



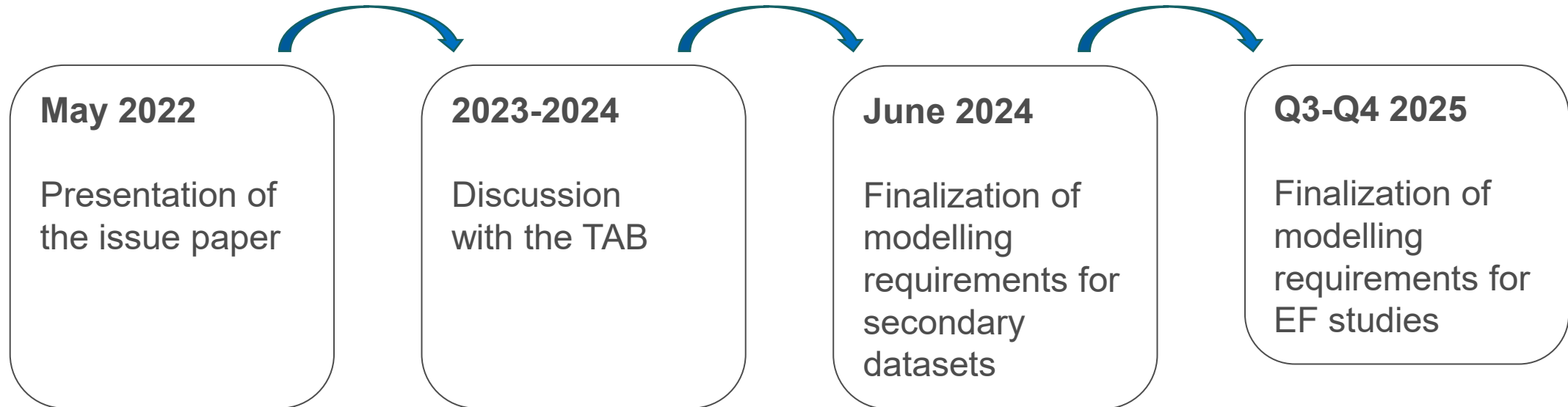
Biogenic Carbon Accounting in EF methods

TAB meeting 25 June 2025

Agenda

- ❑ Summary of stakeholders' feedback & clarifications - 5'
- ❑ Removals → waiting for the CRCF draft methodologies
- ❑ Details of the updated EF method “-1/+1 with carbon transfer” – 25'
 - ❑ How to model the “-1/+1 with carbon transfers”
 - ❑ Identification of hotspots
- ❑ Landfilling - 10'

Timeline



Other parallel ongoing initiatives:

- ❑ GHG Protocol – finalizing the GHG Protocol Land sector and removals guidance (expected for Q4 2025)
- ❑ UN biogenic carbon project – Developing a recommendation to harmonize LCA of bio-based products (by end 2025).
- ❑ **Carbon removals and carbon farming certification (CRCF)** (DG CLIMA) – Working on the draft methodologies.
- ❑ ISO14067 and ISO14064 currently under review

Outcome of previous TAB meetings

Similarly to EN15804

- ❑ **-1/+1 hybrid modelling approach** (secondary databases 0/0 and corrections in EF studies) where biogenic carbon is considered an **inherent property** of the material.
 - ❑ CO2 uptakes and biogenic emissions associated to the **carbon content** of the reference flow
 - ❑ Recycling and recycled materials: Uptake and emissions of biogenic carbon are modelled using the EN15804 biogenic carbon transfer approach
 - ❑ **Landfilling, timeframe for emissions of biogenic carbon: 100 years (as for fossil C)**
- ❑ Forest modelling: no sLUC for forestry products (as in PAS2050), **CO2 uptake considered only for non-native, regenerative forests** (as in EN15804, EN16760, EN16485, ISO21930)
- ❑ **Carbon opportunity cost**: still early to suggest a methodology, datasets should carry the “land occupation” information to allow for future integration
- ❑ **Cradle to gate** studies: allowed, but need to provide **additional information** (e.g. scenario analysis)
- ❑ **Net removals** (for temporary and permanent storage, land management change, land use change): allowed only in EF study – not in secondary datasets - and fulfilling certain methodological conditions. Further methodological rules will be defined in alignment with CRCF.

Feedback

TAB 21/03 & 16/05

- ❑ **10** TAB members sent their feedback after the TAB 16/05 and **7** after the TAB 21/03
- ❑ **Carbon accounting:** comments are always split 1/3 for the 0/0, 1/3 for the -1/+1 without carbon transfer, and 1/3 with carbon transfer.
- ❑ **EoL:** few members highlight that fossil and biogenic carbon should be treated the same for both recycling and landfilling. very diverse feedback concerning the timeframe of landfilling.
- ❑ **LUC:**
 - ❑ 4 members supported linear discounting
 - ❑ Aspects to be clarified when describing the methodology for dLUC for forestry: open questions regarding
 - ❑ Time-frame → current EF method “20 years, or a single harvest period”
 - ❑ Definition of ‘sustainably managed forests’
 - ❑ dLUC and sLUC emissions and removals for forestry → currently, no sLUC for forest products
→ Removals due to dLUC and sLUC not allowed

A quick recap



Methodological challenges in the background

- Anthropogenic vs natural carbon flows
- Managed forests vs un-management forests
- Reference year for forests (e.g., ISO 14067 provides five different options for reference land use)
- Attribution of CO₂ that is absorbed by forests to the harvesting wood - Forests grow without human intervention
- (generic) Adaptation of national data to product LCA.
- Forest modelling and wood climate neutrality is a topic under discussion in several other contexts (e.g., IPCC, GHG Protocol, FLAG) and JRC will continue following the scientific discussions.

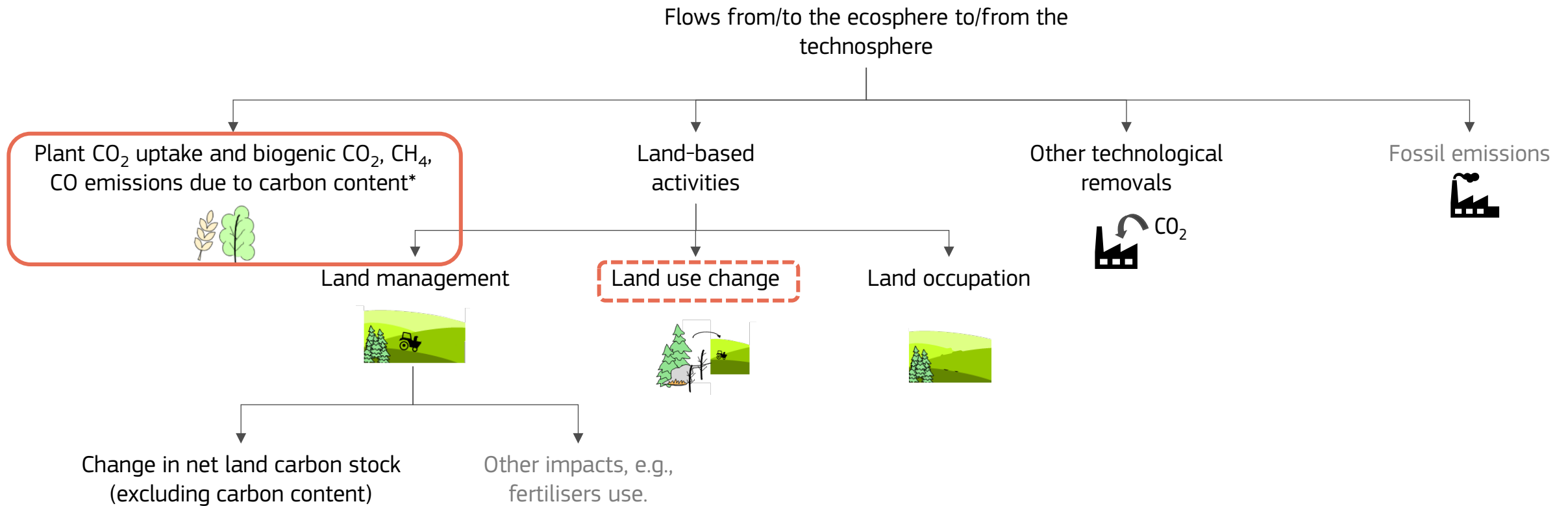
Identification of hotspots

(EF method, section 6.3)

“The user of the PEF method shall identify and list in the PEF report (together with the %) the most relevant:

1. Impact categories
2. Life-cycle stages
3. Processes
4. Elementary flows.”

Biogenic carbon modelling in EF: scope



* Still to be decided if it is due to the product content or also packaging content

How to model the ‘-1/+1 with carbon transfer’

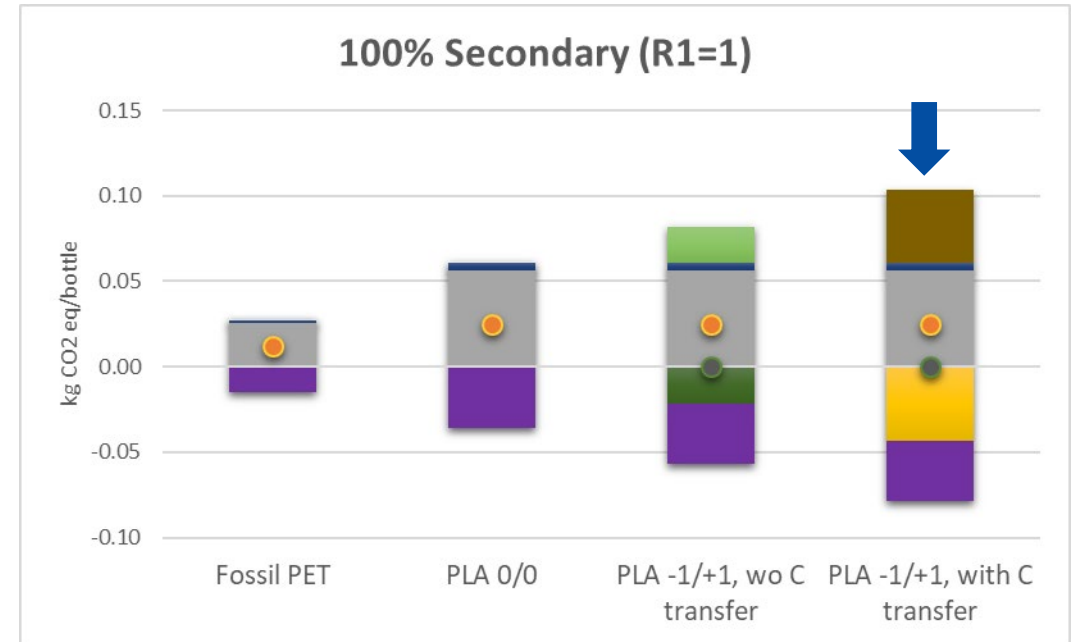
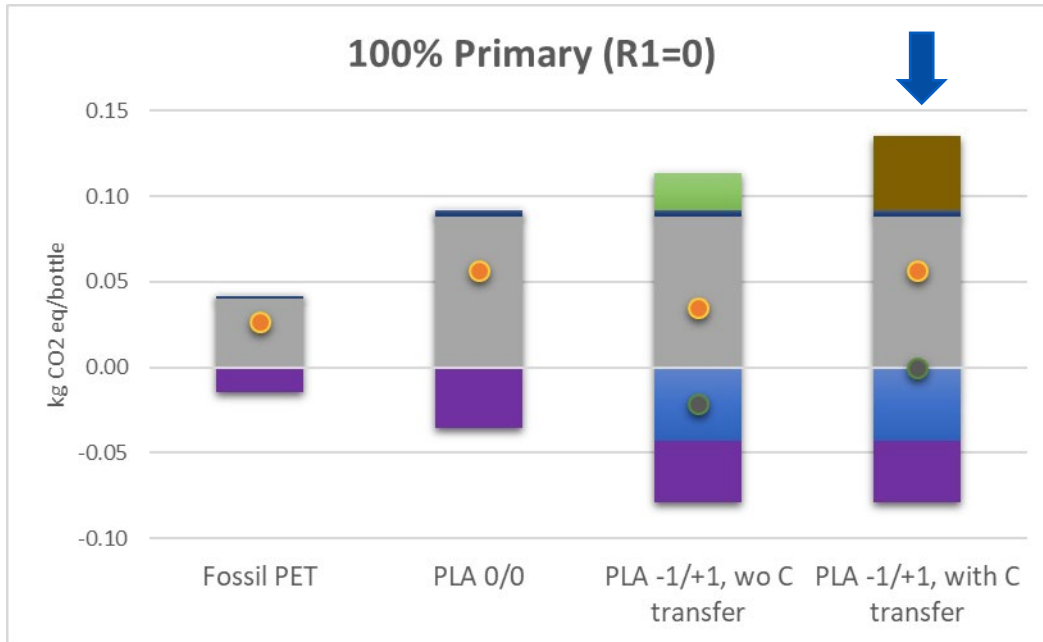
Table 7 Example for illustrating the calculation of GWP-biogenic results (unit is CO₂ equivalents).

		A1-A2	A3	C1-C2	C3	Sum A-C	Comment
Row 1	GWP-biogenic (CO, CH ₄ etc.)	2	1	0.5	2	5.5	Result from LCA tool
Row 2	GWP-biogenic (CO ₂ for non-product/packaging content)	0	0.200	0.5	0	0.205	Result from LCA tool
Row 3	GWP-biogenic (product or packaging content as CO ₂)	-715			715		Manually added
Row 4	GWP-biogenic (as reported in the EPD) ³⁹	-713	1	0.5	717	5.5	Calculated

EPD International - PCR 2019.14 - Construction products -
<https://api.environdec.com/api/v1/EPDLibrary/Files/fe17e14b-3ff4-4ab3-07a6-08dc685f3598/Data>

	Inside the LCA software	Outside the LCA software
	<ul style="list-style-type: none"> ❑ Inside the LCA tool: using dedicated elementary flows and CFs 	<ul style="list-style-type: none"> ❑ In addition to the results of the LCA software (as in the EPD)
Pros	<ul style="list-style-type: none"> ❑ Integrated in the LCA tool. 	<ul style="list-style-type: none"> ❑ It avoids the problem of allocation ❑ It allows the reviewer to verify the carbon balance more easily.
Cons	<ul style="list-style-type: none"> ❑ Risk of distorting the carbon balance due to allocation ❑ Less transparent calculation for the reviewer 	<ul style="list-style-type: none"> ❑ Extra burden of practitioners. ❑ Unclear how to calculate the hotspot analysis (next slides). ❑ More challenging for the correction of CH₄ emissions

Case study – plastic bottle R2=100%



- Production
- Carbon uptake
- Virtual uptake
- Recycling carbon credit
- EoL - emissions
- EoL - replaced material
- EoL - recycling credit
- Virtual emissions
- TOT
- Biogenic carbon balance

Hotspot analysis

	Current EF method	Suggested addition
6.3.1 Most-relevant impact categories	“The identification of the most-relevant impact categories shall be based on the normalised and weighted results. The most-relevant impact categories shall be identified as all of those impact categories that together contribute to at least 80% of the single overall score”	<ul style="list-style-type: none"> <input type="checkbox"/> Cradle-to-grave: ‘-1/+1 with carbon transfer’ = ‘0/0’ <input type="checkbox"/> Cradle-to-gate: if climate change is a most-relevant impact category, both most-relevant impact categories when accounting and without accounting for the carbon uptake shall be identified.
6.3.2 Most-relevant life-cycle stages	“The most-relevant life-cycle stages are those that together contribute more than 80% to any of the most-relevant impact categories identified.”	<ul style="list-style-type: none"> <input type="checkbox"/> Climate change: the most relevant life cycle stages shall be identified both with and without accounting biogenic carbon.

Hotspot analysis (2)

	Current EF method	Suggested addition
6.3.3 Most-relevant processes	“The most-relevant processes are those that together contribute more than 80% to any of the most-relevant impact categories identified. [...] This analysis shall be reported separately for each most-relevant impact category.”	If climate change is a most-relevant impact category when accounting for the biogenic carbon, both most-relevant impact categories when accounting and without accounting for the carbon uptake shall be identified.
6.3.4 Most-relevant elementary flows	“The most-relevant elementary flows are defined as those elementary flows that together contribute at least 80% to the total impact of each most-relevant specific impact category for each most-relevant process , starting from those that contribute the most to those that contribute the least. This analysis shall be reported separately for each most relevant impact category.”	If the flows of CO2 uptakes and biogenic CO2 emissions are most-relevant elementary flows, both most-relevant elementary flows when accounting and without accounting for the carbon uptake / and the biogenic CO2 emissions shall be identified.

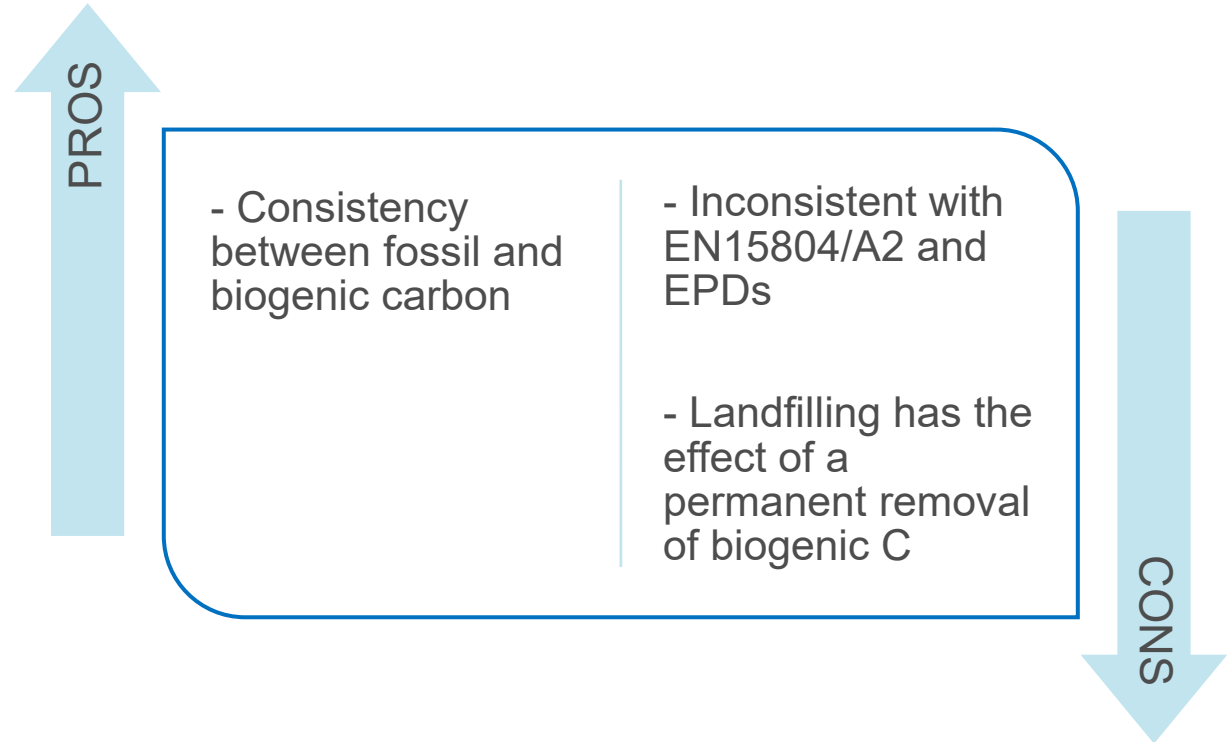
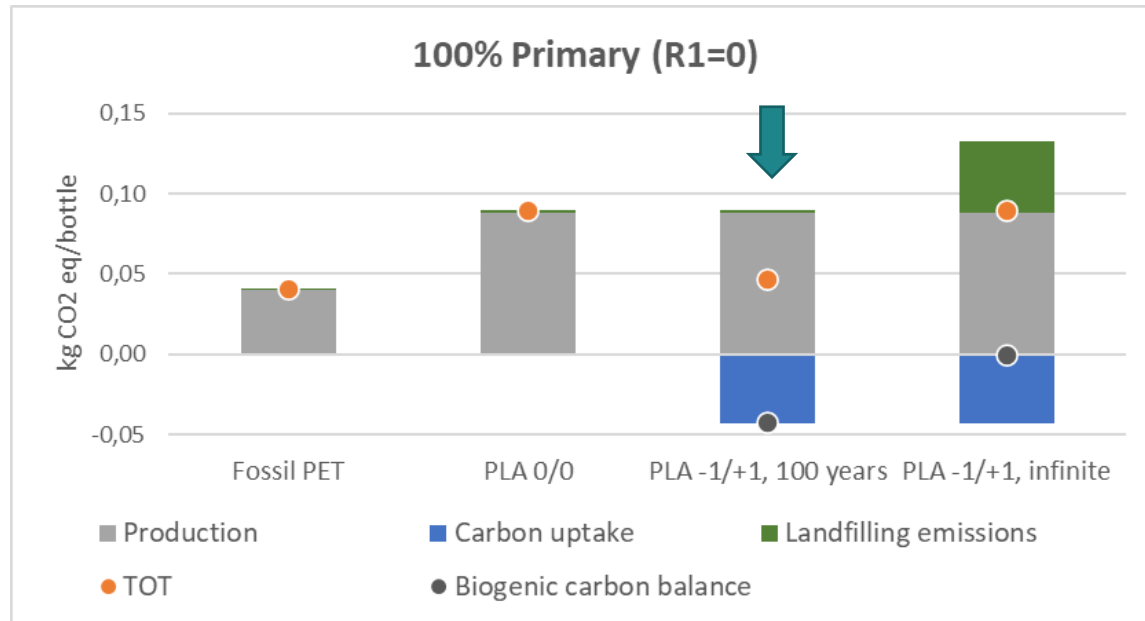
Discussion 1 – Hotspots

- Would you calculate any ‘-1/+1 with C transfer’ corrections in models developed in LCA software or externally (e.g., EF studies)? (JRC has a preference with the latter option)
- Do you agree with our proposals (in slides #11 and #12) that the hotspots should be identified both including and excluding the flows of biogenic carbon?

Landfilling

Landfilling of biogenic C

Timeframe 100 years or infinite?



Discussion 2 – Landfilling

- Which timeframe would you consider as cutoff for the emissions from landfill?
- Would you change the elementary flows “Resource from ground of “carbon dioxide, fossil”/biogenic, stored in landfill” with “Emissions to air: carbon dioxide, fossil/biogenic, long-term emissions”? Do you have any additional comments on the **elementary flows** to be used to model carbon in the landfilling?
- Would you consider other elementary flows for the long-term emissions (e.g., CH₄)?

Thank you



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