ECFD
European Confederation of Fuel Distributors

# POSITION PAPER

# Life cycle analysis should be the regulatory standard for $CO_2$ accounting of vehicles

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## Current regulation ignores the real climate impact of vehicles

The climate-friendly effect of drive trains and vehicles depends on a number of factors such as the $CO_2$ intensity of the underlying electricity mix used as drive energy for battery electric vehicles, the $CO_2$ emitted during the production of vehicle components (especially battery production) or the proportion of $CO_2$-neutral fuels when used in combustion engines.

The regulation currently in force at European and therefore national level does take into account the emissions resulting from the use of a vehicle, however, excludes all other $CO_2$ emissions. The so-called Tank to Wheel (TTW) approach solely considers the tailpipe emissions of a vehicle.

The historical development of legislation with regards to the fuel efficiency of vehicles harbors the reason for the focus of today's regulation. Via efficiency specifications, the endeavor strove for less and less usage of fuel (in the tank), while achieving the same performance (movement at the wheel). Due to reasoning of climate protection these efficiency specifications transformed into $CO_2$-balance sheet analysis, without declaring the sole reflection of the tailpipe emissions as insufficient. Meanwhile, the EU-Commission ignores and disregards even demands of the European Parliament[1] to implement a holistic contemplation of $CO_2$ a vehicle emits during its lifetime.

Already in 2003, the German Federal Environment Agency (UBA) noted critically, that an assessment of so-called zero emission vehicles on the basis of their direct $CO_2$ emissions is neither meaningful nor conclusive, while mixed concepts such as plug-in hybrids as well can only be declared as insufficient. Thus, a paradigm shift from an output evaluation focusing on emissions towards an input evaluation considering energy is necessary [2].

Within the amended Regulation (EU) 2019/631, the EU-Commission has been urged to design a unionwide method until 2025 to evaluate $CO_2$ emissions of new cars and vans during their life cycle[3]. This would include the used fuel as well as the energy usage.

## Why a life cycle analysis is necessary for climate policy

Such a life cycle assessment (abbreviation: LCA) enables for the holistic evaluation of a vehicles' $CO_2$ emissions. This form of $CO_2$-analysis is already used in different environmental balance sheets of other products. Since $CO_2$ has a global

1 Regulation (EU) 2019/631, Recital 50: „It is important to assess the full life-cycle emissions from passenger cars and light commercial vehicles at Union level. To that end, the Commission should no later than 2023 evaluate the possibility of developing a common Union methodology for the assessment and the consistent data reporting of the full life-cycle $CO_2$ emissions of such vehicles placed on the Union market. The Commission should adopt follow-up measures, including, where appropriate, legislative proposals."

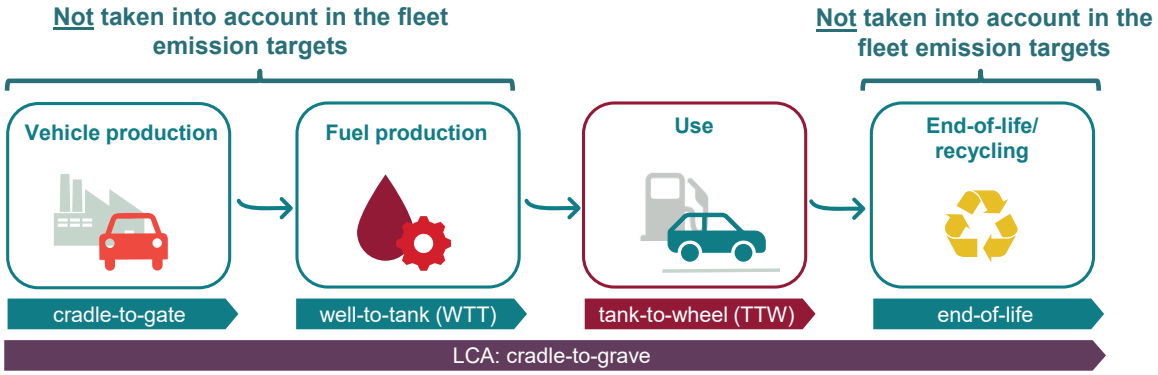
2 https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/texte_95_2013_konzept_zur_zukuenftigen_beurteilung_der_effizienz_von_kraftfahrzeugen.pdf

3 Regulation (EU) 2023/851, https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:32023R0851

effect independent from its origin, it is decisive to consider the $CO_2$ emissions of all products. A shortened or consciously one-sided evaluation rather hinders true progression in climate protection.

By summing up all the $CO_2$ emissions of a vehicle the life cycle analysis enables for a realistic assessment of climate protective characteristics of an engine. A recent study by Frontier Economics depicts these findings :

## Figure 3 $CO_2$ emissions throughout the life cycle




*Source:* *Frontier Economics*

*Note:* *Additional $CO_2$ emissions for the construction and maintenance of the infrastructure are not taken into account here. For example, for battery electric vehicles further emissions incur in the market launch phase for building up the charging infrastructure.*

- Vehicle production („cradle-to-gate"): This includes all $CO_2$ emissions generated during the manufacturing of components for the various drive systems, the bodywork and other vehicle components such as the equipment of the vehicles (including batteries for battery electric vehicles).

- Energy supply („well-to-tank"): The $CO_2$ emissions from the provision of the required fuel or charging current, including the upstream chains.

- Infrastructure provision: Depending on the type of drive train or fuel, additional infrastructure is required. Infrastructure (e.g., charging station infrastructure, development of synthesis capacities for the Production of synthetic liquid fuels etc.)

- vehicle use („tank-to-wheel"): This includes all $CO_2$ emissions generated during the emissions, primarily the so-called tailpipe emissions.

- Disposal or recycling („end-of-life"): The disposal, dismantling or recycling at the end of a vehicle's life may emit $CO_2$ emissions (e.g., also through the use of electricity if it is not yet generated 100% from renewable energies).

The advantage of the LCA methodology lies in a more accurate and more realistic depiction of $CO_2$ emission balances of vehicles, while hidden $CO_2$ emissions outside the EU are more visible. Currently due to the Tank-to-wheel (TTW) approach, battery or fuel cell based electric vehicles are considered zero-emission-vehicles, while disregarding whether the origin of electricity used is fossil or renewable, or whether the battery is produced emission intensive. Under the TTW however, vehicles with internal combustion engines will always have a net value of $CO_2$ emissions, even if the vehicle is powered by fuels such as improved biofuels that emit less $CO_2$ or $CO_2$-neutral fuels such as E-fuels.

Additionally, the life cycle analysis can prevent that technologies are falsely chosen, that could generally increase the amount of $CO_2$ emitted. Frontier Economics thus concludes that "choosing an LCA approach to determine $CO_2$ emissions of products and technologies is therefore consistent with the scientific state-of-the-art and is to be classified as appropriate to evaluate the climate impact"[4]

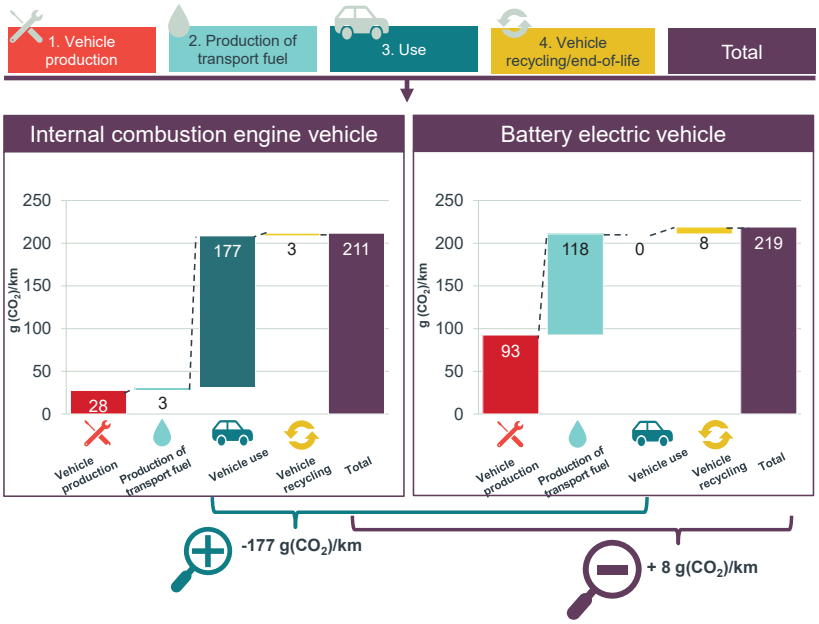
## Vehicle emissions through LCA in comparison

An exemplary calculation of the $CO_2$ balance of two types of vehicle drive (in this case passenger cars) in the Frontier Economics study reveals two crucial facts:

1. The advantageousness of a drive train with regard to the climate impact of a drive technology depends on the individual case. No technology solution is per se the most advantageous, instead it depends heavily on certain factors, such as the $CO_2$ footprint of production, the size of the vehicle or its service life. Depending on the case, this means that a vehicle with a battery-electric drive or with an internal combustion engine has proven to be more advantageous in terms of $CO_2$ life cycle emissions.

2. The life cycle analysis clearly shows that „zero-emission vehicles" such as battery-powered electric vehicles have a significant $CO_2$ footprint, which in the current regulation is not taken into account. Depending on the vehicle, this balance can even exceed the $CO_2$ life cycle assessment of a combustion engine, as the following calculation shows :

**Figure 4** **Illustration: Contrasting life-cycle $CO_2$ emissions of ICEVs and BEVs (example calculation)**




4 Frontier Economics (2023): Need for a life-cycle assessment in fleet emission targets

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## UNITI's demands:

As co-legislators, European politicians and the German government are now called upon to carry through the demand to implement a LCA methodology and to ensure a realistic evaluation of $CO_2$ emissions of vehicles as soon as possible. A fitting method therefore is the life cycle analysis.

Even for legal reasons is a systematic and holistic analysis of potential effects on the environment and the energy balance of products necessary. Changes of the Regulation (EU) 2023/851 and its underlying tailpipe approach resembles a de facto prohibition of internal combustion engines and at the same time for sustainable, $CO_2$-neutral fuels. Such regulation stands in contradiction with the declared goals in RED II and RED III of finding a technological neutral solution by using equitable technologies (see recital 85 in RED II and Recital 29 in RED III). Additionally, the current design of the regulation is legally questionable and possibly unlawful.

A realistic evaluation of $CO_2$-emissions should replace the current zero emission approach in other regulations such as the Regulation of $CO_2$ emission standards for heavy duty vehicles, the EU Vignette Directive or the taxonomy of sustainable financing. Otherwise there is a risk of achieving climate protection targets through (legally) questionable regulatory based one-sided technology preferences, which, depending on the origin, have worse climate protection balance than other technology options.

## The European Confederation of Fuel Distributors

ECFD is the voice of of more than 10,000 distributors of liquid fuels in the EU member states, bringing their competence to the EU level. With an average share of 60 % of filling stations being family-owned members operate mainly independently from major energy companies. ECFD members maintain and secure a reliable supply of conventional fuels, biofuels, LPG and CNG to customers across Europe. In addition, ECFD is actively engaged in the low-carbon energy transition via renewable fuel for the mobility and heating sector. Our members supply sustainable conventional and advanced biofuels and are committed to the rapid market take-off of synthetic powerbased fuels in order to achieve the European climate protectiontargets. Our members own convenience retail outlets and motorway service areas and provide a range of high qualityproducts and services to European consumers. They also manage and supply fuels used in non-road areas like agricultural machinery, shipping and public sector works.

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- Improved air quality, thanks to cleaner fuels with reduced sulphur content
- Higher energy savings, thanks to well-proven and mature technology
- Affordable solutions for vulnerable consumers, thanks to the low cost of upgrading to more energy efficient heating systems and alternative clean mobility solutions.

ECFD – THE EUROPEAN CONFEDERATION OF FUEL DISTRIBUTORS
Secretary General: RA Elmar Kühn, direct line: +49 (0)30 755 414-350, mobile: +49 (0)160 462 12 83,
mail: kuehn@uniti.de / ECFD AISBL, Rue Léon Lepage 4, B-1000 Bruxelles, Belgium, T. +32 (0)2 502 42 00
www.fuel-distributors.eu, info@ecfd.eu