EF methods: state of play and pLCA applications

Prospective LCA policy workshop

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pLCA matters in EF methods

Prospective LCA

- Forward-looking life cycle approach for ex ante assessment of future environmental impacts
- Serves different purposes relating to innovative technologies/processes/products (e.g., informing early design stage, project funding)
- Lack of data and high uncertainty

Recommendation (EU) 2021/2279 provides harmonised rules and data to make LCA of products (PEF) and organisations (OEF) more robust and fit-for-policies

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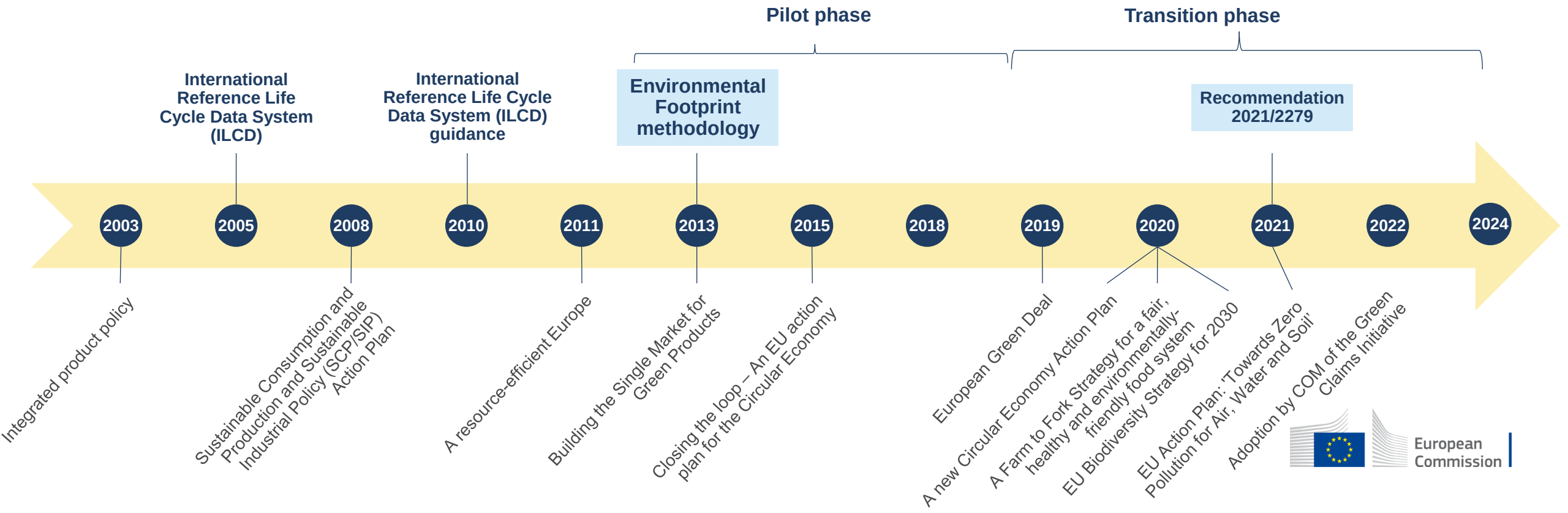
1. Communication of the environmental footprint
2. Development, implementation and evaluation of policies and initiatives
3. Analysis and reduction of environmental impacts of products and organizations, incl. also technologies and processes

The EF journey

21 PEFCR/OEFSRs
~300 organizations involved (mainly associations and large companies)
~3,000 registered participants

Developments:
- Progress / finalisation of PEFCR/OEFSRs
- Monitor and mainstream implementation
- Scientific developments & EF4.0 database
- Governance and engagement



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New PEFCRs (in 2024-2025)

1. **Aquaculture and marine fish**
2. **Apparel& Footwear**
3. **Cut Flowers and potted plants**
4. **Synthetic turf**

Updated PEFCRs/OEFSRs (in 2024-2025)

5. **Beer**
6. **Copper (OEFSR)**
7. **Dairy products**
8. **Feed for food-producing animals**
9. **Pet food**
10. Batteries

Other PEFCRs (in 2025-2026):

11. Aircrafts, drones and VTOL (EASA)
12. Space (DEFIS)
13. Tourism (GROW)

“Shadow” PEFCRs:

- Developed by industry independently from EC

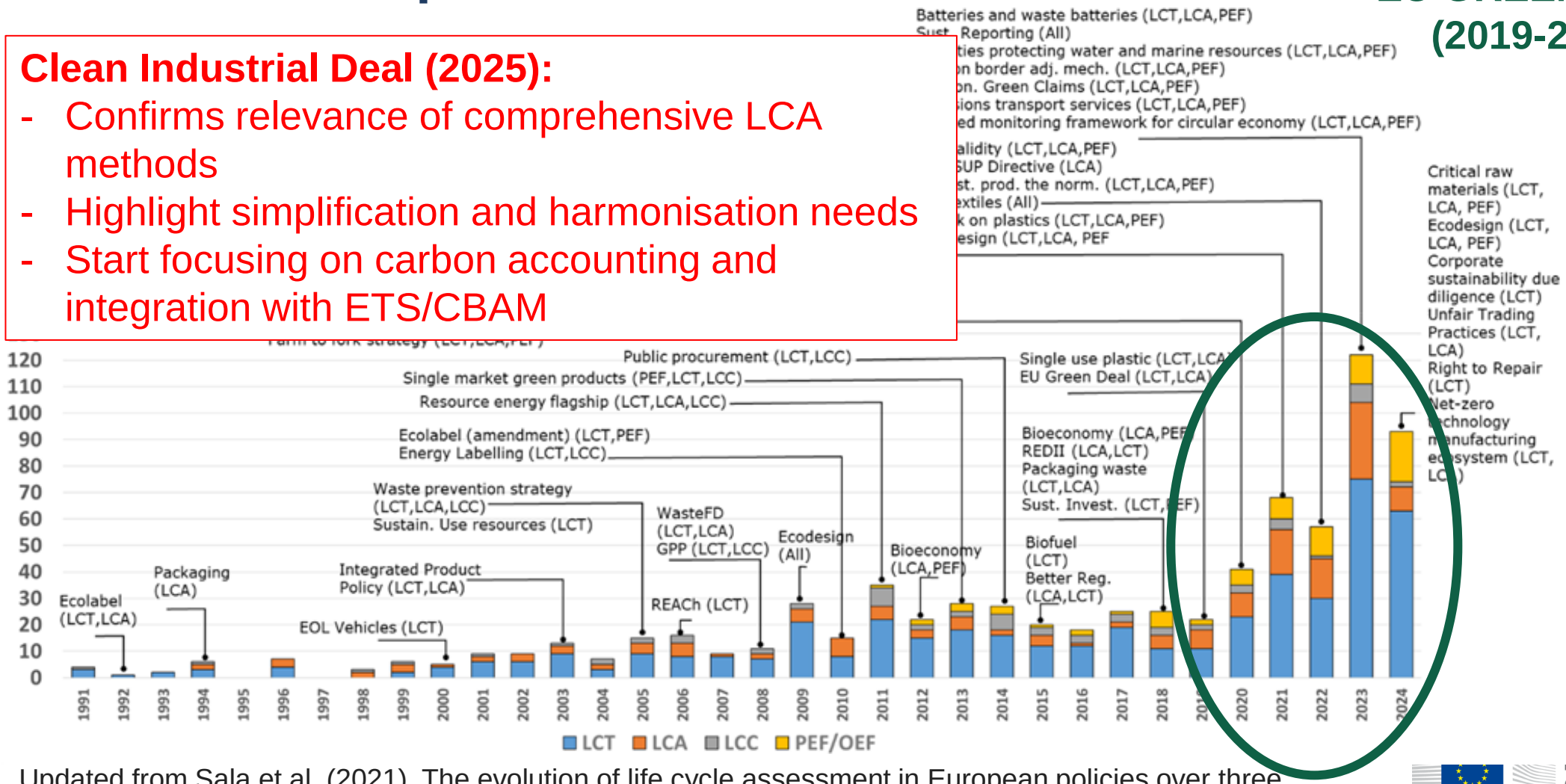
Note: complexity, data gaps and uncertainty particularly significant in some sectors, as in pLCA

LCA/LCT in EU policies

Clean Industrial Deal (2025):

- Confirms relevance of comprehensive LCA methods
- Highlight simplification and harmonisation needs
- Start focusing on carbon accounting and integration with ETS/CBAM

EU GREEN DEAL (2019-2024)



Updated from Sala et al. (2021). The evolution of life cycle assessment in European policies over three decades. *The International Journal of Life Cycle Assessment*, 26, 2295-2314.

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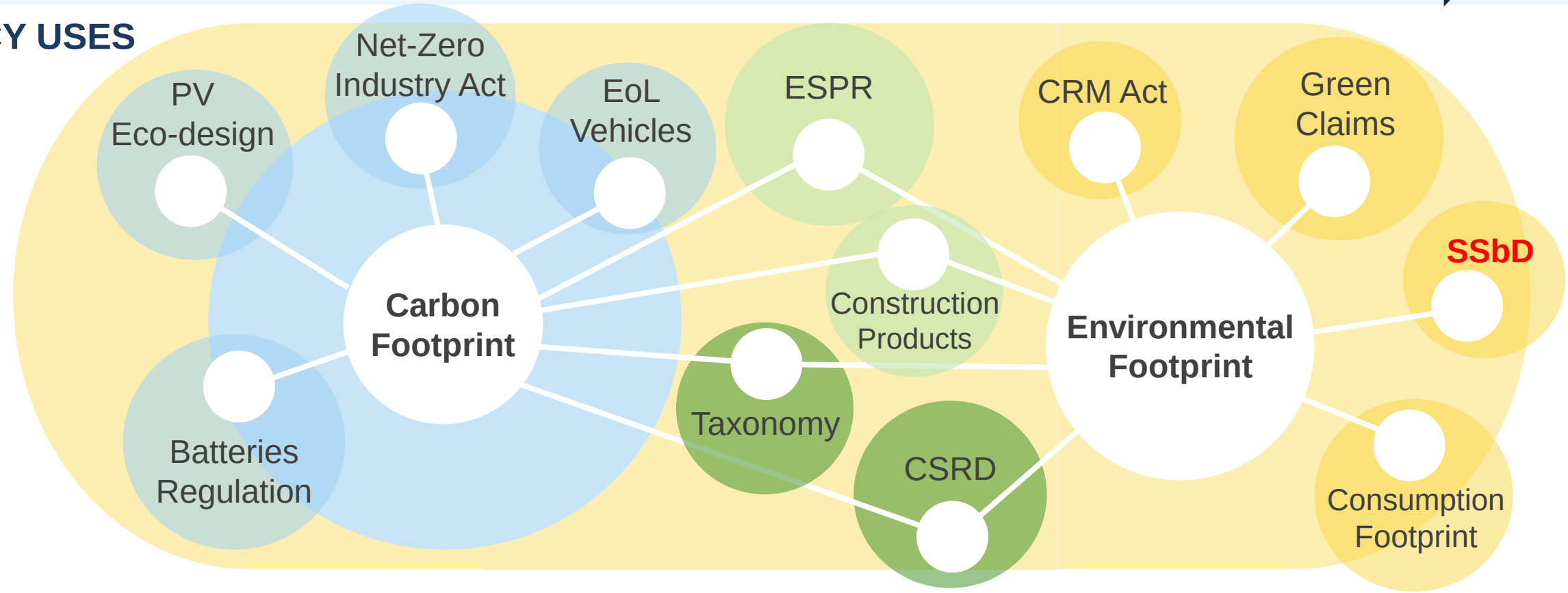
POLICY DEVELOPMENT

POLICY USES



EF-related contexts: Space PEFCR

- **High complexity and data limitations along the value chain**
  - Due to proprietary information, security concerns, or the novel nature of space technologies → identification of data needs/gaps; creation of specific datasets; **complementary assumptions and data** through research projects
- **Managing changes and uncertainties:**
  - Life span, functions and End of Life decided at design phase but unplanned events can take place during the operation of space products (e.g. collisions, solar weather, level of radiations) → **modelling and scenario analysis**
  - Design choices cannot be changed, but from design to launch can take years and there may be new data, new characterization factors, new materials that cannot be considered (in that space mission nor its LCA) → **periodic updates**

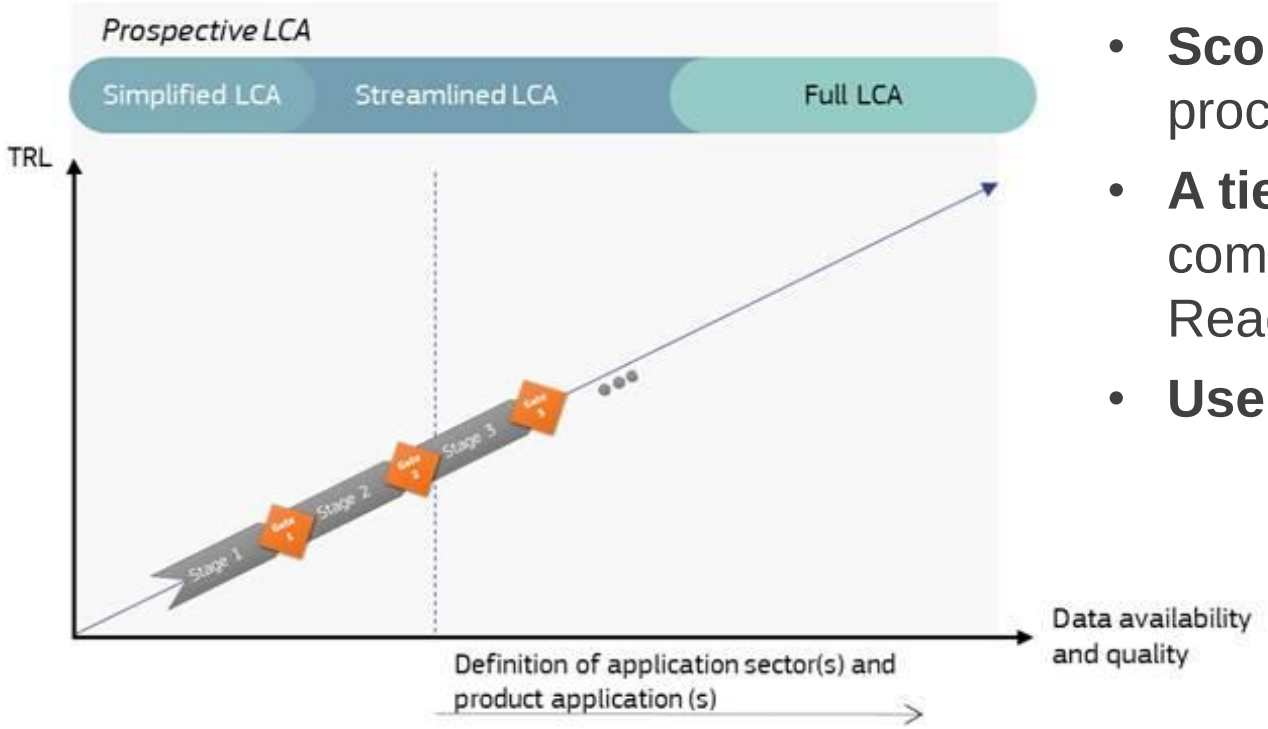
EF-related contexts: PEFCR for drones/eVTOL

- The eVTOL market does not currently exist in Europe. How can one model/demonstrate the >51% TS market coverage requirement?

Summary of development status of eVTOLs

Company	Do they have a product prototype?	Do they have a certified product in operation?	Approximate time in development
Company 1	Y	N	4+ years
Company 2	Y	N	4+ years
Company 3	N	N	unknown

EF-related contexts: SSbD framework



- **Scope:** chemical/material innovation, substitution, or process/product improvements
- **A tiered LCA** based on EF methods to increase the completeness of pLCA, according to Technology Readiness Level and availability of data
- **Use of scenarios** is essential

Abbate et al, 2024. Safe and Sustainable by Design Methodological guidance. JRC138035
Cucurachi et al, 2022. Prospective LCA methodology for Novel and Emerging Technologies for BIO-based products. JRC129632

Priorities for the future of LCA/EF methods

- Pursue policy **coherence and harmonization** (e.g. carbon footprint)
- **Methodological developments** to fulfill policy needs (e.g. Green Claims Directive proposal)
- **Streamline the implementation** (methods, data, SME support, uses)

- **Reviewed EF Recommendation** – early 2026
- **New EF4.0 database** (2026-2027)

THANK YOU!

ENV website: Environmental Footprint methods

JRC website: European Platform on LCA (EPLCA)

EF TAB: Register of Commission expert groups

Circular economy: Circular economy

Green claims: Green claims