

POSITION PAPER

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NEW ELV DIRECTIVE: CONSIDERATIONS FROM THE COMPOSITES VALUE CHAIN PERSPECTIVE

The European Composites Industry Association (EuCIA) welcomes the new ELV Directive's objective to improve circularity in the automotive industry. We believe however that the benefits of composite materials and their positive impact in improving vehicle sustainability should be recognised and balanced with current challenges related to their waste management.

Composites and the automotive industry

Fibre reinforced polymer composite materials (referred here as “composites”) combine fibre reinforcements (glass, carbon, natural fibre) and a polymer matrix. The strong adhesion of the fibres to the matrix results in the exceptional mechanical properties of composites. Thermoset polymer-based composites are employed in parts such as exterior body panels, internal structures, leaf springs, pressure vessels (for natural gas and future novel clean trucks using H₂ storage), lightweight battery cases, and thermoplastic polymer-based composites in parts such as intake manifolds, dashboards, and semi-structural applications.

The automotive industry has benefited for decades from the combination of exceptional mechanical properties and lightweighting of composites.. Specifically, composite parts reduce vehicle weight and provide design freedom (optimised car aerodynamics, functional integration), leading to reduced fuel usage and CO₂ emissions, and cost efficiency in medium and small car/truck manufacturing series. They deliver reliable performance and minimal maintenance cost.

Renouncing the benefits of composite materials by returning to the traditional materials would be in contradiction of the EU Green Deal objectives and potentially make cars heavier and less efficient. The rapidly growing electric vehicle market has an even greater demand for lightweight composite materials, where they offset battery weight and extend driving range, and provide electrical insulation properties.

The global market for composites in transportation has increased from 2.3 Mt in 2010 to 2.8 Mt in 2021, and it is expected to further grow to 3.7 Mt in 2027¹ making transportation one of the main market segments for composites. These increasing volumes call for an adaptation of the waste management schemes for the end-of-life treatment of vehicles in Europe and the setting up of systems to dismantle, collect, reuse, repurpose and recycle composites.

Composites are circular materials

EuCIA believes that composites are circular materials because at the end of their service life reuse is possible both through closed loop and open loop processes. Solutions for end-of-life

¹ JEC Observer: Overview of the global composites market 2022-2027: www.jeccomposites.com

composites are available, such as cement co-processing and mechanical recycling, but need further scale up and proliferation throughout Europe. New technologies (pyrolysis, solvolysis, and others) are in development and are currently being validated in terms of economic and environmental sustainability.

Composites are used in many more applications than those listed for mandatory removal in the Directive. EuCIA strongly believes that this list needs to be extended to cover all relevant composite parts for reuse and/or to avoid contamination for recycling. Moreover, we recommend the proposal to be revised to include information on the composites recycling technologies available today.

Furthermore, future proof legislation needs to consider recycling technologies under development for composite parts, in particular for closed loop recycling². The "closed loop" part of the regulation however leads to an unnecessary restriction of the automotive industry and hinders the use of composites as high-performance lightweight construction material.

In addition, EuCIA echoes the recommendations outlined by Glass Fibre Europe (GFE) in their position paper on the proposed ELV Directive³. (See the Annex for an overview of the main concerns and recommendations.)

Clarifications regarding composite materials

EuCIA believes that some areas of the new ELV Directive draft need further consideration to avoid potential misunderstandings regarding composite materials. The following passages are of particular concern:

- The ELV directive proposal (page 1) cites “...*the increasing use of sophisticated and composite materials poses particular challenges for dismantling, reusing and recycling end-of-life vehicles*”.
- Article 21 of the ELV directive proposal: Fee modulation cites “*In the case of a collective fulfilment of extended producer responsibility obligations, producer responsibility organisations shall ensure that the financial contributions paid to them by producers are modulated by taking into account... (e) the share of materials and substances preventing a high-quality recycling process, such as adhesives, composite plastics, or carbon-reinforced materials;*”
- Annex IV of the circularity strategy-Part A - point 5 (d) of the ELV directive proposal cites “...*measures to address the challenges posed by the use of materials and techniques which hamper easy dismantling or make recycling very challenging, for example adhesives or fibre-reinforced materials*”.
- Annex IV of the circularity strategy-Part B - point 3 (c) of the ELV directive proposal cites “...*the adoption of design features to address the challenges posed by the use of materials and techniques which hamper easy removal or make recycling very challenging, for example adhesives, composite plastics or fibre-reinforced materials;*”.

² <https://publications.jrc.ec.europa.eu/repository/handle/JRC131531>

³ The End-of-Life of Vehicles Regulation and GFR Composite Parts, Glass Fibre Europe, October 2023: <https://glassfibreeurope.eu/the-end-of-life-of-vehicles-and-gfr-composites/>

We would like to provide a few clarifications that might be helpful to the EU Commission in adjusting their approach:

- As stated in the Directive, **composite materials are essential for the lightweighting of vehicles:** In the case of electric powered vehicles, they make it possible to counterbalance the additional weight of the batteries or extend driving range. In the case of hydrogen powered vehicles, they are essential for the safe storage of the compressed gases.
- **Composites are not in any way more “difficult” to recycle than any other materials:** Like metals and ceramics, they require specific technologies and these already exist and are becoming part of the economic system of the Union⁴. The available recycling approaches range from mechanical grinding to produce fillers for plastics to advanced fibre-matrix separation techniques to retrieve individual constituents to produce new high-performance parts. Moreover, their separation from other materials after the shredding of end-of-life vehicles is common practice: their separation from metals is performed with conventional techniques currently in use, such as density and spectroscopic methods. Furthermore, the topic of composites separation from other plastics after shredding has recently been addressed by CEN TC301/WG17 (00301082) under EC request⁵ and a specific clause to enable shredded composites separation has been prepared.
- **Composite structures are not in any way more “difficult” to dismantle than those made of any other materials:** For example, metal welding is an irreversible joining technique that poses the same challenges as adhesive joining. Moreover, the use of metal inserts for conventional reversible mechanical joining of composites is also widely used in industrial practice and this makes the dismantling operation a straightforward process.
- **Composites structures are usually easier to reuse than metal ones:** Since they are more durable and less prone to environmental ageing than metals, at the end of their first life composite structures can be either recertified and reused in the same application or repurposed for new applications. This is already the case in the wind energy sector, where glass fibre reinforced plastics are widely used. Wind turbine blades are refurbished, recertified and sold for reuse in other wind turbines, or repurposed in a myriad of ways, from bridges to bicycle shelters, from playground equipment to building elements.

Composites support the transition to net zero

The composites recycling supply chain already established throughout Europe is experiencing continued growth, stimulated by major industrial players, a multitude of start-ups and continent-wide academic research efforts. Hindering its development through taxation and fees would be

⁴ Caro, D., Albizzati, P.F., Cristóbal Garcia, J., Saputra Lase, I., Garcia-Gutierrez, P., Juchtmans, R., Garbarino, E., Blengini, G., Manfredi, S., De Meester, S., Tonini, D., Towards a better definition and calculation of recycling, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/636900, JRC131531.

⁵ CEN TC301/WG17 TS “Road vehicles – Post Shredder Technology recycling – Design recommendations for plastic products” item 082 - to be published in March 2024 (00301082).

counterproductive in terms of economic growth, job creation and achievement of EU Green Deal objectives.

EuCIA believes that the substantial benefits of composite materials in improving the sustainability of vehicles during their use phase significantly outweigh their present recycling challenges, which are already being addressed and solved. By potentially discouraging the use of composites the new regulation could impact the automotive industry's ability to design lighter weight, more fuel-efficient vehicles, in contradiction of the Green Deal objectives.

EuCIA calls for all stakeholders, OEMs, suppliers, waste collectors, as well as the relevant authorities, to collaborate to develop an EU-wide strategy for dealing with composite components in ELV vehicles to ensure that composite materials can fully support the automotive industry's transition to net zero.

ANNEX

Recommended changes to the proposed ELV Directive

EuCIA and its members (list in annexe) are willing to support the Legislator in making the end-of-life of vehicles regulatory framework conducive to composites reuse or recycling. While very positive in many aspects, the proposal can be further improved by making full use of the mandatory removal and Extended Producers Responsibility (EPRs) requirements for composite parts. In particular, the Legislator should consider the following improvements to the proposal applicable to composites.

1. **Focus on a holistic view:** EuCIA promotes a holistic approach. Use phase AND end-of-life are both important and need to be taken into account. Excluding new (composite) materials per se or implementing a fee modulation simply because closed cycles have not yet been established would be counterproductive.
2. **Include composites in the definition of 'plastic'** (Article 3 (9)): The inclusion of composites in the proposed 'plastic' definition is crucial to preserve the incentive to collect, sort and deploy recycling solutions for composites. Plastics are polymers to which additives or other substances (like glass fibre, carbon fibre, natural fibre) may have been added.
3. **No closed-loop recycling content target for composite materials:** The current proposal recommends "mandatory recycled content targets for plastics in newly type-approved vehicles of 25%, of which 25% from closed loop". We recommend allowing, and promoting, the reuse of composite materials for a high-quality application in another industry.
4. **Further support the reuse of parts and components via the "Circularity Plans"** (Annex IV Part A and Part B): The waste hierarchy in the EU Waste Framework Directive should be the guideline for the "Circularity Plans" and measures for waste prevention and preparation for re-use further promoted. In particular, the "measures to address the challenges posed by the use of certain materials and techniques" should be decided considering their impact on all targets set in the regulation, starting from reuse. For instance, a durable and resistant

material such as composites will make mechanical shredding more demanding, but these same properties can contribute to extending the lifetime of a vehicle and make it a better candidate for reuse.

5. **Remove from the “Circularity Strategy” (Annex IV Part A and Part B) the references to “fibre-reinforced materials” and “composite plastics”** which are incorrectly used to exemplify materials which hamper easy removal or make recycling very challenging: Composite parts do not hamper the removal of other parts or make recycling very challenging. Some parts made from composites are in fact already listed in the Annex VII Part C for mandatory removal (i.e. dashboards and printed circuit boards) to facilitate their reuse, remanufacturing or refurbishment. Composite parts can also be recycled provided they are properly collected, sorted and treated. As recognised by the European Commission Joint Research Centre, three recycling processes for composites are already at TRL9 and other processes are currently under development and expected to be brought to technological maturity in the coming years.
6. **Remove from the Extended Producer Responsibility (EPR) (Article 21, 1e) the reference to “composite plastics”** which is incorrectly used to exemplify materials which prevent a high-quality recycling process: Composite parts do not prevent a high-quality recycling process. Composite parts can be dismantled for reuse or recycled if they are properly collected and sorted (as other materials are). Therefore, it is not justified to implement a fee modulation for car manufacturers using composite parts.
7. **Comment on the design for removal and treatment of electric vehicle batteries:** In chapter II, Article 7, paragraph 1 and 2, and referring to Annex VII, part C and F, it is stated that the design should allow for the easy removal of a list of components, which e.g. includes plastic parts, heavier than 10 kg, and also electric vehicle batteries. It is also stated that "The batteries shall be separately removed from end-of-life vehicles and stored in a designated area for further treatment in accordance with Article 70(3) of Regulation (EU) 2023/ [OP: Batteries Regulation]". However, the battery regulation only states what percentages should be recovered from metals in the battery cells and disregards the fact that for future electric vehicles the load carrying structure or casing could be made lighter, and with lower CO₂ footprint, if composite materials are used. It should be noted that such solutions already exist in series production, and that many suppliers are investigating this option for future battery packs.
8. **Include additional fibre reinforced polymer (i.e. composite) parts in the list of “Mandatory removal of parts and components”** (Annex VII, Part C). Composite parts are durable and long-lasting, with a lifetime potentially exceeding that of vehicles. Some of these parts can also be easily dismantled after road incidents and enter the replacement parts market. In addition, their separate collection could contribute to limiting their contamination, which is a major hurdle to certain recycling processes (in particular closed loop recycling). Therefore, further consideration should be given to including additional composite parts to those already listed in the proposal (i.e. dashboards and printed circuit boards with a surface area larger than 10 cm³).



About EuCIA

The European Composites Industry Association (EuCIA), headquartered in Brussels, represents European national composites associations and industry-specific sector groups at EU level. With the support of its members, EuCIA actively contributes to building an economically and environmentally sustainable European composites industry. EuCIA closely follows relevant standards and legislation, actively communicates on the ways in which composites contribute to a more sustainable world, and promotes educational activities. Our initiatives aim to ensure the healthy growth and continued competitiveness of more than 10,000 companies and an estimated 150,000 employees involved in composites manufacturing across Europe.

EuCIA's members

National Associations

Composites UK - Composites Germany - Finnish Plastics Industries Federation (FiPIF) – Polyvia - Norwegian Circular Material Technology (NCMT) - The Danish Plastics Federation (DPF) - CompositesNL - Turkish Composites Manufacturers Association (TCMA) - Agoria - Assocompositi

Sectorial Organisations

The European Alliance for SMC/BMC - European UP/VE Resin Association - Glass Fibre Europe (APFE) - European Pultrusion Technology Association - Epoxy Europe