Up2Circ – Boosting the Uptake of Circular Business Model, Product and Process Innovation

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Sectorial catalogue

Mobility

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Content

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Short introduction to the industrial ecosystem / content focus

The circular economy is a new and inclusive economic paradigm that aims to minimize pollution and waste, extend product lifecycles, and promote the sharing and repurposing of physical and natural assets.
While circularity is already commonplace in certain industries such as packaging, the transport sector still has a long way to go. The production of components going into vehicles—steel, plastics, glass, aluminum, rubber, paints, etc.—remains a resource- and carbon-intensive process. To turn this around and reduce its environmental footprint, the sector will need to rethink asset utilization, components production, and lifetime optimization in a fundamental way. *Source:* Defining the role of transport in the circular economy (worldbank.org)

Mobility is furthermore a vital part of a thriving urban economy, but mobility solutions that do not take account of economic, environmental and societal impacts, can also be detrimental to urban life. Current linear practices in urban mobility, such as a high dependence on individual car ownership and fossil fuels, have created high levels of congestion leading to wasted time and lost productivity, as well as pollution, noise, heat-island effects, and the depletion of finite resources. Dependence on individual cars in cities can also be a strain on household budgets and can lead to high amounts of urban land devoted to parking. With urbanisation and the demand for urban freight rapidly increasing, the need for more effective urban mobility solutions are pressing. Given this, circular economy principles to design out waste and pollution, keep materials in use and at value, and regenerate natural systems provide the much-needed solution. *Source: emaf_ce-in-cities-factsheets-mobility_all_mar19.pdf (europa.eu)*

Transport today accounts for nearly 30 percent of the CO_2 emissions within the European Union. The EU needs to reduce its transport and mobility emissions while connecting citizens, creating green jobs and leading the innovation in the sector.

As stated in the European Commission 'Sustainable and Smart Mobility Strategy' together with an Action PlanEN•••, mobility and transport matters to us all. From daily commuting to work, visiting family and friends, tourism, to the proper functioning of global supply chains for the goods in our shops and for our industrial production, mobility is an enabler of our economic

and social life. Free movement of people and goods across its internal borders is a fundamental freedom of the European Union and its single market. Travelling in the EU has led to greater cohesion and a strengthened European identity.

The transport and mobility sector is furthermore the second-largest area of expenditure for European households, it contributes 5% to European GDP and directly employs around 10 million workers.

As already mentioned above, there's a dark side and it is represented by greenhouse gas emissions, air, noise and water pollution, accidents and road crashes, congestion and biodiversity loss all of which affect our health and wellbeing.

The European Green DealEN••• requires a 90% reduction in greenhouse gas emissions from transport, in order for the EU to become a climate-neutral economy by 2050. Let's see in details what this means.

Challenges for the sector with regard to sustainability demands, including a brief overview of relevant regulations

In 2020, restraints due to Coronovirus forced the sector to reimagine itself. Transport has been in fact one of the sectors hit hardest by the COVID-19 pandemic. The EU has now an opportunity to build a mobility system that is sustainable, smart, and resilient: a system for future generations

Milestones to be reached, according to EU Commission plan for green, smart and affordable mobility, **by 2030** are the following:

- at least **30 million zero-emission cars** will be in operation on European roads
- **100 European cities** will be **climate neutral**.
- high-speed rail traffic will double across Europe
- scheduled collective travel for journeys under 500 km should be carbon neutral
- automated mobility will be deployed at large scale
- zero-emission marine vessels will be market-ready

By 2035

- zero-emission large aircraft will be market-ready

By 2050

- **nearly all cars, vans, buses as well as new heavy-duty vehicles will be zero-emission**.
- rail freight traffic will double.
- a fully operational, multimodal Trans-European Transport Network (TEN-T) for sustainable and smart transport with high speed connectivity.

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The Eu is now also working on vehicles management at the end of their life. At present they are not being handled in an optimal way, resulting in loss of resources and pollution. Modern, low-emissions vehicles need light-weight materials, batteries and electronic components, which are dependent on imports and can be difficult to recycle. A set of rules is now being proposed to improve the quality of end-of-life treatment, incentivise reuse, and make the most efficient use of precious resources. Source: End-of-life vehicles Regulation (europa.eu)

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CE opportunities for the sector, including best practices

Some key actions that can help achieve a circular economy for transports are listed below:

1. **Utilization improvement**: On average, cars sit idle for more than 90% of their time, and only 1.5 of the typical five seats are occupied. Innovative business models that embrace Mobility-as-a-Service (MaaS), such as ride-sharing, help increase asset utilization. However, to fully embrace circularity, transport must look beyond MaaS business models to combat all forms of waste.
2. The **design** of mobility assets – from vehicles to infrastructure – is key to reaping the benefits of a circular economy transition. Decisions made at the design stage of an asset strongly determine whether waste and pollution are designed out of the system, and whether the asset and the materials in it can be kept in use at their highest value. The design of mobility assets also has an impact on the number of vehicles on the roads, how easily vehicles can be adapted for variable use, whether mobility assets can support the urban energy system, and what type of materials they can be made of
3. By incentivising and supporting **new vehicle manufacturing and infrastructure construction techniques**, cities can improve the use of resources and reduce traffic disruption. Vehicles and transport infrastructure account for significant material consumption and waste generation in cities. These negative impacts can be countered through circular economy actions that engage with infrastructure and vehicle manufacture. For example, recycling end-of-life tires is a significant challenge in the transport sector. Tire manufacturers are now offering innovative service packages that include maintenance, real-time tire condition monitoring, and other services to optimize the lifespan of tires and decrease resource utilization.
4. Vehicles, roads, and street lights can often be operated and managed better. Simple solutions and new technologies can help cities to get more out of their mobility assets (for example through reducing energy use or material use in repairs), while new business models can help overcome financing barriers and create positive incentives.

For more insights and details: [emaf_ce-in-cities-factsheets-mobility_all_mar19.pdf (europa.eu)]

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By transitioning towards a circular economy and making consistent efforts to reduce waste, emissions from the materials used in vehicle manufacturing could be reduced by 70% by 2050. This reduction would be equivalent to approximately 285 million tons of CO2 equivalent. *Source: https://blogs.worldbank.org/transport/defining-role-transport-circular-economy*

Adopting the circular economy for transportation means seeing a fuller scope of meaningful change on the horizon; whether that's reducing end-of-life waste or embracing materials in the planning and design of new, innovative solutions. *Source: Transport and its role in the circular economy - Research & Development World (rdworldonline.com)*

These actions are not exhaustive but provide a starting point for achieving a circular economy for transport. Some examples of best practices in the sector can be found below.

Materials

AIMPLAS research: thermoplastic composites for vehicle batteries could improve both energy efficiency and recycling rates | European Circular Economy Stakeholder Platform (europa.eu): The aim of the project is to optimise the transformation processes of thermoplastic composites in order to improve their properties so they can replace metals in electric vehicle battery casings. This will reduce battery weight and, therefore, battery consumption, while providing a sustainable new solution based on circular economy criteria.

RECOTRANS: microwaves and laser welding for recyclable composites in transportation | European Circular Economy Stakeholder Platform (europa.eu) Through the use of new materials and manufacturing processes, RECOTRANS helps produce lighter and, therefore, less polluting vehicles without increasing costs. Researchers have obtained a reduction in costs and energy consumption in the manufacture of three prototypes. They have also confirmed the feasibility of recycling and processing the resulting material.

Mobility as a Service

Stroller sharing: busy moms and dads can enjoy easier trips to the shops with Buggybooker | European Circular Economy Stakeholder Platform (europa.eu) The Buggy Booker is a convenience service that eases usage of public transport and urban mobility, access to shops or simply family trips.

"+Ricicli +Viaggi" makes it possible to pay for metro rides with plastic bottles | European Circular Economy Stakeholder Platform (europa.eu) The Roman public transport provider, Atac, in partnership with Coripet (Italian Consortium for PET recycling), has launched +Ricicli +Viaggi (the more you recycle, the more you travel), a pilot scheme where riders can pay for travel with PET bottles.

Aviation

SUSTAINair: bringing the aerospace and aviation sectors in line with circular principles | European Circular Economy Stakeholder Platform (europa.eu) This EU-funded research aims to make the entire aviation supply chain ecosystem greener, in line with the Circular Economy Action Plan, and to set new standards for aerospace manufacturing, enabling an increase in cross-sector synergies.

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Overview of tech-savvy SMEs that develop/offer solutions to increase circularity in the sector

- AELS | Aircraft End-of-Life Solutions, We love aircraft ELS buys end-of-life aircraft, then highly skilled mechanics carefully disassemble them.The removed parts are then placed in inventory, recertified and returned to the market.
- Maersk: designing ships that can be dismantled and reused | European Circular Economy Stakeholder Platform (europa.eu) Maersk is a Danish logistics operator dedicated to providing maritime navigation services, with a fleet of container ships. Maersk has been developing ways to build recyclable ships that can be dismantled and reused.
- The company | Greenrail (greenrailgroup.com) The technology developed by Greenrail allows the production of railway sleepers with secondary raw materials, using a blend of rubber collected from ELTs (End of Life Tyres) and plastic from urban waste.
- Reefilla | Ricarica Auto Elettriche | Milano EV charging made easy. Your car recharged anywhere, anytime.
- Heliox | Chi siamo (heliox-energy.com) charging solutions for every vehicle
- EIT Urban Mobility supports launch of revolutionary “Apanha-me!” app | EIT (europa.eu) Apanha-Me
- Home EN (id4mobility.org) ID4Mobility is a European mobility cluster acting in West France, Europe and internationally. Through a collaborative approach, they bring together 400+ members focusing on smarter Mobility. They have been supporting 50 EU projects and 250 members in the development of their large-scale innovation projects since 2006.
- Wetaxi: the fixed-price taxi - The app calls an Italian taxi that fixes the cost of the ride
- Europe's top 50 Clean Mobility startups for 2022 - Startupprize
- Top 10 startups for 2023 - Startupprize

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Links to sector specific online contents, including sector specific funding opportunities

- Zero Emission Area Handbook | McKinsey & Company
- EUMobilityatlas2021_2ndedition_FINAL_WEB.pdf (boell.org)
- emaf_ce-in-cities-factsheets-mobility_all_mar19.pdf (europa.eu)
- Fit for 55: towards more sustainable transport - Consilium (europa.eu)

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