

# Alternative futures for the Circular Economy and its effects on Occupational Safety and Health in 2040

**Workshop 2: Sectors most affected  
29 March 2022**

## **Summary Report**

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## Introduction

The European Agency for Safety and Health at Work (EU-OSHA) has for several years been applying foresight approaches as part of its mission to contribute to safer and healthier working conditions in the EU. Its foresight approach looks at changes that may take place in the future and considers what their consequences could be for occupational safety and health (OSH), with the aim of supporting policymaking and raising awareness to reduce work-related accidents and ill health.

Within EU-OSHA's 3rd foresight cycle,<sup>1</sup> work is focused on the circular economy (CE) and its effects on OSH, primarily within the European context. This project is carried out against the background of an EU policy shift towards more environmentally sustainable practices, with several policy initiatives driving efforts in the CE arena.<sup>2</sup> These initiatives, and indeed the CE as a whole, are widely considered to be critical and influential developments that will be beneficial to the action against climate change and will ultimately have impacts on jobs and on OSH.

Initiated in 2020, Phase 1 of the project explored different ways in which future jobs may be impacted by efforts towards implementing a CE, and what consequences this may have for OSH in the future. This was realised through the development of four macro-scenarios focused on the CE and its effects on OSH, drawing strongly also from previous foresight work undertaken by EU-OSHA. Phase 2, the current project phase, focuses on the dissemination and tailoring of the macro-scenarios developed in Phase 1, via stakeholder engagement.

Through a series of four workshops, the macro scenarios developed in Phase 1 are being disseminated in order to strengthen and maximise the impact of the overall foresight study, and to dive deeper into sectoral and stakeholder perspectives. This is being realised, in part, via the tailoring of the Phase 1 macro-scenarios through the development of micro-scenarios focussing on the specific target groups present at each of the workshops. The resulting micro-scenarios will be presented in a final report at the conclusion of Phase 2 of the project (ca. end of 2022).

This workshop summary report provides an overview of the outputs from the second workshop held on 29 March 2022, which focussed on implications from the macro-scenarios for the most affected sectors.

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<sup>1</sup> Previous foresight cycles completed by EU-OSHA used scenario-building to explore future risks related to work in 'green' jobs and related to digitalisation.

<sup>2</sup> The key related policy initiative is the European Green Deal initiative, which has the overarching aim of making Europe climate neutral by 2050 (see [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)). Alongside the Green Deal initiative sits the Commission's 2015 CE package, comprising - an EU action plan for the CE ('Closing the Loop') with 54 concrete actions to achieve a CE, many with significant policy and regulatory implications for the EU's waste and recycling sector (see <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614>).

## Workshop aims, expected outputs and agenda

### Overall aims

- To provide participants with an understanding of what foresight is and its function in enhancing policy making (on a European, national, sectorial and/or company level) (i.e. anticipatory governance)
- Introduce participants to the scenarios and the likely implications these may have for OSH in the future (i.e., diving into stakeholder and sectorial perspectives)
- Enable participants to think about what these implications might mean for different sectors

### Expected outputs

- Dissemination of the Phase 1 macro-scenarios in a clear and memorable way
- Strengthen and maximise the impact of the overall foresight study (while positioning EU-OSHA an inclusive, forward-thinking and solution providing organisation)
- Content-wise, collect insights and input for the development of the micro-scenarios, here focussing on implications for most affected sectors

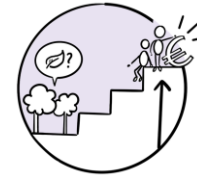
### Agenda

<b>Opening Remarks &amp; Intro to Workshop and CE and OSH Scenarios – Plenary</b>	
09:30 – 10:20 CET	Annick Starren (EU-OSHA): Short Intro & Welcome Cornelia Daheim & Jessica Prendergast (Future Impacts): Intro to the foresight process and the four macro-scenarios All: Q&A
<b>Working Session 1: Implications from CE for affected sectors until 2040 – Group work</b>	
10:35 – 11:25 CET	Guiding question for the group work: What changes could the different scenarios bring about for different sectors? Including which different sectors will be affected and how (specifically regarding OSH aspects)
<i>Short Break</i>	
<b>Working Session 2: Implications from CE for affected sectors until 2040 - Part 2 – Group work</b>	
11:30– 12:15	Guiding question for the group work: What changes could the different scenarios bring about for different sectors? Including which different sectors will be affected and how (specifically regarding OSH aspects)
<i>Lunch Break</i>	
<b>Working Session 3: Road-mapping / (OSH) levers for supporting most affected sectors – Plenary / Group work</b>	
13:15 – 14:00	Guiding question for the group work: What could be done to improve perspectives for the sectors most affected (with a focus on CE/OSH)? Which actors and stakeholders play a key role in this? What are key levers, i.e., most important measures?
<b>Sharing Results, Final Reflections &amp; Next Steps - Plenary</b>	
14:00 – 14:30	All: Key insights from group discussions All: Final comments and reflection / Q&A Annick Starren (EU-OSHA): Wrap-Up, Next Steps and Closing Remarks
Workshop End	



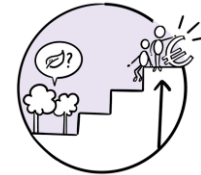
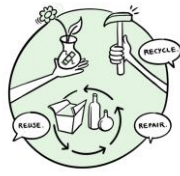
## Overview of the results from the working groups

### Key changes from the scenarios for the most affected sectors



Sectors	The roaring 40's – fully circular and inclusive	Carbon neutrality – of a hazardous kind	Staying afloat – amid economic and environmental crises	Regional Circularities – with European Divides
Energy sector	<ul style="list-style-type: none"> <li>Diversification of (renewable) energy sources</li> <li>Efficiency as a major lever</li> </ul>	<ul style="list-style-type: none"> <li>Emergence of new jobs with higher competitiveness (large-scale need for retraining)</li> <li>Regional differences &amp; fragile supply chains</li> </ul>	<ul style="list-style-type: none"> <li>Energy sources dictated by price &amp; energy security concerns</li> <li>Green infrastructure is aging &amp; needs maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Increased dependence on fossil fuel producing countries</li> <li>Division of workforce between highly paid &amp; precarious</li> </ul>
Transport sector	<ul style="list-style-type: none"> <li>New types &amp; forms of transportation emerge (e.g., EVs, shared models)</li> <li>Improved accessibility &amp; emission regulation</li> </ul>	<ul style="list-style-type: none"> <li>Greater numbers of local traffic &amp; EVs</li> <li>Optimized logistics (incl. EV) may lead to problems related to driver's resting times</li> </ul>	<ul style="list-style-type: none"> <li>Market drives increased use of all forms of transportation</li> <li>Public transportation becomes more expensive &amp; chaotic</li> </ul>	
Manufacturing sector	<ul style="list-style-type: none"> <li>Design for recyclability</li> <li>Circular production including ethical considerations</li> </ul>	<ul style="list-style-type: none"> <li>More design-focused jobs</li> <li>New modes of management (digital Taylorism)</li> </ul>	<ul style="list-style-type: none"> <li>Europe dependent on imports of scarce natural resources</li> <li>Price competition hinders improvement towards circularity</li> </ul>	<ul style="list-style-type: none"> <li>Increasing surveillance &amp; micromanagement</li> <li>Competition for virgin materials &amp; recycled goods</li> </ul>
Construction sector	<ul style="list-style-type: none"> <li>Circular construction design &amp; materials (i.e. life cycle perspectives &amp; increase in modular design &amp; prefab constructions)</li> <li>Demolition becomes part of everyday business</li> </ul>	<ul style="list-style-type: none"> <li>Renovation, rebuilding &amp; waste work increases (alongside increased safety concerns)</li> <li>Recycled materials increasingly used - without knowledge of possible hazards</li> </ul>	<ul style="list-style-type: none"> <li>Competition for natural resources</li> <li>Migrant workers &amp; automation make up greatest share of workforce</li> </ul>	<ul style="list-style-type: none"> <li>Demand for virgin materials exceeds supply</li> <li>Not so easily recyclable materials are just 'dumped'</li> </ul>
Agriculture, forestry and food sectors	<ul style="list-style-type: none"> <li>Use of advanced tech (e.g., AI, smart farming, vertical farming, precision fermentation) reduces resource input</li> <li>Shortened supply chains &amp; more localised production</li> </ul>		<ul style="list-style-type: none"> <li>Insufficiently regulated technology &amp; chemical use</li> <li>Sectors fully dependent on technology (e.g., drones, GM crops)</li> </ul>	
Waste, recycling and environmental remediation sectors	<ul style="list-style-type: none"> <li>Massively growing sector with new emerging methods &amp; (higher paid) work opportunities</li> <li>AI &amp; robotics increasingly assist in sorting &amp; recycling of harmful materials</li> </ul>	<ul style="list-style-type: none"> <li>Rapid reskilling necessary</li> <li>More local &amp; informal work, as well as increase in unpaid repair work</li> </ul>	<ul style="list-style-type: none"> <li>Increase in informal waste management activities</li> <li>Two tier waste system: Valuable (i.e., reusable/recyclable materials) &amp; "dumping" at lowest cost of non-valuable materials</li> </ul>	<ul style="list-style-type: none"> <li>Waste processing becomes 'ghettoised'</li> <li>More waste incineration &amp; less circularity</li> </ul>

## Key implications from the scenarios for sectors and for OSH



Sectors	The roaring 40's – fully circular and inclusive	Carbon neutrality – of a hazardous kind	Staying afloat – amid economic and environmental crises	Regional Circularities – with European Divides
Energy sector	<ul style="list-style-type: none"> <li>Shortage of skilled renewables' workers may lead to high production pressure &amp; increase of accidents</li> <li>Decentralised &amp; local energy production (e.g., in households) outside OSH realm</li> </ul>	<ul style="list-style-type: none"> <li>Psycho-social stress from redundancies in carbon-intensive industries</li> <li>Unknown OSH risks may emerge green industries – due to rapid pace of change in the sector</li> </ul>	<ul style="list-style-type: none"> <li>OSH risks strongly individualized &amp; liabilities unclear</li> <li>Loss of skills &amp; knowledge with regards to OSH in transitioning industries</li> </ul>	<ul style="list-style-type: none"> <li>Decreasing health &amp; working capacity of older workforce</li> <li>Rising psycho-social stress and tensions in the workplace (i.e. due to widening societal divide)</li> </ul>
Transport sector	<ul style="list-style-type: none"> <li>More OSH regulation required for platform workers</li> <li>Advanced public transport schemes &amp; fewer accidents</li> </ul>	<ul style="list-style-type: none"> <li>New skills constantly needed alongside new tech</li> <li>OSH risks related to producing &amp; recycling batteries</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance of green vehicles relies on skilled workforce</li> <li>Divide between high paid &amp; precarious jobs</li> </ul>	
Manufacturing sector	<ul style="list-style-type: none"> <li>Life cycle perspective in risk assessment at the design stage</li> <li>New processes &amp; new materials could lead to new risks, especially if the rate of change is fast</li> </ul>	<ul style="list-style-type: none"> <li>Overstrained workers may no longer stick to protocols &amp; endanger themselves</li> <li>Competition increases stress levels</li> </ul>	<ul style="list-style-type: none"> <li>Only minimal risk assessments performed with new materials</li> </ul>	<ul style="list-style-type: none"> <li>Automation &amp; digitalisation could increase perceived job insecurity</li> <li>Environments with less colleagues &amp; more machines increase stress</li> </ul>
Construction sector	<ul style="list-style-type: none"> <li>Neglect of traditional hazards (e.g., asbestos)</li> <li>Increasing level of sub-contract work</li> <li>AI: Inherent bias as well as ability to impair workers concentration</li> </ul>	<ul style="list-style-type: none"> <li>Construction and maintenance of renewables' may place workers at risk</li> <li>Deconstruction of old buildings to make them greener entail risks (e.g., asbestos)</li> </ul>	<ul style="list-style-type: none"> <li>Cross-cultural problems in understanding &amp; valuing OSH</li> <li>Increasing health hazards with no mechanism to compensate workers properly</li> </ul>	<ul style="list-style-type: none"> <li>Rapidly emerging new technologies can lack necessary safety features</li> <li>Rapid introduction of new materials could lead to unforeseen risks</li> </ul>
Agriculture, forestry and food sectors	<ul style="list-style-type: none"> <li>More fine-tuned use of pesticides &amp; fertilizers</li> <li>OSH risks shifted towards laboratories (e.g., lab food)</li> </ul>		<ul style="list-style-type: none"> <li>OSH reduced to mere add-on &amp; not mandatory</li> <li>Potential health hazards for machinery operators &amp; others from new tech e.g. drones &amp; robots</li> </ul>	<ul style="list-style-type: none"> <li>Urbanised biowaste to be used as e.g., fertiliser reducing the need for chemical fertilisers</li> </ul>
Waste, recycling and environmental remediation sectors	<ul style="list-style-type: none"> <li>OSH risks due to new forms of recycling &amp; waste sorting</li> <li>Risks related to employing unskilled labour – largescale reskilling required</li> </ul>	<ul style="list-style-type: none"> <li>Increased automation will go together with management by algorithm &amp; surveillance</li> <li>Unsafe collection &amp; sorting of hazardous materials</li> </ul>	<ul style="list-style-type: none"> <li>OSH risks for non-trained gig workers</li> <li>Recycling plants as local pollution hotspots</li> </ul>	<ul style="list-style-type: none"> <li>Informal workers have less protective equipment &amp; e.g., higher injury rates</li> <li>Increased automation will go together with management by algorithm, constant surveillance and people being treated as machines</li> </ul>

Key needs and priorities for action and policy (i.e. OSH levers)

**Levers for supporting most affected sectors – across the scenarios**

*All sectors / cross-cutting:*

**Broaden coverage of OSH / Blur sectoral boundaries (i.e. cross-sectoral collaboration):**

- Broaden OSH scope: Make OSH become a facilitator of the green transition (implies training needs/shift towards e.g., integrating life cycle perspectives, design thinking etc.) and become pro-active (i.e. Implementing a foresight / anticipatory approach; Coordination / cooperation with standards community) and make OSH natural to invest beyond bureaucraties (changing the involvement and responsibility paradigm from I must to I want)
- Innovation policy: Transformative innovation policy provides tools and ideas for crossing boundaries, as OSH and CE can provide good examples to eliminate silo thinking
- Upscale cooperation and harmonization: Improve links between key EU agencies i.e., EEA and EU-OSHA, harmonize standards across EU and make practices comparable across the EU
- Continuous (and cross-sectoral) research on materials/chemicals/hazards as well as their limitation/legislation concerning emissions

**Getting (and staying) 'ahead of the curve'**

- Stay on top of new developments, identify emerging risks and align policies (e.g., try to integrate regulations into growing informal economy)
- Digitisation: Integrate OSH aspects in new digital systems and improve transparency of digital/algorithm-driven management systems
- Mental Health: Requires new forms of assessment, monitoring, safeguarding, need better and more precise regulation and control of parameters
- Include HF/ OHS issues in the requirements for investment funds

**Training, upskilling, and reskilling:**

- Expand OSH education approach: Embed OSH skills and knowledge and new qualifications related to the CE at universities and in vocational trainings and pursue a Lifelong- learning approach with regards to reskilling for new technologies
- Approved employer schemes: Allow employers to gain official OSH accreditation so that freelance employees can ensure they are working for reputable employers

*Sector specific:*

- **Energy sector:** Develop safe maintenance strategies for green technologies and offer better and comprehensive reskilling courses/resources
- **Transport sector:** Introduce rules for dealing with new hazards posed by autonomous driving and the use of driver assistance systems
- **Manufacturing sector:** Include OSH experts in CE design processes with focus on the dismantling/repairing process of a product; introduce recycling concerns into design regulations
- **Construction sector:** 1) Limit the number of materials/chemicals able to be included in one component; 2) Raise EU investment in green housing and energy efficient buildings
- **Agriculture, forestry and food sectors:** Strengthening processes around the introduction of new materials i.e., EU-wide database, encourage research collaboration on new materials i.e. from properties all the way to end-of-life
- **Waste, recycling and environmental remediation sectors:** 1) Find strategies to include informal workers in OSH education (i.e., offer payment for workers who attend OSH training) & invest in research/policy action to formalize informal waste workers; 2) Upscale the localise recycling

economies (i.e. invest in more sorting and recycling plants) while introducing stricter regulations on waste exports

## Discussion and conclusions

The group exercises and discussions at the workshop focussed on identifying key changes from the macro-scenarios for most affected sectors to 2040, as well as specific OSH implications. It found that across all four scenarios, both positive and negative repercussions will likely be felt across all sectors, with particular consideration placed on the role that automation and cross-sectoral collaboration can play in reducing the negative health and safety impacts on workers of the transition to a circular economy. Notably, the waste, recycling, and remediation sector was identified by workshop attendees as a key sector in which it will become increasingly necessary to prioritise (e.g. with focused research, policy, education, etc.) to ensure adequate health and safety outcomes for workers; followed by the construction, manufacturing, and energy sectors.

While this workshop was only the second in a series of four workshops to be completed in 2022, it's possible to already draw some initial conclusions on key actions and policy initiatives needed to support sectors most affected in the transition to the CE as detailed in the four macro-scenarios. Across the working groups, three key cross-cutting policy levers<sup>3</sup> were identified by the workshop attendees, these included:

- A call to **broaden the reach and coverage of OSH** across EU policies requiring assessments in the domain of health and safety, security and/or sustainability as well as **increasing cross-sectoral dialogue and collaboration** to limit any future negative impacts of the transition to a CE, and particularly those that could emerge from 'silo mentality'.
- A need to **get (and stay) 'ahead of the curve' regarding research and regulation on new technologies and developments** related to the CE and any potential associated health and safety issues, to ensure workers receive **the most-up-to-date safety information and training possible**.
- Expanding the **role and reach of training, upskilling, and reskilling** workers (both those who are currently employed and those currently unemployed) under the concept of 'lifelong learning' to ensure that workers are equipped for future workplaces and the ever-changing job landscape.

In looking ahead to upcoming project steps, the focus will remain on disseminating the macro-scenarios to key stakeholder groups while simultaneously identifying and collecting a wide-range of varied perspectives on what the implications of any shift to a CE may be for workers and workplaces of the future. The final project report (likely to be published around the end of the 2022) will bring together the key insights from across all four workshops, while highlighting upcoming challenges (and opportunities) for OSH for key stakeholders based on potential CE developments. As a key outcome of this project phase, the final results will also discuss the needs for research, policy and action that emerged across the stakeholder workshops, as well as putting forward recommendations and highlighting gaps and identify for future actions and research needs to improve the health and safety of workers in the future.

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<sup>3</sup> Additionally, key sector-specific policy levers were also identified by workshop attendees which are outlined in detail on pages 4, 5 and 6 of this summary report.