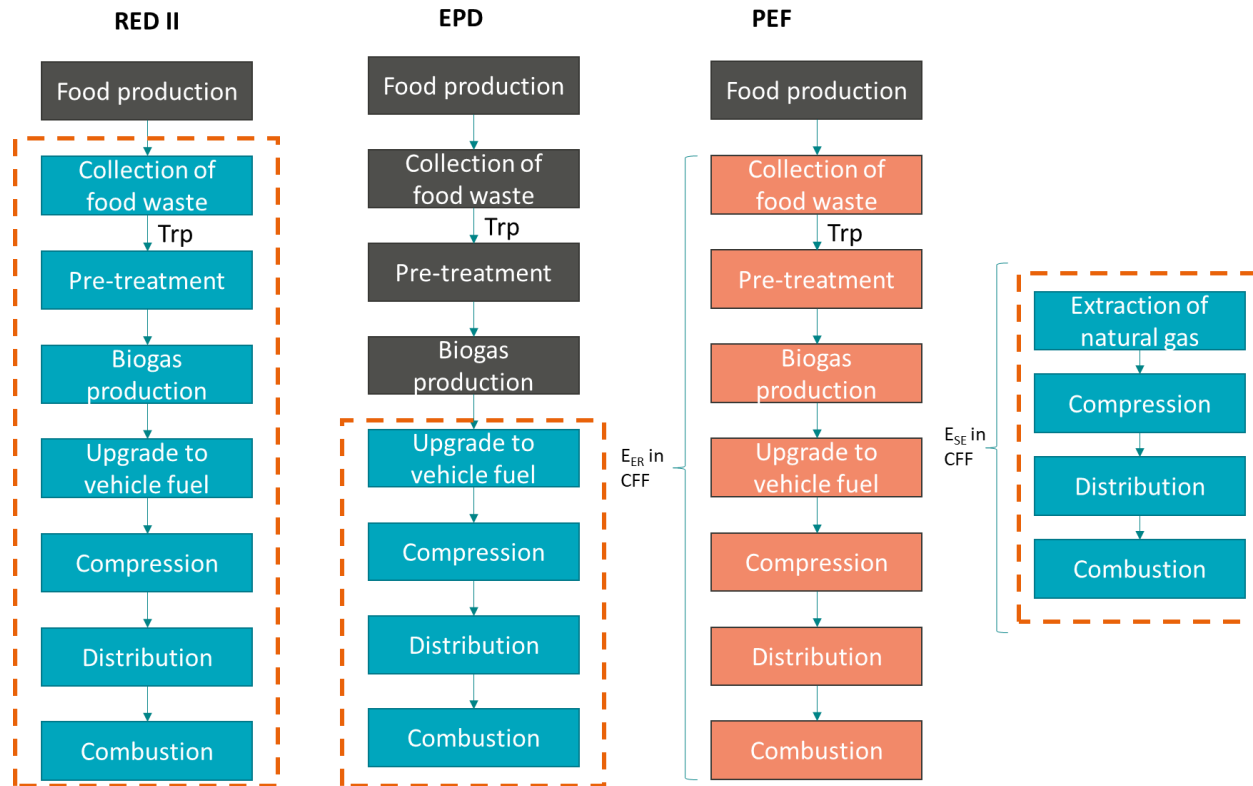
EPD:
Biogas carries no burdens from digestion



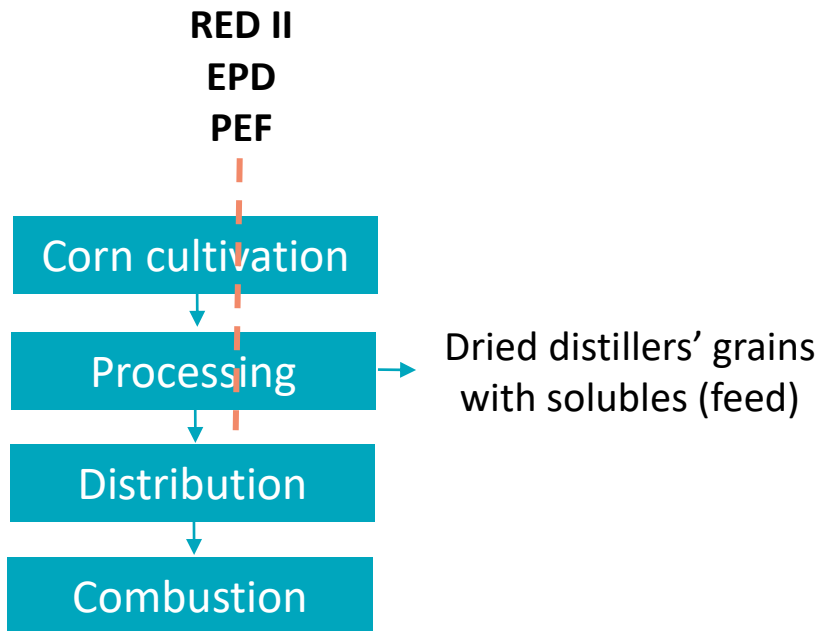
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Modelling land-use and co-products: Ethanol from corn

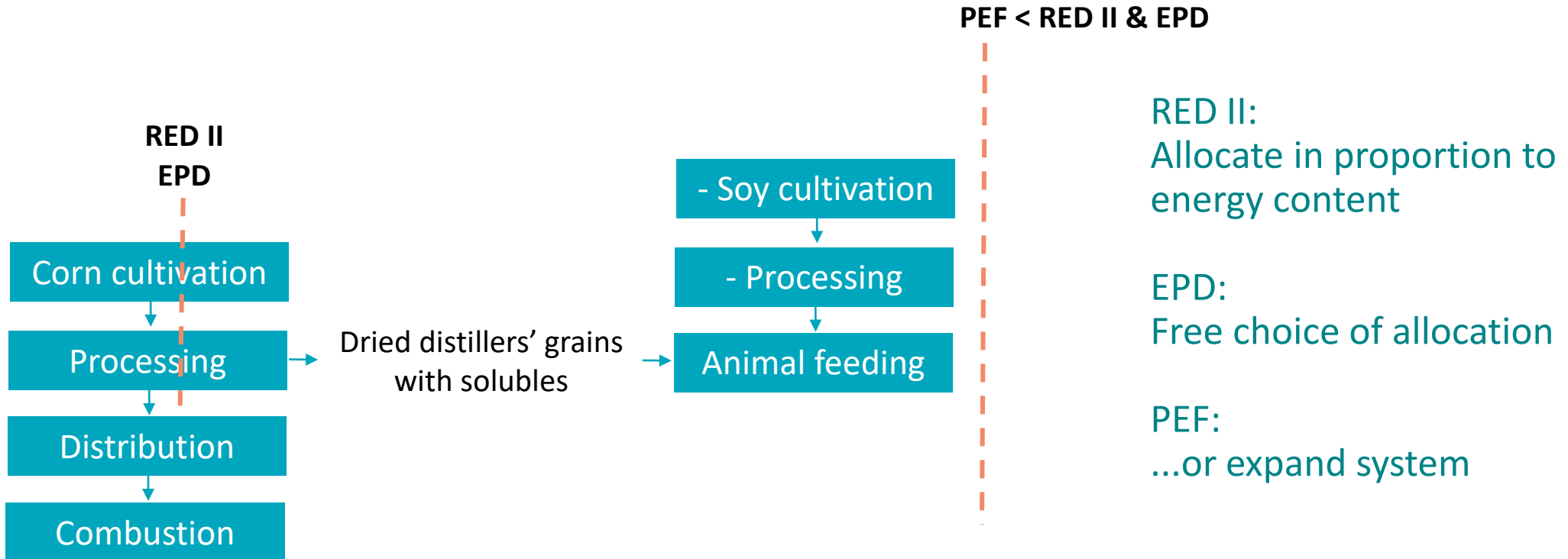


RED II:
Allocate in proportion to
energy content

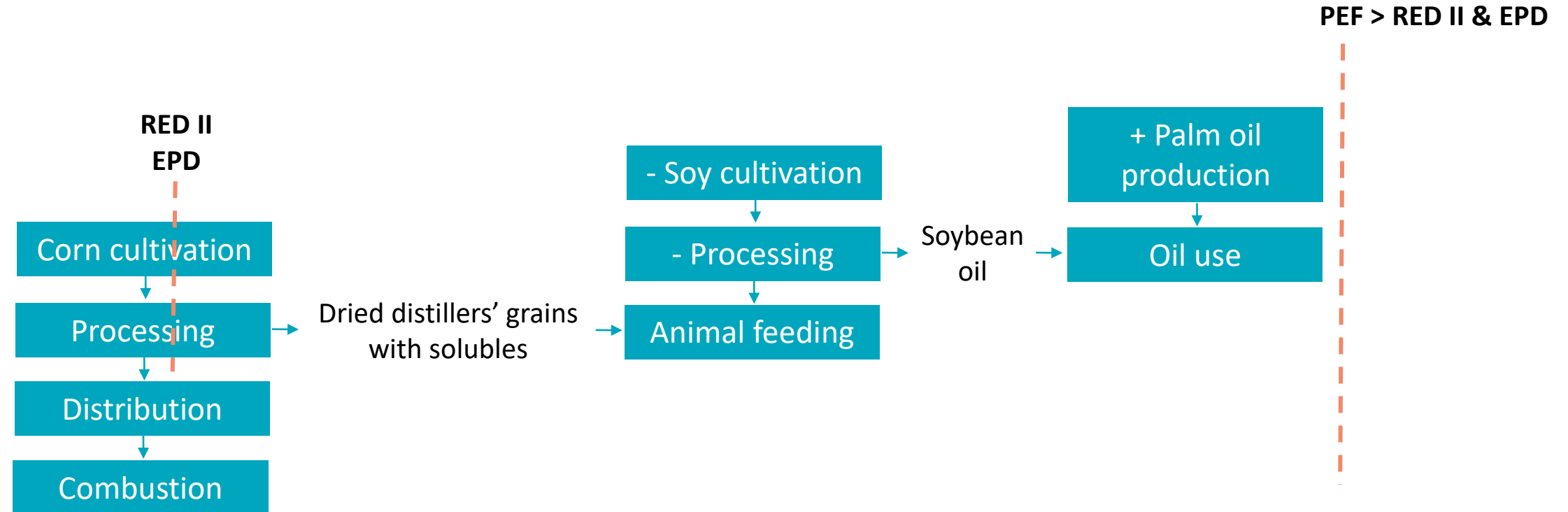
EPD:
Free choice of allocation

PEF:
Free choice of allocation...

Modelling land-use and co-products: Ethanol from corn



Modelling land-use and co-products: Ethanol from corn



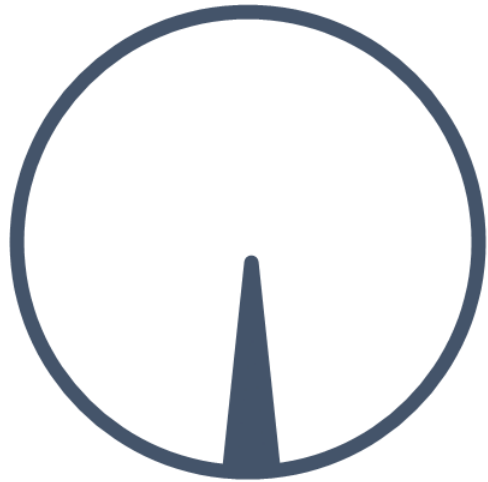
Avoid comparing results from different LCAs

- LCA is not a method

Avoid comparing results from different LCAs

- LCA is not a method
- LCA is a family of methods

Attributional and consequential LCA



What part of the global environmental burdens should be assigned to the product?

XX kg CO₂-equ.
etc.

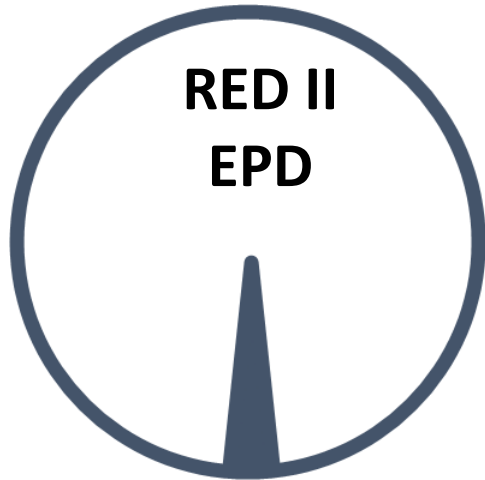
Respond to
different questions



What is the impact of the product on the global environmental burdens?

ZZ kg CO₂-equ.
etc.

Attributional and consequential LCA



What part of the global environmental burdens should be assigned to the product?

XX kg CO₂-equ.
etc.

----- PEF -----

Respond to
different questions



What is the impact of the product on the global environmental burdens?

ZZ kg CO₂-equ.
etc.

Concluding remarks

- The methods contain fundamental differences and are at different levels of development, maturity and adoption
- In certain situations, they can lead to conflicting results, thus influencing decision making processes in different directions
- Applying a framework like EPD or PEF in addition to RED II would require significant efforts
 - different rules (which were often contradicting or difficult to interpret)
 - because of additional data and reporting requirements

Recommendations

- Important that there is information and support
 - The project stresses the need for PCR and PEFCR development for renewable fuels
 - The project stresses the need for PEF and CFF specific guidelines
- Is there a need for harmonization?
- Important that actors are informed

Project members

Swedish Life Cycle Centre

Research Partners

- **IVL Swedish Environmental Research Institute (project lead)**
- **CIT Industrial Energy**
- **KTH, Royal Institute of Technology**
- **RISE Research Institutes of Sweden**
- **Tomas Ekvall, TERRA**

Industrial Partners

- **Air Liquide (Fordons Gas Sverige AB)**
- **BASF – The Chemical Company**
- **Drivkraft Sverige**
- **Lantmännen Aspen AB**
- **Nouryon**
- **NTM, Network for Transport Measures**
- **Preem AB**
- **Scandinavian Enviro Systems AB**
- **Scania CV Aktiebolag**
- **SEKAB Biofuel Industries**
- **St1 Sverige AB**
- **Volvo Technology AB**

Thank you for your attention!

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