Observations and Feedback to the European Commission on the Currently Adopted Revision of Directives 2000/53/EC and 2005/64/EC on End-of-Life Vehicles

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EEB European Environmental Bureau and IEN Irish Environmental Network

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ZERO WASTE ALLIANCE IRELAND

Towards Sustainable Resource Management

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1. INTRODUCTION

The enormous number of mechanically propelled motor vehicles manufactured, used and discarded annually is one of the principal characteristics of the present and previous century – in all of the earlier centuries people travelled on foot, by boats or ships, or by using domesticated animals for transportation. In those earlier centuries, transportation waste consisted mainly of animal dung, carcases of animals, and the remnants of vehicles and ships, principally wood, with iron appearing from the eighteenth century onward.

The invention and relatively inexpensive mass production of motor vehicles powered by internal combustion engines, while providing transportation for very large numbers of people in developed and in developing countries, created not only very serious atmospheric pollution because of the huge amounts of exhaust gases emitted to the atmosphere, but also a huge solid waste problem, because of the quantities and the increasing varieties and technical changes in the types of waste generated.

It has been estimated that by 2022, about 1.446 billion cars travelled the surface of planet Earth; equivalent to 17.7% of the world's population who own a car. If we consider the statistics of vehicle numbers going back over the last 60 years, the increase is very significant. Although the numbers of vehicles apparently decreased slightly in 2019 and 2020 due to COVID-19, the number of cars sold in 2021 increased again, and despite considerable efforts by Governments, environmental NGOs and international agencies, the number of vehicles seems to be climbing steadily.

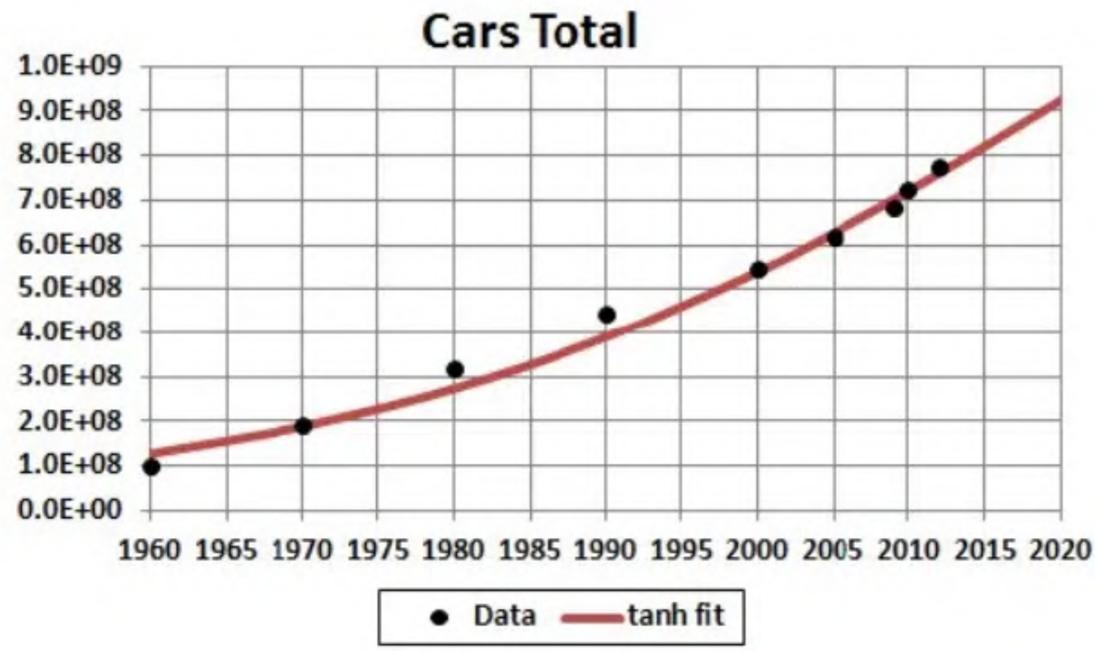

Figure 1: **Total estimated number of cars in the world. Source: https://www.pd.com.au/blogs/how-many-cars-in-the-world/**

It should be noted that the above figures and graph include only light vehicles (cars) and they do not include heavier road vehicles such as vans and trucks. The quantities of materials – steel, aluminium, glass, plastics, rubber and motor fuels – used for the production and riving of motor vehicles is also a matter of rising concern, in addition to the atmospheric pollution caused be vehicle exhaust emissions.

Every year, over six million vehicles in Europe reach the end of their life and are treated as waste. When end-of-life vehicles (ELVs) are not properly managed, they can cause environmental problems and the European economy loses millions of tonnes of materials.

The automotive manufacturing industry is among the largest consumers of primary raw materials such as steel, aluminium, copper, and plastics, but makes little use of recycled materials. Although the recycling rates of materials from ELVs are generally high, the scrap metals produced are of low quality and only small amounts of plastic are recycled.[1]

Every year, end-of life vehicles in the Community generate between 8 and 9 million tonnes of waste, which must be managed correctly. In order to implement the precautionary and preventive principles and in line with the Community

[1] https://environment.ec.europa.eu/topics/waste-and-recycling/end-life-vehicles_en

strategy for waste management, the generation of waste must be avoided as much as possible.[2]

1.1 The European Union takes up the Challenge of Addressing the Problem of "End-of-Life" Vehicles (ELVs)

Waste management comes within the scope of environmental policy (Article 192 of the TFEU), which aims to preserve, protect and improve the quality of the environment, protect human health and utilise natural resources prudently and rationally. The European Community was not slow to take up the "end-of-life vehicles" management challenge; and, in 2000, the first Directive on End of Life Vehicles (Directive 2000/53/EC) was approved by the Council of Ministers, under Articles 100 and 235 of the Treaty establishing the European Economic Community. The objectives of this Directive were to improve the environmental performance of all economic operators involved in the life-cycle of all types of road vehicles.

The second Directive on End of Life Vehicles was adopted in 2018,[3] giving the Commission the power to adopt implementing acts setting out detailed rules necessary to control EU countries' compliance with the ELV targets and the exports and imports of ELVs; and to adopt delegated acts to supplement the Directive by:

- ✓ exempting certain materials and components containing lead, mercury, cadmium or hexavalent chromium (other than in cases listed in Annex II of the Directive), if their use is unavoidable and establishing maximum concentration levels allowed as well as deleting materials and components of vehicles from Annex II, if their use is avoidable;
- ✓ introducing coding standards to facilitate the components suitable for reuse and recovery;
- ✓ establishing the minimum requirements for the certificates of destruction; and,
- ✓ establishing minimum requirements for the treatment of ELVs (Annex I).

While this Directive was a distinct improvement on the 2005 Directive which preceded it some 12 years earlier, it soon became outdated as a result of advances in vehicle types and technology.

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[2] Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles. preamble, paragraphs (3) and (4).

[3] Directive (EU) 2018/849 of the European Parliament and of the Council of 30 May 2018 amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment.

1.2 Need for Updating and Revision of the Directives on "End-of-Life Vehicles" (ELVs)

The production of vehicles has undergone important changes since the adoption of the Directive 2000/53/EC some 20 years ago. This is the case notably with the increasing use of new technologies and components in cars, such as plastics, carbon fibre or electronics, which present specific challenges for their recovery and recycling from end-of-life vehicles (ELVs). The growing number of electric vehicles on the EU market is also creating considerable new challenges to the ELV sector in terms of adjusting to the new treatment processes.

The rapidly increasing number of electric vehicles (EVs) contain specific parts and components (e.g. batteries), which require special handling when EVs reach the end of their lives. The recovery measures adopted to overcome the economic situation created by the COVID 19 pandemic (especially premiums to purchase electric/hybrid cars) are likely to further accelerate the shift to electric cars in the EU, while in the short term also increasing the volumes of vehicles sent for scrapping.[4]

The proposed and adopted revision of the two ELV Directives listed above is intended to address these new developments; and the ELV Directive also needs to be reviewed in the light of:

(i) the policies of the European Green Deal and the Circular Economy Action Plan, which define an ambitious agenda to transform the European economy, based on a modern, competitive, low carbon and circular industry; and,

(ii) the recently adopted EU legislation on waste management.

The European Green Deal and the Circular Economy Action Plan emphasise that the EU policy on waste should put waste reduction at its core, notably through changes in the design of products, promote high quality recycling and facilitate the uptake of recycled materials in new products. They call on the Commission to propose green public procurement (GPP) criteria and targets in sectoral legislation.

The European Green Deal identifies vehicles as one product where "*the Commission will consider legal requirements to boost the market of secondary raw materials with mandatory recycled content*"; and the Circular Economy Action Plan also indicates that "*the Commission will also propose to revise the rules on end-of-life vehicles with a view to promoting more circular business models by linking design issues to end-of-life treatment, considering rules on mandatory*

[4] Revision of Directive 2000/53/EC on end-of-life vehicles; Inception Impact Assessment; Ares(2020)5755999 - 22/10/2020.

recycled content for certain materials of components, and improving recycling efficiency".[5]

The Waste Framework Directive,[6] which sets out overarching rules and principles for the environmentally sound management of waste across the EU, has been substantially amended in 2018, with a view to increasing the contribution of the waste sector to a circular economy (notably through the adoption of new provisions on recycling targets and extended producer responsibility schemes). That Directive is now the subject of a major revision, and the Commission recently invited feedback from members of the public and other interested persons and organisations on a recently adopted targeted revision of the Directive.[7]

1.3 Call for Evidence and Public Consultation

On 04 October 2018, the European Commission issued a call for evidence on which to base an evaluation of the then current EU rules on end-of-life vehicles. These rules were aimed to:

- make dismantling, recycling and reusing end-of-life vehicles more environmentally friendly; and to
- push manufacturers to make new vehicles without hazardous substances, so their parts can later be reused.

This evaluation was intended to assess how well the EU rules were working and whether they were delivering the expected benefits for the environment, the public and industry; while the call for evidence gave an opportunity to European citizens and stakeholders to give their views on the Commission's understanding of the problems caused by the production and fate of end-of-life vehicles.

The call for evidence was followed by a public consultation, open from 06 August 2019 to 29 October 2019; and, like the call for evidence, it was aimed at a target audience of vehicle producers, distributors, collectors, motor vehicle insurance companies, dismantlers, shredders, material recovery operators, recyclers, and other authorised treatment facility operators, and all others who were concerned about the challenges associated with end-of-life vehicles. These problems were connected with the vehicles themselves, but also their components and materials, impacts on members of the public and consumers, environmental

[5] Revision of Directive 2000/53/EC on end-of-life vehicles; Inception Impact Assessment; Ares(2020)5755999 - 22/10/2020.

[6] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, OJ L 312, 22.11.2008.

[7] https://environment.ec.europa.eu/publications/proposal-targeted-revision-waste-framework-directive_en and https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13225-Environmental-impact-of-waste-management-revision-of-EU-waste-framework_en

protection organisations; environmental non-governmental organisations will be relevant for their contribution on waste management, pollution, circular economy, etc.

The European Commission also stated that every year, millions of vehicles in Europe reach the end of their lives. If end-of-life vehicles (ELV) are not managed properly, they can be a threat to the environment as well as a lost source of millions of tonnes of materials. Directive 2000/53/EC on end-of-life vehicles (ELV Directive) was adopted in 2000 to minimise the impact of end-of-life vehicles (ELVs) on the environment and to improve the environmental performance of all the economic operators involved in the life cycle of vehicles.

Directive 2018/849/EU obliged the Commission to evaluate it by the end of 2020, and special attention was to be given to its implementation, to the feasibility of setting targets for reporting per specific materials, and to the problem of the end-of-life vehicles of unknown whereabouts.

The consultation by the Commission attracted a total of 125 valid feedback submissions.

Zero Waste Alliance Ireland (ZWAI) did not make a submission to the European Commission at either the preliminary call for evidence stage in 2018 or the public consultation stage in 2019; but we are now very pleased to have the opportunity to provide feedback to the European Commission at this near-final adoption stage, when the Commission is considering the adoption of a revised and possibly new Directive, to be presented to the European Parliament and Council.

Even though we have some reservations about the Commission's currently adopted proposal for a new "end-of-life vehicles" Directive, we believe that it could become an important legislative component of the overall waste and resource management and sustainability policies of the EU.

2. ZERO WASTE ALLIANCE IRELAND (ZWAI)

At this point we consider that it is appropriate to mention the background to our submission, especially the policy and strategy of ZWAI.

2.1 Origin and Early Activities of ZWAI

Zero Waste Alliance Ireland (ZWAI), established in 1999, and registered as a company limited by guarantee in 2004, is a Non-Government Environmental Organisation (eNGO) and a registered charity. ZWAI has prepared and submitted to the European Commission, the Irish Government and to Irish State Agencies many policy documents on waste management, and continues to lobby the Irish Government and the European Commission on the issue of using resources more sustainably, on using resources sustainably, on promoting re-use, repair and recycling, and on development and implementation of the Circular Economy.

One of our basic guiding principles is that human societies must behave like natural ecosystems, living within the sustainable flow of energy from the sun and plants, producing no materials or objects which cannot be recycled back into the earth's systems, or reused or recycled into our technical systems, and should be guided by economic systems and practices which are in harmony with personal and ecological values.

Our principal objectives are:

i) sharing information, ideas and contacts,

ii) finding and recommending environmentally sustainable and practical solutions for domestic, municipal, industrial and agricultural waste management in Ireland, and for more efficient and ecologically appropriate uses of natural resources such as scarce minerals, water and soil;

iii) lobbying Government and local authorities to implement environmentally sustainable waste management practices, including clean production, elimination of toxic substances from products, re-use, recycling, segregation of discarded materials at source, and other environmentally and socially beneficial practices;

iv) lobbying Government to follow the best international practice and EU recommendations by introducing fiscal and economic measures designed to penalise the manufacturers of products which cannot be re-used, recycled or composted at the end of their useful lives, and to financially support companies making products which can be re-used, recycled or are made from recycled materials;

v) raising public awareness about the long-term damaging human and animal health and economic consequences of landfilling and of the destruction of potentially recyclable or re-usable materials by incineration;

vi) investigating, raising public awareness and lobbying Irish Government departments and agencies about our country's failure to take adequate care of vulnerable and essential natural resources, including clean water and air, biodiversity, and soil;

vii) advocating changes in domestic and EU legislation to provide for more ecologically appropriate, environmentally sustainable and efficient uses of natural resources; and,

viii) maintaining contact and exchanging information with similar national networks in other countries, and with international zero waste organisations.

2.2 Our Basic Principles

Human communities must behave like natural ones, living comfortably within the natural flow of energy from the sun and plants, producing no wastes which cannot be recycled back into the earth's systems, and guided by new economic values which are in harmony with personal and ecological values.

In nature, the waste products of every living organism serve as raw materials to be transformed by other living creatures, or benefit the planet in other ways. Instead of organising systems that efficiently dispose of or recycle our waste, we need to design systems of production that have little or no waste to begin with.

There are no technical barriers to achieving a "zero waste society", only our habits, our greed as a society, and the current economic structures and policies which have led to the present environmental, social and economic difficulties.

"*Zero Waste"* is a realistic whole-system approach to addressing the problem of society's unsustainable resource flows – it encompasses waste elimination at source through product design and producer responsibility, together with waste reduction strategies further down the supply chain, such as cleaner production, product repairing, dismantling, recycling, re-use and composting.

ZWAI strongly believes that Ireland and other Member States, and the EU as a whole, should have a policy of not sending to other countries our discarded materials for further treatment or recycling, particularly to developing countries where local populations are being exposed to dioxins and other very toxic POPs. Relying on other countries' infrastructure to achieve our "recycling" targets is not acceptable from a global ecological and societal perspective.

2.3 What We are Doing

Our principal objective is to ensure that government agencies, local authorities and other organisations will develop and implement environmentally sustainable resources and waste management policies, especially resource efficiency, waste reduction and elimination, the promotion of re-use, repair and recycling, and the development and implementation of the Circular Economy.

As an environmental NGO, and a not-for-profit company with charitable status since 2005, ZWAI also campaigns for the implementation of the UN Sustainable Development Goals, including (but not limited to) Goal 12, Responsible Consumption and Production; Goal 6, Clean Water and Sanitation (having particular regard to the need to avoid wasting water); and Goal 15, to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and to halt and reverse land degradation and halt biodiversity loss.

In responding to many public consultations, members of ZWAI have made submissions and given presentations on:

- Submission to the Department of the Environment, Community and Local Government on Tyres and Waste Tyres (January 2014);
- how Ireland and the European Union should address the problem of plastic waste (March 2019);
- the problem of single-use plastic packaging by the Irish food industry (November 2019);
- transforming the construction industry so that it could become climate-neutral (instead of its present position as a major emitter of greenhouse gases and toxicants);
- the general scheme of the Irish Government's Circular Economy Bill (October 2021);
- recovery and reuse of the phosphorus and nitrogen content of wastewater (2019 to 2022);
- proposed revision of the EU Regulation on Shipments of Waste (January 2022);
- proposed revision of the Waste Framework Directive (August 2022);[8]
- Ireland's energy security situation (October 2022);

[8] Feedback to the European Commission on the revision of the Waste Framework Directive; ZWAI, 16 August 2022. https://www.zwai.ie/resources/2022/feedback-to-the-european-commission-on-the-revision-of-the-waste-framework-directive/

- Ireland's Fourth National Biodiversity Action Plan (November 2022);
- Ireland's National Bioeconomy Action Plan 2023-2025 (January 2023);
- Ireland's draft Waste Management Plan for a Circular Economy (July 2023);[9]
- the problem of disposable vaping devices (July 2023);[10]
- the rapidly increasing European and global problem of waste electronic and electric equipment (WEEE, September 2023);[11]
- observations to the European Commission on a Proposed EU Directive on Soil Monitoring and Resilience (November 2023);[12] and,
- observations to the Department of the Environment, Climate and Communications on the Irish Government's Green Public Procurement Strategy and Action Plan (November 2023);[13] and,
- observations to the European Commission on a proposed targeted partial revision of the EU Waste Framework Directive (November 2023).[14]

It will be clear that ZWAI is primarily concerned with the very serious issue of discarded substances, materials and goods, whether from domestic, commercial or industrial sources, how these become "waste", and how such "waste" may be

[9] Submission to the Regional Waste Management Planning Offices on the draft Waste Management Plan for a Circular Economy; ZWAI, 05 July 2023: https://www.zwai.ie/resources/2023/submission-on-the-draft-waste-management-plan-for-a-circular-economy/

[10] Submission to the Department of the Environment, Climate and Communications in Response to the Department's Public Consultation on Disposable Vaping Devices; ZWAI, 27 July 2023: https://www.zwai.ie/resources/2023/submission-to-the-decc-on-disposable-vapes-and-why-they-should-be-banned/

[11] Submission by ZWAI to the European Commission on Waste from Electrical and Electronic Equipment — Evaluating the EU Rules; ZWAI, 22 September 2023. https://www.zwai.ie/resources/2023/waste-from-electrical-and-electronic-equipment-weee-evaluating-eu-rules/

[12] Observations and Feedback to the European Commission on the Proposed EU Directive on Soil Monitoring and Resilience; ZWAI, 03 November 2023. https://www.zwai.ie/resources/2023/submission-on-the-proposed-eu-directive-on-soil-monitoring-and-resilience/

[13] Submission to the Department of the Environment, Climate and Communications in Response to the Department's Public Consultation on a draft Green Public Procurement Strategy and Action Plan; ZWAI, 17 November 2023. https://www.zwai.ie/resources/2023/submission-to-the-decc-on-the-draft-green-public-procurement-strategy-and-action-plan/

[14] https://environment.ec.europa.eu/publications/proposal-targeted-revision-waste-framework-directive_en and https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13225-Environmental-impact-of-waste-management-revision-of-EU-waste-framework_en

prevented by re-design along ecological principles. These same ecological principles can be applied to the many ways in which we abstract and use water as a resource, and to the equivalent volumes of wastewater produced as a consequence of these uses.

ZWAI is represented on the Irish Government's Water Forum (An Fóram Uisce), is a member of the Irish Environmental Network and the Environmental Pillar, and is funded by the Department of Communications, Climate Action and the Environment through the **Irish Environmental Network**.

In 2019 ZWAI became a full member of the **European Environment Bureau** (EEB); and a member of the **Waste Working Group** of the EEB. Through the EEB, we contribute to the development of European Union policy on waste and the Circular Economy. In November 2021, the EEB established a **Task Force on the Built Environment**; ZWAI is a member of this group, and we contribute to discussions on the sustainability of construction materials, buildings and on the built environment.

3. PREVENTION AND ELIMINATION OF WASTE FROM ELVS

As noted in section 1.2 above, EU policy on waste should put waste reduction at its core, notably through changes in the design of products, promote high quality recycling and facilitate the uptake of recycled materials in new products. In our submission, we have taken this aim as our starting point, and the following sections address the relevance and need for compliance with the EU Waste Hierarchy.

3.1 Relevance and need for Compliance with the EU Waste Hierarchy

Efficient sorting and recycling of end-of-life-vehicles (ELV) is a very important step in improving the circularity of the automotive industry. However, in line with the EU Waste Framework Directive's Waste Hierarchy system, the most crucial step in improving circularity is prevention:

Figure 3.1: The Waste Hierarchy can be used to evaluate processes that protect the environment alongside resource and energy consumption from most favourable to least favourable actions.

Prevention, therefore, can reduce the demand for raw materials: in this case: natural rubber, synthetic rubber, steel, aluminium and other metals, and plastic. The extraction and production of each of these materials is associated with large negative environmental consequences. Furthermore, these materials can also generate pollution and environmental damage during the recycling and waste disposal phases. Improper recycling of tyres can release toxic compounds into air and water bodies, and of course the informal burning of tyres has a large pollution potential with associated carcinogenic effects in humans,[15] [16] Tyres used in waste-to-energy schemes produce greenhouse gases, even if the harmful particulate matter is largely scrubbed.

Recycled materials have the potential to be poorly suited for use in vehicles, impurities in recovered metals can lead to a reduction in the quality of the recycled metal. Adopting measures to prevent the generation of waste in the first place can therefore help achieve the goals of the European Green Deal – to achieve climate neutrality in the EU by 2050.

3.2 Use of Public Transport to Reduce Private Car Use

The transportation sector accounts for 20.5% of global energy consumption.[17] Improving the efficiency and affordability of public transport infrastructure including high-speed railways, subways, buses and trams can therefore reduce consumption and reliance on cars.

A focus on connecting rural areas to urban centres is key to reducing car dependence, this can be achieved primarily through rail and bus networks. Reducing car dependence can also help reduce social exclusion in older people and economically disadvantaged groups,[18] providing a social as well as an environmental benefit.

Lucas and Jones (2009),[19] define a 'car-reliant location' as one "*where it is virtually impossible to access a given location by any other mode of transport, or where it is impossible to live in place without a car (e.g. deeply rural village with no local facilities)*" and "*a car reliant society*" as one where "*high and increasing levels of car use are observed among the population as a whole and where people without cars are excluded from essential activities*".

[15] Lemieux, P.M. and Ryan, J.V., 1993. Characterization of air pollutants emitted from a simulated scrap tire fire. Air & Waste, 43(8), pp.1106-1115.

[16] Lemieux, P.M. and DeMarini, D.M., 1992. Mutagenicity of emissions from the simulated open burning of scrap rubber tires. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, CINCINNATI, OH 45268(USA). 1992.

[17] Outlook, A.E., 2010. Energy information administration. Department of Energy, 92010(9), pp.1-15.

[18] Mattioli, G., 2014. Where sustainable transport and social exclusion meet: Households without cars and car dependence in Great Britain. Journal of Environmental Policy & Planning, 16(3), pp.379-400.

[19] Lucas, K. and Jones, P., 2009. The car in British society.

3.3 Reducing Car-Dependence In Cities

Improving public transport infrastructure in cities, and between cities and rural areas, can lead to a reduction in car use. This will in turn reduce consumption and demand for vehicles, thereby reducing the generation of end -of-life vehicles. Reducing car use in cities has numerous other benefits including:[20]

- Reduction in air pollution,
- Reduction in noise pollution
- Reducing temperature in city centres,
- Reduction in premature mortality and morbidity.
- Reduction in the need for parking places and road space provide opportunities to increase green space and green networks in cities, which in turn can lead to many beneficial health effects.

Figure 3.3: Oslo has improved public transport infrastructure and reduced car-use in the city centre since 2019.

Oslo started a gradual transition to becoming a car-free city in 2019. Car parking spaces were removed to discourage car use in the city centre, while also making massive improvements to public transport infrastructure and cycling lanes. Additionally, there are tolls on all roads in and out of the city.[21]

[20] Nieuwenhuijsen, M.J. and Khreis, H., 2016. Car free cities: Pathway to healthy urban living. Environment international, 94, pp.251-262.

[21] What happened when Oslo decided to make its downtown basically car-free? World Changing Ideas, 24 January 2019. https://www.fastcompany.com/90294948/what-happened-when-oslo-decided-to-make-its-downtown-basically-car-free.

3.4 Ecodesign & "Preparing For Re-Use"

When prevention measures have been taken to reduce the potential of ELV waste as much as possible, the next priority according to the Waste Hierarchy is "preparing for re-use". Re-use of vehicles therefore, requires the parts that make up the whole vehicle be as durable and long-lasting as possible. The concept of ecodesign can help guide vehicle manufacturers to maximise the re-use potential of every vehicle produced:

Ecodesign is defined as: "*the integration of environmental aspects into product design and development, with the aim of reducing adverse environmental impacts throughout a product's life cycle".*

The main principles of Ecodesign are:

- Repairability;
- Durability; and,
- Sustainable Production.

Ecodesign, involving repair ability durability and sustainable production can be implemented in a way that will reduce or even eliminate waste from vehicles, either during their operation lives, or at the end of their lives. We will address this issue further in the sections below. Ecodesign of tyres is addressed in section 3.7 below, with further recommendations in section 3.8 to reduce tyre waste. In section 4 we examine the use of recycled materials in vehicles.

3.5 Avoiding "Planned Obsolescence" Or Planned Failure

Unfortunately, common business practices make use of "planned obsolescence" to maximise profits, often at great cost to the environment, human health and resource efficiency.[22]

The origin of the phrase "planned obsolescence may lie in a pamphlet distributed in London in 1932, "*Ending the Depression Through Planned Obsolescence"*.[23] At the time, the Great Depression was causing mass unemployment and great suffering, resulting from sudden distrust in the stock market after years of wild speculation and increasing stock values. When this stock market bubble burst, spending decreased sharply, likely due to the desire of people at the time to save what money they had for future necessities. In simple terms, this led to economic stagnation.

[22] Satyro, W.C., Sacomano, J.B., Contador, J.C. and Telles, R., 2018. Planned obsolescence or planned resource depletion? A sustainable approach. Journal of cleaner production, 195, pp.744-752.

[23] London, B., 2014. Ending the depression through planned obsolescence. Revue du MAUSS, 44(2), pp.47-50.

The idea of "planned obsolescence" was to perpetuate consumption by forcing the replacement of products, thereby continuously providing jobs, income and economic stimulation. The concept, as can be expected from the time period, was totally ignorant of the environmental damage such a system could inflict. Unfortunately, at the present time, planned obsolescence is an ingrained business practice. Combating planned obsolescence is one of the keys to the establishment of a circular economy and the elimination of waste.

For vehicles, planned obsolescence is an established method of "*shortening the replacement cycle"*, especially by increasing the frailty of component parts which have to be frequently replaced. In this context a better term may be "planned failure".

As mentioned in the Impact Assessment Report, (13.7.2023 SWD(2023) 256 final PART 1/4): "*there are no legal incentives for manufacturers to increase the amount of recycled content in new vehicles or to use materials and parts which can be easily repaired, dismantled, re-used, remanufactured or recycled".* Therefore, the polluter pays concept must be extended to vehicle manufacturers. Vehicle parts must be re-designed to be more long-lasting and durable, easily repairable and cross-compatible across vehicle makes and models. Currently, parts from cars destined for scrap are generally not recovered as the re-usability of these parts is limited. Vehicle manufacturers currently profit from the practice of planned failure of vehicle parts. For safety, vehicles in Europe must pass a road worthiness test, however, this has the unintended effect of facilitating the constant breakdown and replacement of vehicle parts.

Additionally, vehicle manufacturers may design their vehicles to be intentionally difficult to repair, and therefore some repair jobs can only be handled by specifically trained dealership mechanics, at high cost to the vehicle owner. Issuing fines to vehicle manufacturers who fail to produce easily repairable vehicles should provide incentive to shift this unsustainable business practice.

It is our submission that the revised ELV directive does not address this issue adequately; it does not specify that more of a vehicle's components should be easily replaceable, and it does not require manufacturers of vehicles to ensure a specific and easily measurable degree of repairability (a repair metric), or to provide publicly available information on the removal and replacement of parts in their vehicles. Secondly, it is also our submission that the target for the recycled content of vehicles should be higher than proposed in the revised Directive.

3.6 End of Life Waste from Electric Vehicles

As the use of electric vehicles increases, the proper handling of electric vehicle waste is required. The total spent electric vehicle batteries generated between 2015 and 2040 could be as many as 21 million.[24] An electric vehicle battery may last for 8 to 10 years.

As lithium-ion batteries age, they lose capacity to hold an electric charge. When the capacity of a battery drops to around 80%, the batteries can be remanufactured. This means that the defective cells are replaced, and the battery can be re-used in another electric vehicle. This is a good example of "Re-use", a part of the Waste Hierarchy. Extended producer responsibility can ensure that the manufacturer handles the costs of collection and remanufacture, thereby ensuring the longevity of batteries.

Old lithium-ion batteries may also be repurposed for less strenuous use, such as secondary energy storage. This allows the extension of their useful life and thereby avoids the batteries becoming "waste".[25]

Recycling of Lithium ion batteries is the final option, once other uses have been exhausted. The recycling of these batteries can be difficult due to their complex structures: multiple modules, containing numerous pouches, prismatic, or cylindrical cells connected in a range of parallel-series configurations (welding, wire bonding, and mechanical joining are common joining techniques used within LIB cells, modules, and packs).[26]

Lithium ion batteries can be recycled in a pyrometallurgical process. The batteries are heated to high-temperatures in a smelter to burn away the plastic and organic compounds. The metal alloys are separated out and removed. The lithium fraction remains in the slag and can be recovered with additional processing, which of course required more energy and resources. As the price of Lithium increases, this process may become more profitable for recyclers. In the hydrometallurgical process, the materials are leached out of the batteries by acids or bases and then separated via electrolysis, precipitation, solvent extraction and ion exchange.

More research is required to develop techniques to profitably recycle end of life electric vehicle batteries. It is worth considering also that many new types of electric vehicle batteries are currently being developed based of new element

[24] Richa, K., 2016. Sustainable management of lithium-ion batteries after use in electric vehicles. Rochester Institute of Technology.

[25] Chen, M., Ma, X., Chen, B., Arsenault, R., Karlson, P., Simon, N. and Wang, Y., 2019. Recycling end-of-life electric vehicle lithium-ion batteries. Joule, 3(11), pp.2622-2646.

[26] Cai, W., 2017, March. Analysis of Li-Ion battery joining technologies*. International Battery Seminar and Exhibit.

combinations and new technologies. Therefore, this field of research deserves attention.

3.7 Eco Design Of Tyres

Global production of tyres is increasing year by year, and 1 billion tonnes of waste tyres or end-of-life tyres are generated every year.[27] Tyres are generally sent to landfill or burned, rather than being recycled, with the release of considerable quantities of environmental pollutants. Various methods are employed to deal with tyre waste, including incineration and pyrolysis. Incineration however produces greenhouse gas emissions and hazardous fly ash. When the tyres are "recovered" by incineration, they have been permanently destroyed and therefore another tyre must be produced to replace it. This system of production, use and destruction by incineration is not conducive to the circular economy. Incineration, also known by the euphemism "*energy recovery*", ensures steady demand for new products and facilitates the rapid exploitation of natural resources and associated environmental collapse.

Pyrolysis of tyres is another proposed method of dealing with tyre waste. The tyres are heated to high temperatures of about 350 to 800°C in a nitrogen environment, at which point they break down into inert gases and fuel. However, pyrolysis plants are costly and require substantial investment of time, expertise and resources, therefore the application of this technology is limited to highly developed regions.

It is crucial therefore, to decrease this tyre waste stream by prevention, and simultaneously reduce the negative environmental impact of tyres by switching to more sustainable production methods. Using natural, sustainably produced materials will reduce dependence on fossil fuels. Tyres produced with non-fossil fuel derived materials can generally be broken down naturally without the release of microplastics or carcinogenic compounds.

However, since plant-based materials compete for land-use with food crops, it is essential to employ prevention strategies to reduce overall car reliance and tyre production.

3.8 Recovering and Reusing Materials in End-of-Life Tyres

In January 2014, Zero Waste Alliance Ireland made a submission to the Irish Department of the Environment, Community and Local Government, on tyres and waste tyres. This lengthy and detailed submission provided technical information on how end-of-life tyres can be separated relatively easily into their individual

[27] Pathak, P. and Sinha, S., 2021. Valorisation of waste tires into fuel and energy. In Advanced Technology for the Conversion of Waste Into Fuels and Chemicals (pp. 109-122). Woodhead Publishing.

component materials of rubber, steel and nylon cord; and the submission demonstrated how these materials may be reused, including the addition of rubber to asphalt for road surfacing, providing increased skid resistance, less liability of cracking, and longer life for the road surface.

Tyres contain multiple valuable materials such as rubber (75%), steel (15%) and textile fibres (10%) . Tyres that cannot be used anymore and are disposed of become an end-of-life tyre (ELT), and approximately 50% of ELTs generated in the EU are mechanically recycled to recover their high-value materials (though the proportion varies greatly among member states. By breaking down the rubber contained in waste tyres into smaller granules, recycled rubber can be used in many applications across diverse sectors e.g., sports, construction, agriculture, automotive, etc.

However, with the lack of regulatory incentives to enhance existing and develop new end-markets for recycling, a significant volume of tyres are incinerated or used to co-fuel cement kilns, a practice labelled as "energy recovery" or simply "recovery" – a most misleading term. For every one tyre incinerated in Europe approximately one tyre is mechanically recycled.

It is our submission that the proposed revised ELV Directive should include:

- ✓ a ban on the export of unprocessed waste tyres to countries outside the EU;
- ✓ technical and commercial criteria which require manufacturers of tyres to design their tyres for mechanical recycling, so that most of the tyres' raw materials, i.e., rubber and steel can be recovered;
- ✓ measures to prevent imports of non-REACH-compliant tyres into the EU;
- ✓ green public procurement and mandatory recycled content targets for rubber products to ensure recycled materials from ELTs replace virgin raw materials in the automotive (e.g., tyres and OEM applications) and construction sectors (e.g., asphalt and road paving);
- ✓ traceability of recycled materials from tyres and compliance with high-quality standards along the value chain; and,
- ✓ a harmonised EU-wide end-of-waste (EoW) criteria that stimulates the use of recycled materials from ELTs.

3.9 Problems Caused by Use of Synthetic Rubber in Tyres

It is hardly necessary to mention that the raw materials for almost all synthetic elastomers are derived from petrochemicals (mainly fossil fuels). The use of fossil fuel reserves is causing considerable environmental damage in the form of climate change and environmental pollution. Tyre-derived microplastics from the gradual wear of the synthetic rubber in tyres is a growing concern. These microplastics are contaminating soils and ecosystems and pose health impacts on aquatic and terrestrial organisms including humans, via the food chain, drinking water, and air.[28] The recycling of tyres in concrete is another potential source of tyre-derived-microplastics.[29] The consequences of the release of these microplastics into the environment and the impacts on the health of humans and wildlife is not yet fully understood.

3.10 Natural Rubber

Hevea brasilensis, known as the Pará rubber tree or, most commonly, the rubber tree, is native to South America. A milky sap is extracted from the tree by wounding the bark, this is then processed to produce natural rubber. Truck tyres can contain 30% natural rubber, while car tyres generally contain about 15%.

Figure 2.9: Industrial rubber plantations replace biodiverse forests.

Natural rubber is a renewable and biodegradable material, however its production results in air and water pollution, negative impacts on worker's health,[30] and relies on unsustainable intensive agriculture. Häuser et al. (2015)[31] summarise the

28 Kumar, M., Xiong, X., He, M., Tsang, D.C., Gupta, J., Khan, E., Harrad, S., Hou, D., Ok, Y.S. and Bolan, N.S., 2020. Microplastics as pollutants in agricultural soils. Environmental Pollution, 265, p.114980.

29 Mohajerani, A., Burnett, L., Smith, J.V., Markovski, S., Rodwell, G., Rahman, M.T., Kurmus, H., Mirzababaei, M., Arulrajah, A., Horpibulsuk, S. and Maghool, F., 2020. Recycling waste rubber tyres in construction materials and associated environmental considerations: A review. Resources, Conservation and Recycling, 155, p.104679.

30 Tekasakul, P. and Tekasakul, S., 2006. Environmental problems related to natural rubber production in Thailand. Journal of Aerosol Research, 21(2), pp.122-129.

31 Häuser, I., Martin, K., Germer, J., He, P., Blagodatskiy, S., Liu HongXi, L.H., Krauß, M., Rajaona, A., Shi Min, S.M., Langenberger, G. and Zhu ChaoDong, Z.C., 2015.

current rubber production situation: More than 90% of the global natural rubber production originates from monoculture plantations in tropical Asia. Rubber production is predicted to increase in the near future along with the expected increase in car and tyre production, therefore increase destruction of tropical rainforests is likely. Conversion of rainforest to rubber plantations is associated with increased soil erosion, decreased biodiversity, water pollution through run off, decreased carbon sequestration. Dependency of farmers on the single crop of rubber increases the risk to their livelihoods in the long term.

3.11 Carbon Black

Carbon black is a major component of tyres, as a pigment and reinforcing agent. However, its production is very energy intensive, as fossil fuel derived heavy aromatic oils are used; these oils are vapourised and then burned to form microscopic carbon particles, which are then collected in filters.

Because this is an energy intensive process which relies on fossil fuels, there are alternatives with lesser environmental impacts, using renewable materials that are derived from various biomass feedstocks or through recycling of agricultural industry wastes.

For example, tyres made from cellulose-rubber composites have better wear resistance,[32] and enhance biodegradability of rubber in soil.[33] Cellulose can be produced from hemp or other agricultural waste, or produced by bacteria in bioreactors. Other renewable tyres fillers include starch and nanostarch, chitin, lignin (from wood), sustainable biochar, and soy protein.[34]

When considering how to eliminate and reduce waste from end-of-life vehicles, it is therefore necessary to consider every component, together with the manufacture, operation and final disposal of the vehicle as a whole.

Environmental and socio-economic impacts of rubber cultivation in the Mekong region: challenges for sustainable land use. CABI Reviews, (2015), pp.1-11.

[32] Karaağaç, B., 2014. Use of ground pistachio shell as alternative filler in natural rubber/styrene–butadiene rubber-based rubber compounds. Polymer Composites, 35(2), pp.245-252.

[33] Bras, J., Hassan, M.L., Bruzesse, C., Hassan, E.A., El-Wakil, N.A. and Dufresne, A., 2010. Mechanical, barrier, and biodegradability properties of bagasse cellulose whiskers reinforced natural rubber nanocomposites. Industrial Crops and Products, 32(3), pp.627-633.

[34] Chang, B.P., Gupta, A., Muthuraj, R. and Mekonnen, T.H., 2021. Bioresourced fillers for rubber composite sustainability: Current development and future opportunities. Green Chemistry, 23(15), pp.5337-5378.

4. USE OF RECYCLED CONTENT

One of the most efficient ways to reduce waste from end of life vehicles is increase the amount of proportion of recycled content in each vehicle at the time of manufacture, and to use recycled spare parts during maintenance throughout the life of the vehicle. In this section we will look at the use of recycled content as a way of reducing or eliminating waste.

4.1 Overview of the Problem

The production of vehicles is one of the most resource-intensive industries in the EU. It relies on a wide range of raw materials in high volumes, contributing significantly to resource depletion in the EU, with highly variable recycling and reuse rates that undermine the integrity of the circular economy:

1. **Steel.** Used for vehicle frames, body panels, and various structural components, Europe's automotive industry is responsible for 19% of the demand for the EU's steel industry (over 7 million tonnes/year). While steel is highly recyclable, the challenge lies in separating different types of steel and ensuring the quality of recycled steel. Contamination with other materials and coatings can affect the quality of recycled steel. Steel in the automotive industry is recycled at a rate of more than 95%.[35] However, the scrap quality is often too low, notably due to contamination with high levels of copper during the shredding process. This prevents higher scrap utilisation rates in producing new high-grade products, which are downcycled for other purposes.

2. **Aluminium.** Used for lightweight components, such as body panels, engine parts, and alloys, Europe's automotive industry is responsible for 42% of the demand for the EU's aluminium reserves (approximately 2 million tonnes/year). Aluminium recycling requires significant energy, and the process can be energy-intensive. Sorting and separating different aluminium alloys pose challenges, as the properties of recycled aluminium may vary. Aluminium recycling rates are already among Europe's highest of all materials, with a recycling rate of over 90% in the automotive and building sectors.[36] Like steel, the scrap quality is often too low, notably due to insufficient sorting of alloys containing zinc, copper, silicon and magnesium alloying elements accumulating in cast aluminium.

[35] Recycling of Industrial Mineral Applications – Contribution to the Circular Economy. Industrial Minerals Association Europe (IMA-Europe), September 2023. https://ima-europe.eu/wp-content/uploads/2023/08/IMA-Europe-Recycling-IM-2023-08-30-a-FINAL.pdf

[36] Enabling the circular economy with aluminium. European Aluminium; https://european-aluminium.eu/blog/enabling-the-circular-economy-with-aluminium/

3. **Plastics.** The lightness, flexibility, and many qualities of plastics make them ideal for the automotive industry, reducing cars' overall weight and leading to less fuel consumption.[37] Europe's automotive industry is responsible for 10% of the overall consumption of plastics in the EU (over 6 million tonnes/year). The automotive industry uses a variety of plastics with different compositions.

   By volume, 50% of today's cars are made of plastic, according to EuRIC, the European recycling industry association. That volume includes dashboards, bumpers, handles, buttons, casings, ceiling fabric, seats and seat belts, airbags, carpeting, etc. Furthermore, car manufacturers may sometimes add carbon fibres to plastics to improve their robustness, making them "*challenging to recycle,"* said ACEA, the EU carmaker's association. "*Technologies may not yet be available"* to enable recycling at market scale.[38] Sorting and recycling mixed plastics can be challenging, and the presence of additives and fillers can affect the quality of recycled plastic. Contamination with other materials also poses a challenge. Only 19% of plastics, or 0.2 million tons, per year from ELVs are currently going to recycling. 0.1 million tons are effectively recycled, while around 0.8 million tons of plastic waste per year either end up in landfills (40%) or are sent to waste-to-energy facilities (41%).

4. **Rubber.** Used in tyres, seals, hoses, and gaskets, Europe's automotive industry is responsible for 65% of the production of general rubber goods in the EU. Tyres, the predominant source of rubber in the automotive industry, are considered challenging to recycle, even though the technology to recycle used tyres and to recover their components has been available for decades, and there are many uses for the steel and rubber which can be recovered.[39] The composition of used tyres, and the presence of reinforcing materials make the recycling process more complex, but not impossible. Scrap tires can also be bulky and difficult to handle. According to The European Tyre and Rubber Manufacturers'

[37] Horacio Vieyra, Joan Manuel Molina-Romero, Juan de Dios Calderón-Nájera and Alfredo Santana-Díaz, 2022. Engineering, Recyclable, and Biodegradable Plastics in the Automotive Industry: A Review. *Polymers* 2022, 14(16), 3412; https://doi.org/10.3390/polym14163412. 21 August 2022.

[38] Recyclers applaud EU's new plastic recycling goal for cars, automakers wary. *Euractiv*, 29 Aug 2023. https://www.euractiv.com/section/circular-materials/news/recyclers-applaud-eus-new-plastic-recycling-goal-for-cars-automakers-wary/

[39] Submission by Zero Waste Alliance Ireland to the Irish Department of the Environment, Community and Local Government, on Tyres and Waste Tyres; 30 January 2014. This lengthy and detailed submission provided technical information on how end-of-life tyres can be separated relatively easily into their individual component materials, and these materials may be reused, including the addition of rubber to asphalt for road surfacing, providing increased skid resistance, less liability of cracking, and longer life for the road surface.

Association (ETRMA), 94% of end-of-life tyres in the EU were collected and treated for material recycling and energy recovery in 2019.[40]

5. **Glass.** Used for windows, windshields, and mirrors, Europe's automotive industry requires 1.5 million tonnes of flat glass produced in the EU each year. Automotive glass is often laminated or coated, which complicates the recycling process. Separating different types of glass and removing contaminants like coatings and adhesives can be challenging. Insufficient data on glass recycling and recovery rates is available for the automotive industry in the EU.

6. **Copper.** Used in various components and systems within a car due to its excellent electrical conductivity, heat dissipation properties, and corrosion resistance, Europe's automotive industry requires 6% of the demand for all copper used in the EU. While copper is highly recyclable and retains its quality through the recycling process, challenges may arise in collecting and separating copper from other materials in complex components. The increasing use of small electronic vehicle parts makes efficient recovery more complex. Insufficient data on copper recycling and recovery rates is available for the automotive industry in the EU.

As stated in the impact assessment report, there needs to be more integration of circularity in vehicle design and production, leading to high dependencies on primary raw materials.[41] The share of parts and components from ELVs which are re-used or remanufactured remains low. The suboptimal management of waste from ELVs represents a loss of resources for the industry in the EU, either because waste is not recycled back into the economy (especially for plastics or glass) or because the quality of the scrap is often too low (especially for steel and aluminium) for direct use by the automotive industry in the EU.

Vehicles reaching their end of life are currently not managed optimally to facilitate efficient reuse in the automotive industry. About 6.1 million ELVs are collected annually in the EU, representing 6.9 million tons of waste. While substantial progress has been made since 2000 to reach the 85% recycling/re-use target set out in the ELV Directive, a large share of materials, particularly Automotive Shredder Residues (ASR), is sent to landfills or incinerated.

[40] ETRMA (European Tyre and Rubber Manufacturers' Association) press release. Brussels, 11th May 2021. https://www.etrma.org/wp-content/uploads/2021/05/20210511_ETRMA_Press-Release_ELT-2019.pdf

[41] https://ec.europa.eu/info/law/better-regulation/have-your-say_en

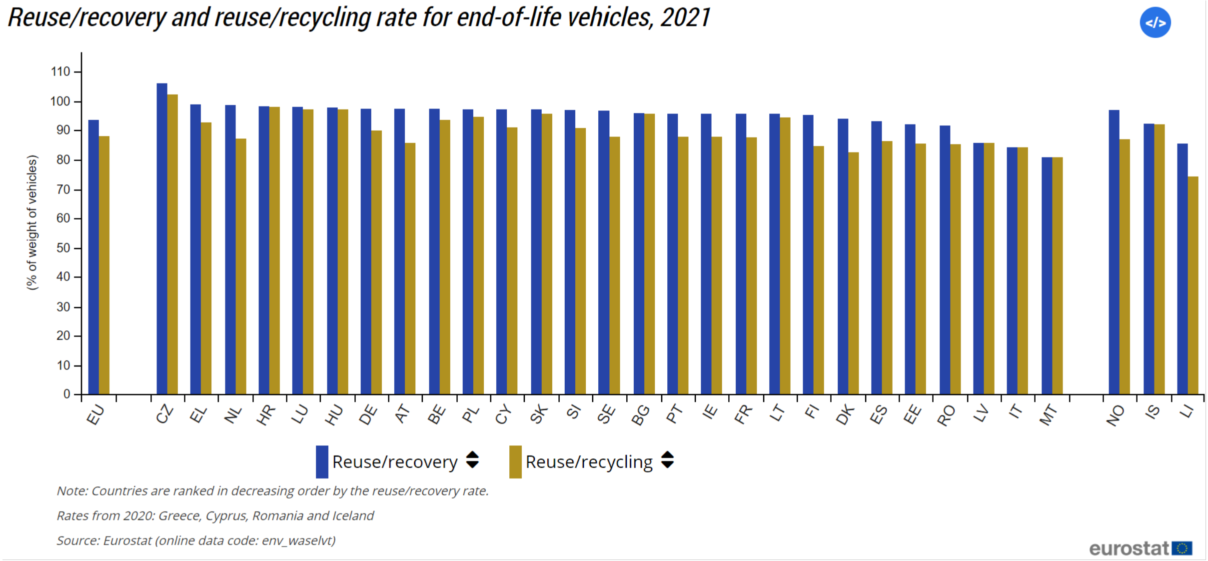


Fig 4.1 **Reuse / recovery and reuse / recycling rate for end-of-life vehicles in the EU, 2021. Source: Eurostat.**[42]

The potential for higher quantity and quality of materials from ELVs to be re-used, remanufactured and recycled remains underexploited due to the following regulatory and market failures:

1) **Economic Value.** Recycling from ELV materials such as plastics, glass, or precious metals from electronic components is not profitable.[43] Economies of scale and incentives to promote better scrap quality still need to be improved. Authorised treatment facilities (ATFs) are mostly SMEs that maintain viability in commercialising the most valuable spare parts removed from ELVs and selling depolluted ELVs to shredders.

2) **Regulatory Failure.** The definition of "recycling" in the ELV Directive includes "*backfilling*" and is broader than other definitions applied to other waste streams under the Waste Framework Directive.**[44]** As a result, in some Member States, considerable amounts of wastes from ELVs, especially inert materials, glass particles, mixed plastics, rubbers, fibres, and textiles, are backfilled and accounted for as recycled. There is no incentive in the current legal framework for economic operators to increase the re-use and remanufacturing rates of parts from used vehicles or ELVs.

[42] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=End-of-life_vehicle_statistics&oldid=555195

[43] https://ec.europa.eu/info/law/better-regulation/have-your-say_en

[44] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02008L0098-2

These inefficiencies in recycling, recovery and reuse in the automotive industry will become more prevalent with continued industry growth. In October 2023, the EU car market expanded significantly, with new registrations surging by 14.6% to 855,484 units.[45] This marked the fifteenth consecutive month of growth, with notable increases in three of the largest markets: France (+21.9%), Italy (+20%), and Spain (+18.1%).

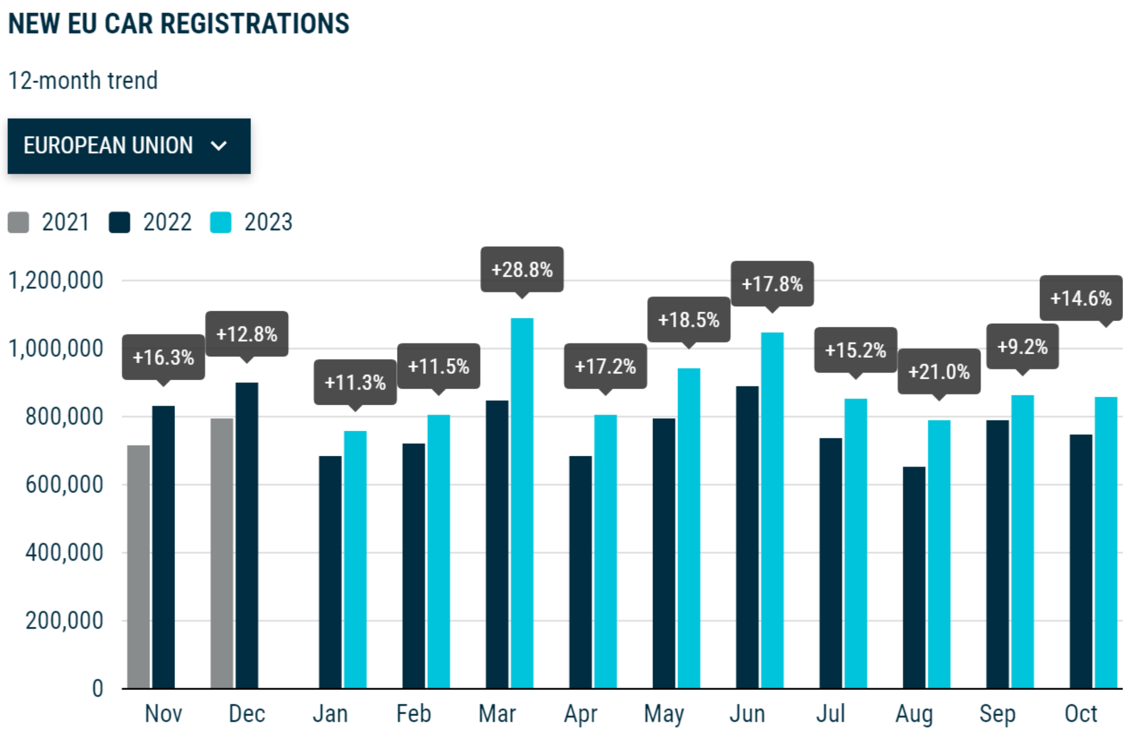


Fig 4.2 New EU car registration 2021 to 2023. Source: ACEA.[46]

4.2 Policy Options & Recommendations

To address the problems outlined in section 4.1 above, a specific objective has been set out in the EC proposal document: "'*Use recycled content: Significantly increase the use of recycled materials (especially plastics, steel, aluminium and CRMs) in the production of vehicles, thereby incentivising recycling, reducing*

[45] Press releases, 21 November 2023. | New car registrations: +14.6% in October; battery electric 14.2% market share. ACEA press release, 21 Novėmber 2023: New car registrations. https//acea.auto/pc-registrations/new-car-registrations-14-6-in-october-battery-electric-14-2-market-share/#:~:text=In%20October%202023%2C%20the%20EU,by%2014.6%25%20to%20855%2C484%20units.&text=This%20marked%20the%20fifteenth%20consecutive,and%20Spain%20(%2B18.1%25).

[46] https://www.acea.auto/nav/?content=press-releases

strategic dependencies of raw materials for the automotive industry and supporting the decarbonisation of the EU industry".

To address this specific objective, three policy options have been presented with varying levels of ambition:

- **PO2A** includes a requirement for recycled content targets for plastics in new vehicles of at least 6% of the overall plastics in the vehicle fleet by 2031 and 10% by 2035, of which 25% of recyclates originates from closed-loop recycling from ELVs.

- **PO2B** includes mandatory recycled content targets for plastics in newly type-approved vehicles of 25%, of which 25% from closed loop. This would represent an annual growth of 30% until 2031 compared to the average baseline in 2022. PO2B would set a mandatory recycled content target for steel at 20% for newly type-approved vehicles in the Regulation, with the target to be achieved seven years after entry into force.

- **PO2C** includes mandatory recycled content targets for plastics in newly type-approved vehicles of 30% of recycled content, of which 25% is from closed loop. PO2C would consist of a recycled content target for steel of 30% for newly-type approved vehicles, including a 15% closed loop percentage. In addition, the Commission would be (i) tasked to assess the desirability, feasibility and impacts of setting out recycled content targets in new vehicles for other materials, especially aluminium alloys, copper and CRMs such as rare earth elements or magnesium, and (ii), based on a feasibility study, empowered to set out recycled content targets for the materials in question.

While these policy options promote recycling, and include closed-loop practices, it is our submission that they need to be more ambitious to fully address the systemic change required for the automotive industry to embrace the circular economy. Additionally, they lack a clear mechanism for flexibility in targets, which may arise due to a wide range of contrasting factors, such as resource availability, technological advancements in resource recovery, and the higher use of alternative resources that may be seen in the proliferation of electric vehicles throughout the EU within the timespan of the proposed targets.

While PO2C has been correctly identified as the most ambitious policy option of the three suggestions, there is a range of improvements that could be made to add more clarity and coherence for effective implementation and coordination within the automotive industry. **Zero Waste Alliance Ireland** therefore proposes the following recommended changes in the revised ELV Directive:

Recommendation 1: Conduct Comparative Life Cycle Assessments (LCAs).

Comparative LCAs should be conducted for both business-as-usual and proposed policy scenarios. Due to the high cost of current recovery-treatment techniques, the scope of these LCAs must cover not just resource depletion and availability but also GHG emissions and energy consumption. Scenario analyses should also cover alternative recovery treatment methods. By completing these LCAs, more realistic recycling and reuse targets could be set, allowing for consideration of alternative materials beyond plastic and steel. The concerns from industry regarding the high cost of material treatment could be addressed by identifying environmental and energy hotspots in the EOL management of materials, and the best available techniques and practices could be provided to relevant industries. The results of these LCAs could also influence consumer awareness and behaviour by providing information on the environmental impact of vehicles. They would lend to the establishment of robust labelling and certification programs that prioritise materials with high reuse potential.

Recommendation 2: Standardisation of Plastic Usage in Manufacturing.

Plastics and composites recycling in the automotive industry is complex and challenging. Although simple plastic products (e.g., water bottles and food containers) are readily recyclable, plastics and composites in automotive applications are heterogeneous, have strong connections to other plastics, and are thus challenging to liberate for recycling.[47] Bio-based plastics present an exciting alternative to petroleum plastics, but the technology needs maturity before implementation.[48]

The EU should prioritise and mandate the standardisation of plastic usage in automotive manufacturing, focusing on transitioning towards biobased or natural materials. This strategic move is essential to foster the principles of the circular economy, promoting sustainability, resource efficiency, and the waste management hierarchy. Standardising the use of plastics in this sector would streamline recycling processes and facilitate the collection and reuse of materials.

By mandating the adoption of biobased or natural plastics in automotive manufacturing, the EU can take a significant step towards reducing its dependence on petroleum-based plastics and promote reuse within manufacturing.

Implementing standardised regulations for biobased plastics in the automotive industry would contribute to a more sustainable and circular economy and drive advancements in technology manufacturing processes. As the demand for

47 https://link.springer.com/article/10.1007/s10163-014-0244-z

48 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5456202/

biobased plastics increases, companies will be incentivised to invest in research and development, ultimately accelerating the maturity of this technology.

In addition to environmental benefits, mandating the use of biobased plastics in automotive manufacturing can stimulate economic growth. The EU could simultaneously promote the development of a thriving bioplastics industry, creating jobs and fostering innovation in the region. This strategic move would position the EU as a global leader in sustainable automotive manufacturing and could influence other areas to adopt similar policies.

5. Verification and Traceability of Recycled Plastics

In the pursuit of integrating recycled plastics into the automotive industry, **Zero Waste Alliance Ireland** wishes to emphasise the pivotal importance of verification and traceability in ensuring the authenticity and sustainability of recycled materials in the proposed Directive. This comprehensive approach not only aligns with environmental goals but also establishes a foundation for responsible and transparent business practices within the automotive sector.

Achieving targets on recycled plastics necessitates a robust system that verifies the origin and nature of plastic waste materials. Recognizing this imperative, it is our submission that the role of type-approval competent authorities in enforcing traceability measures should be included in the proposed Directive. These authorities should be able to require manufacturers of vehicles and vehicle components to provide certification attesting to the traceability of plastic waste materials.

5.1 Certification Requirements

The certification, as proposed by **Zero Waste Alliance Ireland**, should encompass detailed information on the origin and nature of plastic waste utilized in new type-approved vehicles. This information will become integral to creating a transparent and accountable supply chain, and it will act as a tangible proof of adherence to recycled content standards and will ensure that the materials used align with sustainability objectives.

5.2 Third-Party Audit Checks

In addition to manufacturers' self-certification, we recommend incorporating third-party audit checks for every vehicle containing recycled plastic parts and components; and it is our belief that external auditors can play a crucial role in independently verifying the accuracy and reliability of the information provided by manufacturers. This additional layer of scrutiny would not only enhance the credibility of recycled plastic targets but would also give confidence to consumers, regulatory bodies, and stakeholders across the automotive industry.

5.3 Holistic Approach to a Circular Economy

The call for traceability certification aligns seamlessly with broader goals of fostering a circular economy within the automotive industry in the EU. It establishes a clear link between the use of recycled materials and their origin, facilitating a closed-loop system where materials can be tracked and managed throughout their lifecycle. This holistic approach is essential for creating a sustainable and accountable ecosystem within the automotive industry.

5.4 Mitigating Greenwashing and Ensuring Compliance

In an era where environmental considerations are paramount, there is a heightened risk of greenwashing – the deceptive practice of presenting a misleading perception of environmental responsibility. Verifiable traceability becomes instrumental in mitigating this risk by providing a transparent and traceable record of the origin and nature of plastic waste materials used in the manufacturing process. Manufacturers, by substantiating their claims through traceability certification, can demonstrate a genuine commitment to using recycled materials, fostering trust among consumers and stakeholders.

Moreover, traceability acts as a potent tool for regulatory bodies and type-approval competent authorities to ensure compliance with set standards. By mandating manufacturers to provide certification, these authorities can systematically audit and verify the supply chain, curbing the potential for non-compliance or the use of substandard recycled materials. This not only fortifies the regulatory framework but also serves as a deterrent against practices that could compromise the integrity of targets for recycled plastic in vehicles.

5.6 Concluding Remarks on Verification and Traceability of Recycled Plastics

In conclusion, the integration of recycled plastics into the automotive industry demands a holistic approach to verification and traceability. **Zero Waste Alliance Ireland** therefore submits that type-approval competent authorities in Member States should be empowered to enforce traceability measures, and to request manufacturers to provide detailed certification. The incorporation of third-party audit checks will strengthens the credibility of the entire process, ensuring that recycled materials used in vehicles align with declared standards. This comprehensive strategy not only advances environmental sustainability but also reinforces the commitment of the automotive industry to responsible and transparent practices.

6. CONCLUSIONS

Vehicle production, use and disposal is associated with negative environmental impacts at every stage, and sometimes with negative social impacts. Tackling the problem of end-of-life vehicle waste is challenging and **Zero Waste Alliance Ireland** welcomes the effort of the EU Commission to address these issues.

However, we advocate that the best way to minimise the impacts of end-of-life vehicle waste is to prevent it in the first place. This can be achieved through investment and development in public transport infrastructure in cities and rural areas, with the added benefit of positive social and human health impacts.

Furthermore, ecodesign of vehicle parts and tyres can play a part in minimising the constraints and negative environmental impacts of ELV waste processing. Lastly, the substitution of synthetic fossil fuel derived plastics and rubber in vehicles and tyres can only be sustainably achieved if there is a simultaneous decrease in the demand and production of vehicles. Without a decrease in vehicle production, plant-based materials will compete for land-use with food crops, thereby driving up food costs.

Considering all these points, the problem of ELV waste is multi-faceted and requires simultaneous action across several industries including waste management, agriculture, civil infrastructure, private manufacturing companies and the fossil fuel industries.

The integration of recycled plastics into the automotive industry demands a holistic approach to verification and traceability. It is our submission that the proposed Directive should mandate the establishment of competent authorities in Member States; and these should be empowered to enforce traceability measures, and to request manufacturers to provide detailed certification. The incorporation of third-party audit checks should also be required by the proposed ELV Directive in order to strengthen the credibility of the entire process, and to ensure that recycled materials used in vehicles comply in all respects with declared EU standards. Our suggested strategy would not only assist the development of the circular economy for vehicles, but would help to improve environmental sustainability, and may also reinforce the commitment of the automotive industry to responsible and transparent practices.

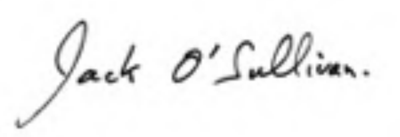
Turning to the proposed and currently adopted revised ELV Directive, it is our conclusion that the proposed regulation for ELVs is quite rigorous.

The requirement for producers to pay for the cost of collection, dismantling and recycling of the vehicles they sell is welcome. In theory this should incentivise the production of long-lasting durable vehicles that are easy to dismantle and recycle. This requirement should also increase the repairability of vehicles since a vehicle that is continuously repaired will not be scrapped before it has reached the end of its useful life.

Crucially, measures to prevent "planned failure" of vehicle parts are not included in the regulation. This is a major missed opportunity to bring the automotive industry closer to the circular economy aimed for in the European Green Deal.

It is our submission that the that the proposed directive also fails to discourage the increasing number of vehicles (especially larger "cars" such as SUVs) placed on the European market, it does not align with the EU policy of reducing dependence on private car use, and fails to ensure that end of life vehicles exported from EU Member States do not become "waste" in third countries.

Jack O'Sullivan



Zero Waste Alliance Ireland

This submission was researched and written by Jack Coffey (ZWAI member and director), Luke Fegan (ZWAI member and director), Nazia Naheed Husain (ZWAI member), and Jack O'Sullivan (ZWAI founder member and director); and was edited by Órla Coutin (ZWAI administrator and researcher), and Jack O'Sullivan.

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