FORESIGHT STUDY ON THE CIRCULAR ECONOMY AND ITS IMPACTS ON OSH: PROCESS AND KEY FINDINGS

Project background

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 and improve safe and healthy working environments.

Within its third foresight cycle, work is focused on the circular economy (CE)[1] 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.[2] 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 aimed to explore 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 achieved through the development of four macro-scenarios focused on the CE and its effects on OSH up to 2040, drawing strongly from previous foresight work undertaken by EU-OSHA. Phase 2 focused on the dissemination and tailoring of the macro-scenarios developed in phase 1 via stakeholder engagement, with the aim to involve a wide range of views in discussing the potential future effects on OSH from a shift to a CE. While Phase 1 of the project presented the macro-scenarios (or framework scenarios), phase 2 concentrated on zooming in on the details of stakeholder and sectoral perspectives to develop micro-scenarios that aim to shed further light on the working conditions and OSH implications within each scenario world.

The phase 1 macro-scenarios: four different CE (and OSH) futures until 2040, in the EU

The four macro-scenarios were generated via a key factor-based scenario methodology drawing from an extensive literature analysis (which included significant parts of earlier foresight work done by EU-OSHA) and expert interviews. A narrative was then developed for each scenario, describing the world in 2040, including how the development pathways came to be, and levers and turning points. Special emphasis was placed on the effects on working conditions, as well as a first review of potential implications for OSH.

With their wide variations with regard to the potential pathways to a European CE, the scenarios demonstrated how different the effects on working conditions could be. Potential implications for worker health and safety cover a correspondingly wide area, from a transformation approach that integrates OSH considerations at all stages, from product development and design to end-of-life recycling, to a world in which policymakers and stakeholders fail to grasp the opportunity to shape developments and where economic success comes at the expense not only of the environment but also of worker safety and health, and in which OSH is relegated to the side lines.

Illustration showing an overview of the four scenarios

The phase 2 dissemination workshops and development of the micro-scenarios

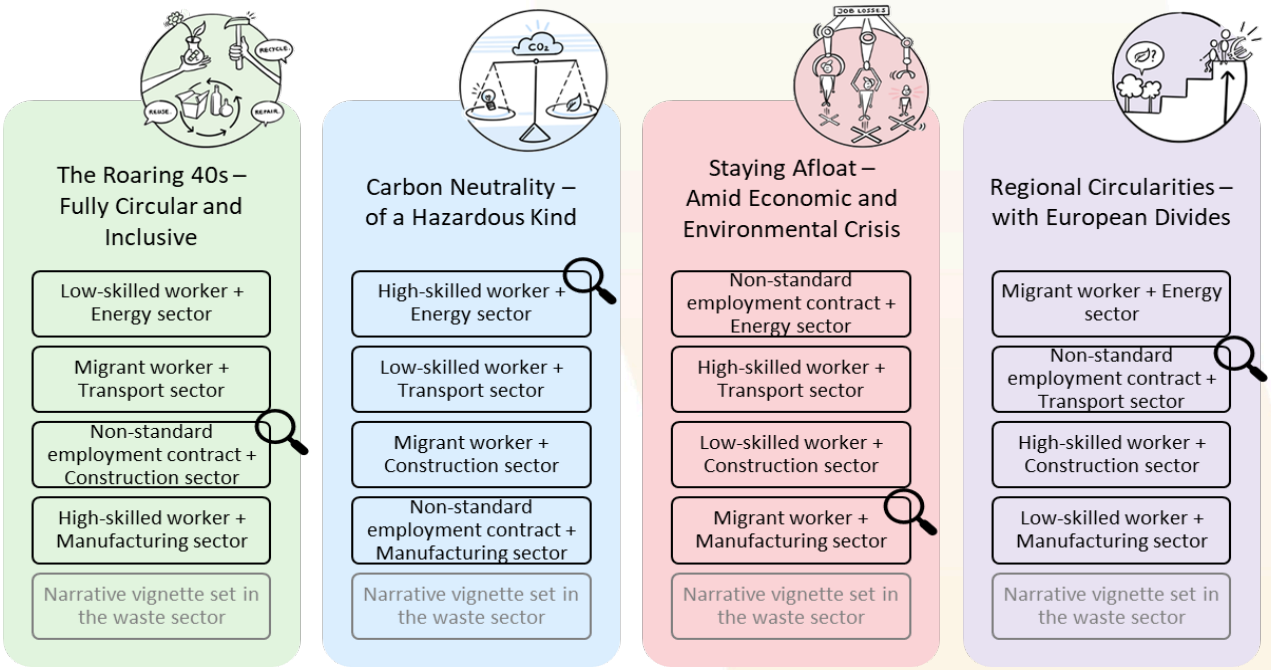
[1] For the purpose of this project, we have followed the definition of a CE put forward by the Ellen MacArthur Foundation: 'A Circular Economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.' See: https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy

[2] The key policy initiative in this space is the EU Commission's European Green Deal initiative that 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). Alongside the Green Deal initiative sits the Commission's 2015 CE package, comprised of 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).

Phase 2 of the project centred on the dissemination and tailoring of the scenarios via stakeholder dialogue at four workshops held in 2022. A stakeholder mapping exercise was undertaken to ensure workshop participants were well balanced with regard to organisational type, professional expertise and focus, as well as tripartite attribution to ensure that the results were informed by a wide range of perspectives. During the four workshops, the phase 1 macro-scenarios were used as input to encourage dialogue and reflection, with stakeholders being invited to explore future possibilities and identify specific implications for OSH.

While in phase 1 of the project macro-, or framework, scenarios with an emphasis on overall developments were developed and explored, phase 2 concentrated on zooming in on the details of stakeholder and sectoral perspectives to create a set of 16 micro-scenarios. Insights from the four workshops were then aggregated, integrated and clustered to develop 16 micro-scenarios that 'zoom in' on specific groups of workers and sectors in each macro-scenario. The 16 micro-scenarios aim to shed light on working conditions and OSH implications within each macro-scenario.

Illustration showing the logic of the macro- and micro-scenarios and stakeholder and sectoral perspectives.



Key project findings

The phase 1 and phase 2 scenarios illustrate how widely the challenges for OSH may vary in the coming decades. However, they all underline the key message that the current decade will be crucial for Europe's future: How can we realise a process in which the speedy transition to carbon neutrality is successfully managed, where changes also contribute to increased safety and health of workers?[3]

A number of potential opportunities and risks for future OSH as a result of a CE in the EU were identified across the four workshops. Where the implications identified by the participants were also backed up by findings from the phase 1 research, references are provided. Implications in blue have a positive impact on worker safety. The table is limited to significant implications, that is, to those affecting larger groups or subgroups of workers, and is hence not exclusive. Those that were identified as cross-cutting implications (i.e. those that cut across three or more scenarios) are listed in the table below by workplace risk category.[4]

[3] The key messages from phase 1 can be found in detail in the report 'Foresight Study on the Circular Economy and its Effects on OSH. Phase 1: Marco Scenarios', alongside the phase 2 final report 'Foresight Study on the Circular Economy and its Effects on OSH. Phase 2: Dissemination and Tailoring of Phase 1 Scenarios via Stakeholder Dialogue and Workshops'.

[4] For the breakdown and classification of workplace hazards, including examples for each category, please refer to the phase 2 report 'Foresight Study on the Circular Economy and its Effects on OSH. Phase 2: Dissemination and Tailoring of Phase 1 Scenarios via Stakeholder Dialogue and Workshops' and the article 'Understanding job hazards in EU-OSHA's OSHWiki (OSHWiki, 2022).

Category of Workplace Risks	Implications that cut across at least three scenarios[5]
Physical or safety hazards	• Automation is used to reduce physical workloads, for example, by introducing exoskeletons where loads have to be carried (EU-OSHA, 2019), and to reduce worker exposure to physical hazards, for example, working at heights during wind turbine inspections • Demolition of offshore fossil fuel sites carries increased risks, as the structural integrity of installations may have been compromised, or due to adverse weather conditions (Offshore, 2020) • Decommissioning of old power plants is associated with physical risks, with significant amounts of the work having to be carried out manually in potentially badly documented installations (Geigle Safety Group, 2020) • Renewable energy production has significantly fewer safety hazards than fossil fuel energy production, in particular with regard to transportation, handling and the handling of heavy machinery (OWD, 2022) • To shrink transportation and office space footprints (with regard to energy use and waste), remote work is increased in the CE, reducing physical risks (ILO, 2019)
Chemical hazards	• During CE-related building renovations, high risk of chemical hazards (e.g. airborne asbestos, synthetic mineral fibres, polychlorinated biphenyls (PCB)), in particular if material is recycled with the intention of reuse (Charef et al., 2021) • Decommissioning of old power plants is associated with chemical risks, including the release of asbestos and human-made fibres, violent decomposition of toxins and materials that lack thermal stability, and so on (Geigle Safety Group, 2020) • If the unique health challenges presented by nanomaterials are not fully explored prior to introduction as a result of, for example, insufficient funding for tests, or pressure for a rapid release to maintain a competitive edge, new risks ensue (ILO, 2019; OECD, 2022)
Biological hazards	• Biotechnology, which will play a key role in the transition to a CE thanks to its ability to make many widely used chemicals and materials (Schilling and Weiss, 2021), has low barriers to entry, increasing potential for misuse (McKinsey, 2020)
Ergonomic issues	• The push to reduce transportation and commercial space footprints in the CE leads to an increase in teleworking, likely from home with non-ergonomic equipment (EU-OSHA, 2018; Kauffeld et al., 2022) • As recycling increases in the CE, the significant ergonomic issues in the recycling industry apply to more workers (Solus, 2019)

[5] Please note that while these cross-cutting implications occur in at least three scenarios in broad outlines, the exact details will invariably be different as regards their impacts on the health and safety of workers.

▪ Category of Workplace Risks	▪ Implications that cut across at least three scenarios[5]
	• As product use cycles become longer in the CE, ergonomics plays a larger role in design and conception, reducing the overall occurrence of ergonomic issues
▪ **Psychosocial issues**	• In a CE, the communal and environmental quality improve, impacting positively on the overall resistance to stress and anxiety (Haigh et al., 2022) • For some parts of the population, the increase in remote work (cf. Physical hazards, above) will lead to higher levels of stress and anxiety (Martin et al., 2022) • If states pursue the transition to a CE at the expense of social safety and cut budgets, reduced social services will result in increased stress

With the aim of turning the OSH risks from a CE identified above into opportunities to improve health and safety, a proactive and integrated governance and industry approach is needed to commit to policies and initiatives that ensure OSH considerations are front and centre in the transition to a CE in the EU. To provide more detail on specific actions to achieve early integration of OSH considerations within the CE, some of the project's key findings and recommendations are listed in the table below.

▪ Actions to safeguard workers in the transition to a CE		▪ Lead stakeholder(s)
▪ **Policy and funding initiatives**	• OSH should be a primary consideration **in all relevant policy measures (such as the European Green Deal, Fit for 55 package, etc.**). Specific actions could include integrating OSH safeguards concerning all hazards into *procurement standards* (similar to the 'sustainable by design' chemicals strategy in the context of the European Green Deal). • Clear **EU-wide standards** need to be set that close OSH loopholes and effectively regulate across industries and EU taxonomy. • **OSH transition funding** for industries and sectors most affected by the transition to a CE is needed, as well as the building of *funding networks* between businesses and institutions. • Need to integrate OSH considerations as early as possible into relevant **CE and industrial policies** (e.g. by increasing social partner involvement and enlarging the scope to include the self-employed (ETUC, 2019)), **to safely anticipate future changes** in the world of work from the CE.	• European Commission • European Agency EU--OSHA • National authorities • Industry (association)

▪ Actions to safeguard workers in the transition to a CE		▪ Lead stakeholder(s)
▪ **Foster collaboration and communication**	• A foresight or anticipatory approach with **improved links between key agencies** could *harmonise standards across the EU* and lead to comparable practices in OSH outcomes across EU countries and regions. • Increase **cross-sectoral dialogue & collaboration:** Development of EU-wide cross-sectoral *OSH certifications and standards, and communication* of relevant information (OSH-related research, best practices, etc.) will be important to overcome any emerging 'silo mentality'. • Building a capable OSH knowledge network centred on experiences during the transition to the CE across the EU (i.e. allowing for worker feedback) would improve and streamline communication around OSH impacts from the CE and help to ensure EU cohesion with regard to training programmes and standards. • In sectors critical to the CE transition, **awareness of health and safety issues via, for example, events and seminars** would benefit key stakeholders.	• European Agency EU--OSHA • National authorities • Industry (association) • Worker representatives and organisations
▪ **Tailored solutions**	• Urgent need to support the **promotion of reskilling and lifelong learning**, with tailored contents developed in close collaboration between EU agencies and corporate requirements based on up-to-date needs. Easy access must be paramount, for example, with *individual learning accounts and micro-credentials* (based on the EU 'Action to improve lifelong learning and employability'). • **(Re-)education opportunities including integration, skilling and job safety programmes must be tailored to social situations (i.e. temporal resources, capacities, motivation).** In parallel, increased funding **for supervision and control measures** focusing on individual workplace situations will be necessary. • Need to ensure that new green jobs allow **trade union representation and respect bargaining rights**, and that labour standards and social rights are part of any new sectoral climate strategy.	• European Commission • European Agency EU-OSHA and other agencies, (CEDEFOP, Eurofound) • Industry (association) • Worker representatives and organisations • Education providers

References

CCOHS – Canadian Centre for Occupational Health and Safety (2022). *Introducing New Technology at the Workplace. OHS Answers Fact Sheets*. Retrieved 26 October 2022, from: https://www.ccohs.ca/oshanswers/safety_haz/new_technology.html?=undefined&wbdisable=true

Charef, R., Morel, J.-C., and Rakhshan, K. (2021). Barriers to Implementing the Circular Economy in the Construction Industry: A Critical Review. *Sustainability*, 13, 12989. https://doi.org/10.3390/su132312989

ETUC – European Trade Union Confederation (2019). *ETUC position on a new EU strategy on Occupational Safety and Health*. Retrieved 01 December 2022, from: https://www.etuc.org/sites/default/files/circular/file/2019-11/ETUC%20position%20on%20a%20new%20EU%20strategy%20on%20Occupational%20Safety%20and%20Health.pdf

EU-OSHA – European Agency for Safety and Health at Work, *Foresight on new and emerging occupational safety and health risks associated with digitalisation by 2025*, 2018. Available at: https://osha.europa.eu/sites/default/files/Foresight_new_OSH_risks_2025_report.pdf

EU-OSHA – European Agency for Safety and Health at Work, *The impact of using exoskeletons on occupational safety and health*, 2019. Available at: https://osha.europa.eu/en/publications/impact-using-exoskeletons-occupational-safety-and-health

Geigle Safety Group (2020). *OSH Academy Course 815 Study Guide. Demolition Safety*. Retrieved 26 October 2022, from: https://www.oshatrain.org/courses/studyguides/815studyguide.pdf

Haigh, L., de Wit, M., Russel, M., Fraser, M., Kouloumpi, I., and Robinson, B. (2022). *Why we need to rethink the 'technical' circular economy. A circular economy fit for the 21st-century*. Retrieved 1 December 2022, from: https://www.circle-economy.com/blogs/why-we-need-to-rethink-the-technical-circular-economy

ILO – International Labour Organization (2019). *Safety and health at the heart of the Future of Work: building on 100 years of experience*. Retrieved 26 October 2022, from: https://www.ilo.org/safework/events/safeday/WCMS_686645/lang--en/index.htm

Kauffeld, S., Tartler, D., and Gräfe, H. et al. (2022). What will mobile and virtual work look like in the future?—Results of a Delphi-based study. *Gruppe. Interaktion. Organisation. Zeitschrift für Angewandte Organisationspsychologie*, 53, 189-214. https://doi.org/10.1007/s11612-022-00627-8

Kjellstrom T., Oppermann, E., and Lee, J. (2022). Climate Change, Occupational Heat Stress, Human Health, and Socioeconomic Factors. In T. Theorell (Ed.), *Handbook of Socioeconomic Determinants of Occupational Health*. Handbook Series in Occupational Health Sciences. Springer. (pp. 71-89). https://doi.org/10.1007/978-3-030-31438-5_37

Martin, L., Hauret, L., and Fuhrer, C. (2022). Digitally transformed home office impacts on job satisfaction, job stress and job productivity. COVID-19 findings. *PLoS ONE*, 17(3), Article e0265131. https://doi.org/10.1371/journal.pone.0265131

McKinsey (2020). *The Bio Revolution. Innovations transforming economies, societies, and our lives*. Retrieved 26 October 2022, from: https://www.mckinsey.com/industries/life-sciences/our-insights/the-bio-revolution-innovations-transforming-economies-societies-and-our-lives

OECD – Organisation for Economic Co-operation and Development (2022). *Chemical Accidents Involving Nanomaterials: Potential Risks and Review of Prevention, Preparedness and Response Measures – Project Report*. Retrieved 26 October 2022, from: https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/cbc/mono(2022)19&doclanguage=en

Offshore (2020). *Offshore Exclusive: Safe decommissioning requires the right mindset, the right skills*. Retrieved 18 November 2022, from: https://www.offshore-mag.com/home/article/14186510/offshore-exclusive-safe-decommissioning-requires-the-right-mindset-the-right-skills

OSHWiki, *Understanding job hazards*, 2022. Available at: https://oshwiki.osha.europa.eu/en/themes/understanding-job-hazards

OWD – Our World in Data (2022). *What are the safest and cleanest sources of energy?* [July 2020, updated July 2022] Retrieved 26 October 2022, from: https://ourworldindata.org/safest-sources-of-energy

Schilling, C., and Weiss, S. (2021). A Roadmap for Industry to Harness Biotechnology for a More Circular Economy. *New Biotechnology*, 60, 9-11. https://doi.org/10.1016/j.nbt.2020.08.005

Solus (2019). *Ergonomics in the Waste Handling Industry*. Retrieved 01 December 2022, from: https://solusgrp.com/blog/post/ergonomics-in-the-waste-handling-industry.html

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