

### Comparison of PCF tools

Stage	Considerations for comparison	Collaborative PCF calculation with TACK		Own PCF calculation with an alternative tool*	
		Impact on costs/effort	Comment	Impact on costs/effort	Comment
Implementation	Implementation of a PCF methodology	● Methodology developed with contribution by Afera & IVK members	The tool is based on a <b>validated calculation model</b> based on ISO standard 14067:2018: 'Greenhouse Gases – Carbon Footprint of Products' through an expansion of the Together for Sustainability (TfS) PCF Guideline. The development of TACK was funded with the <b>PCF development fee</b> paid by Afera members.	● Significant effort required with expert LCA knowledge	Model will need to be developed by <b>in-house experts or LCA consultants</b> , and the methodology (model) will need additional validation (see <i>Validation of the tool</i> below).
	Software installation	● No installation necessary	It is a <b>web-based</b> interface which could be (optionally, additionally) linked to corporate ERP systems.	● Might require IT effort to set up	In the cases of readily available tools (e.g., Excel), no additional effort. Other tools/databases might require <b>installation and maintenance locally</b> , which in some cases could involve large file transfers and require IT support to maintain.
	Validation of the tool	● Tool will be third-party validated	DEKRA will perform the validation of the methodology, documentation and training requirements.	● Additional cost to be considered	Validation of a system to calculate PCF could reduce the verification effort (see <i>Third-party verification of PCF calculation</i> below).
Usage	Expertise needed to use the tool	● No LCA expertise needed; short training provided	Non-LCA experts can work with the <b>pre-customised, web-based</b> tool following a short training session on using the intuitive system.	● Additional training could be needed	Depending on the sophistication of the tool, a <b>high degree of LCA expertise</b> may potentially be needed to use it reliably.
	Licenses/access to the software	● Purchase of a license is required	A company license to access the <b>Sphera LCA Calculator</b> is necessary. Companies with pre-existing licenses to Sphera LCA software will benefit from discounted rates.	● Depends on the selected tool	Some free tools exist (e.g., Open LCA), while many others are commercial with <b>variable license costs</b> . It is likely that there is already a license for commercial spreadsheet software in-house.
	Use of primary data (from suppliers) in calculations	● Possible; preferred option if available	If primary data for raw materials is available, it can be <b>inputted into TACK for use in calculation</b> ; otherwise secondary data can be relied upon.	● Likely possible, but limited	If allowed by the tool, primary data can generally be used and could be freely available (e.g. from a supplier), but it is not <i>always</i> available, so it <b>cannot be relied upon exclusively</b> . Access to secondary data is necessary.
	Use of secondary data in calculations	● Possible; purchase of a license is required	The tool provides <b>access to a high-quality-curated database</b> : An adhesive module contains data on chemical raw materials for adhesives. The tape module contains the materials used in tape manufacturing. TACK's secondary dataset has been curated from Sphera's LCA database in a collaborative effort between Afera and IVK members.	● Depends on the database used	<b>Free database</b> - Expert knowledge required to judge the quality of the data. You could rely on primary data from suppliers, but this is not widely available. <b>Commercial database</b> - Several databases are available for purchase, but the right information needs to be selected within it. <b>Tailored database</b> - It is likely that existing datasets are insufficient, and proxies need to be identified, or new datasets need to be developed. Experts are needed to create new estimations based on literature or expertise. Furthermore, filtering the vast available data is necessary to avoid getting lost in the possibilities. The trade-off of skipping this cost can decrease the quality and transparency of the outcome (difficult for SMEs).
	Data security	● End-to-end encryption, servers in EU	Data is only accessible using <b>company-specific login credentials</b> . Data is <b>encrypted during transit and stored encrypted</b> in a database. Cloud servers will always be <b>located in the EU</b> .	● Depends on implementation and user behaviour	Security can be highly <b>dependent upon the specific implementation</b> and the <b>behaviour of users</b> . Risks of disclosure need to be properly mitigated with user instruction and policies.
	Time to obtain results	● Fast	Calculations are run on a cloud server; with an optimised model; and are available <b>within minutes</b> of clicking the "Calculate" button	● Variable depending on tool used	Depending on the tool used, calculation time can vary <b>from immediate to several hours</b> in the case of a non-optimised complex LCA model
Output	Third-party verification of PCF calculation	● Available with limited effort required	TACK has already been validated, so verification is limited to user input. A third party can verify calculation results with relative ease.	● Likely to require significant effort	The amount of effort required for a verifier will be <b>linked to the validation performed</b> (see <i>Validation of the tool</i> above). If no validation has been performed, the <b>effort could be significant</b> : verifying the methodology used by the free tool, the methodology used by providers of primary data, calculated PCF values, etc....
	Quality of results	● High quality	<b>State-of-the-art quality of results</b> . In collaboration with external expert consultants and active members from Afera and IVK, the tool will provide a balanced and transparent win-win among the meticulousness of the data selection, the selected standard and the alignment of the results across the industry.	● Depends on the quality of the underlying data and methodology	The quality of the value will depend on the input and quality of the data, tool and selected methodology. The higher the precision of the data, the significantly higher costs will be.
	Reporting	● Detailed and transparent report	Developed from collaborative feedback, the TACK-issued report includes necessary <b>background information</b> on the methodology used and the <b>results</b> presented in useable form. The report provides a <b>summary for external dissemination</b> and detailed insights for internal and R&D purposes. <b>Disclaimers and instructions</b> are included to guide readers on proper use of the information.	● May require additional effort	A detailed, custom-made report may need to be created from scratch or drafted individually, increasing time and effort.
Maintenance	Maintenance and update of the database	● Paid, but costs shared among Afera and IVK members	The LCA database can be periodically updated and reviewed by Sphera depending on the needs; New data will be incorporated into TACK during periodic updates. Data is third-party verified.	● Depends on the database used	It depends on how frequently the underlying data is updated and made available. New data must also be verified.
	Maintenance and update of the tool	● Paid, but costs shared among Afera and IVK members	Sphera takes care of <b>periodic maintenance and updates</b> (e.g. for the implementation of new features) of the tool. Sharing costs among all members makes it cost-effective and feasible to implement new features on a routine basis.	● Individually responsible for costs	Additional resources may be needed for in-house or outsource support, especially to implement new features.
Transparency	Alignment of methodology for PCF	● Transparent, reliable and accurate values available across the supply chain	A <b>common methodology</b> across the sector increases the reliability of data provided to downstream users for the complete industry	● Unclear to customers how to interpret results from various suppliers	While PCF data on own products may become available, <b>questions will arise from customers/end-users</b> about how this would compare to methodologies used by others.

\*Examples: Excel spreadsheet, Open LCA, or other commercial LCA tools

Legend
● No or low effort/costs involved
● Unknown/variable additional effort/costs involved
● High effort involved