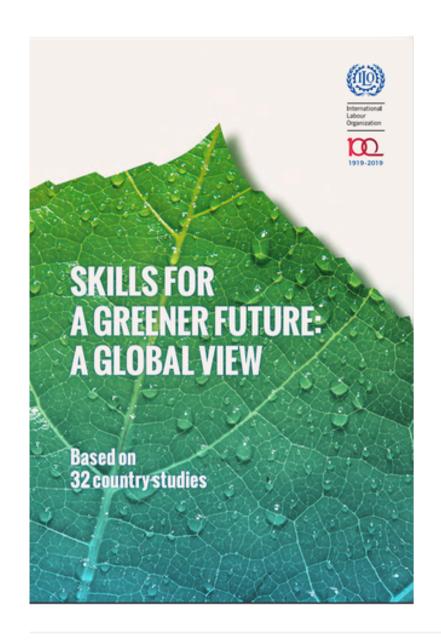
Working in groups

Facilitator: Marta Trawinska (ISP)









This is the first global report on the implications of the transition to lowcarbon and resource-efficient economies for skills, gender and occupations.

READ MORE

ILO, Skills for a greener future: a global view, 2029 https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed_emp/documents/publication/wcms_732214.pdf







Energy Sustainability Scenario

- This scenario examines the employment and skills implications of pursuing energy sustainability to limit global warming to below 2°C, as stipulated by the Paris Agreement. It focuses on sectors like renewable energy, energy efficiency, and clean technology.
- Job Creation: Significant job growth is expected in industries focused on renewable energy (such as wind, solar, and hydroelectric power), energy efficiency, and sustainable infrastructure. Jobs will be created in areas like installation, maintenance, and energy management.
- Skills Demand: The transition will require new technical skills, particularly in renewable energy technologies, energy auditing, and sustainable construction. Additionally, there will be an increased need for cross-disciplinary skills that enable workers to adapt to advanced green technologies.
- Reskilling Needs: Workers displaced from fossil fuel-based industries, like coal and oil, will need to be reskilled to transition into these growing green sectors.







Circular Economy Scenario

- This scenario explores the impact of transitioning to a circular economy, where recycling, resource efficiency, and waste reduction are prioritized. It is based on an annual 5% increase in recycling rates for materials such as plastics, glass, metals, and minerals.
- Job Reallocation: The circular economy is expected to create jobs in recycling, waste management, and sustainable manufacturing. New roles will emerge around designing products for longevity, reuse, and recyclability.
- Skill Requirements: Skills in areas like waste processing, materials science, and sustainable product design will be in high demand. Workers will need to understand resource efficiency principles and have the technical know-how to operate within a circular economy framework.
- Workforce Adaptation: Jobs in traditional manufacturing sectors may decrease, with workers needing to transition to roles that support a circular model. This may include retraining in sustainable production techniques or learning to work with recyclable materials.
- In the Circular Economy Scenario, job shifts are particularly pronounced in mid-skill occupations, and the overall success of this transition hinges on the availability of training programs that support skills in recycling, eco-design, and waste reduction processes.

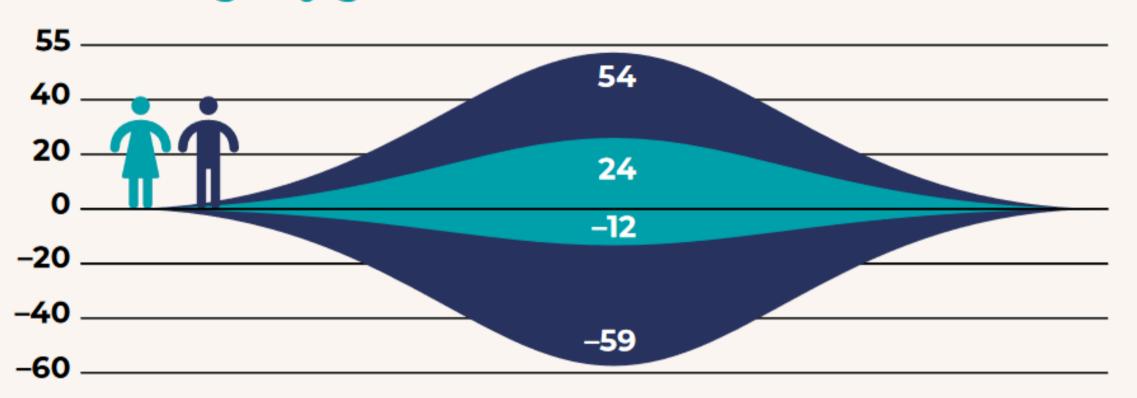






Figure ES 5. Jobs created and destroyed in a global circular economy scenario, by gender, 2030 (millions)

Job change by gender



Note: For detailed information on the methodology see ILO, 2018a, pp. 39, 162-170.

Source: ILO calculations based on EXIOBASE v3 and national labour force surveys.

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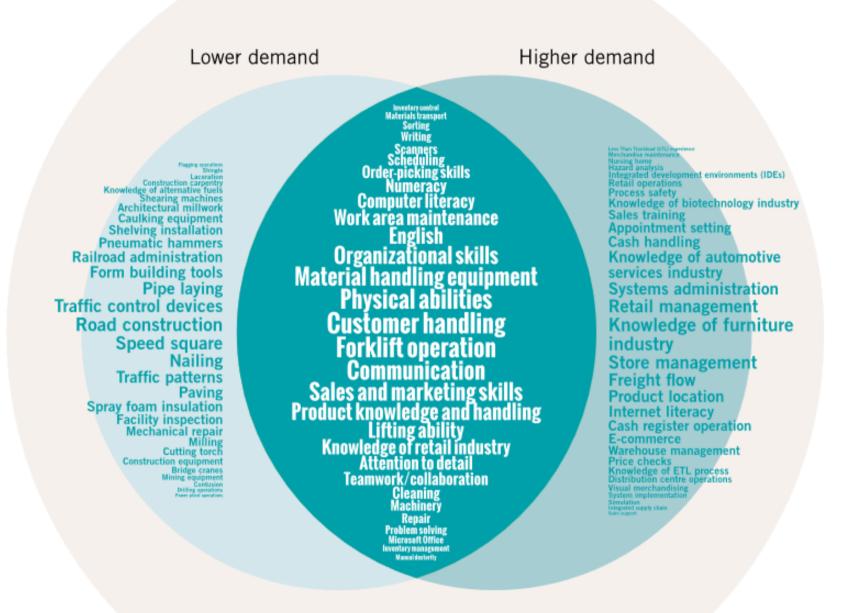






Figure ES 6. Overlap of core and technical skills for workers in mining, construction, manufacturing and transport, in declining and in growing industries (circular economy scenario)

Circular economy



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Figure ES 7. Overlap of core and technical skills for science and engineering professionals, in declining and in growing industries (energy sustainability scenario)

Energy sustainability

Lower demand

Higher demand

Energy trading logic data interpretation Geological maps Infor software Instrument design Structural geology Transportation security Hydraulic fracturing Petrel software Geosteering Petrophysics Wireline Nuclear plant design Geophysics Well testing Reservoir simulations and evaluations Gas prospecting Knowledge of meridium system Radiation protection Knowledge of calculus principles
Graphic and visual design software
Quality assurance and control
Product development
Organizational skills
Writing
Drafting and engineering design
Mechanical engineering
Creativity
Planning
Customer handling
Problem solving
Communication
Microsoft Office
Project management
Teamwork/collaboration
Research
Scheduling
Budgeting
Sales and marketing skills
Troubleshooting
Computer literacy
Attention to detail
Manufacturing processes
Technical support
Construction management
Numbrashing

Ackant "
declarical, electrical, and plumbing (MEP) design
roduct location
Requirements analysis
Architectural engineering Plumbing design Rapid prototyping Material flow management Plumbing systems Commercial construction Store management Store merchandising Design-build Vehicle systems Shop drawings Connected home Design for Six Sigma Lead follow-up Infotainment Automotive engineering Mechatronics Schematic design
Project architecture
Catia V5
PCB layout and design
Vehicle design
Tool design
UX Wiretrams
Press saldstee





Figure ES 8. Top skills needed in high-, medium- and low-skill occupations (energy sustainability and circular economy scenarios

8(a). Circular economy scenario

High-skill occupations

Presentation skills **Business development** Sales management **Building effective relationships** Organizational skills **Enterprise Resource Planning (ERP)** Customer handling Problem solving Microsoft Office Writing Budgeting Scheduling Numeracy Sales and marketing skills Product knowledge and handling Leadership Communication Multitasking Physical abilities Computer literacy Knowledge of retail industry Creativity Teamwork/Collaboration Troubleshooting Attention to detail Time management Project management

Occupational health and safety Supervisory skills Knowledge of retail industry Quality assurance and control Budgeting Scheduling Attention to detail Physical abilities Organizational skills **Problem solving** Estimating Commercial construction Writing Leadership **Construction management** Microsoft Office Project management Cost control Time management **Procurement** Logistics Planning Staff management Computer literacy Quality management Teamwork/Collaboration Customer handling Sales and marketing skills Communication **Building effective relationships**

8(b). Energy sustainability scenario

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Figure ES 8. Top skills needed in high-, medium- and low-skill occupations (energy sustainability and circular economy scenarios

8(a). Circular economy scenario

8(b). Energy sustainability scenario

Physical abilities Knowledge of retail industry Time management Cash handling Customer handling

Problem solving Scheduling Attention to detail
Communication Retail management Cleaning
Writing Microsoft Office Multitasking

Sales and marketing skills

Computer literacy Store management
Plumbing Repair Asset protection Lifting ability
Building effective relationships Store operations

Teamwork/Collaboration

Numeracy Cash register operation

Supervisory skills Inventory management

Product knowledge and handling

Organizational skills

Medium-skill occupations

Microsoft Office Troubleshooting Communication Problem solving Physical abilities Packaging Carpentry Knowledge of retail industry Scheduling **Building effective relationships** Lifting ability Customer handling Heating, ventilation and air conditioning Food preparation Cleaning Repair Numeracy Plumbing Writing Multitasking Power tools Sales and marketing skills Organizational skills Food safety Product knowledge and handling Hand tools Forklift operation Work area maintenance Teamwork/Collaboration Attention to detail

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Figure ES 8. Top skills needed in high-, medium- and low-skill occupations (energy sustainability and circular economy scenarios

8(a). Circular economy scenario

8(b). Energy sustainability scenario

Microsoft Office **Facility maintenance** Customer handling Preventive maintenance Heating, ventilation and air conditioning Lifting ability Cleaning Writing Multitasking Troubleshooting Physical abilities Painting Machinery Sales and marketing skills Attention to detail Repair Plumbing Vehicle inspection Teamwork/Collaboration Organizational skills problem solving Scheduling Communication Computer literacy Knowledge of retall Industry Quality assurance and control Forklift operation Housekeeping Electrical devices Contract preparation

Low-skill occupations

Work area maintenance Teamwork/Collaboration Attention to detail Lifting ability Knowledge of furniture industry Problem solving Scanners Machinery English Hand tools Computer literacy Cleaning Scheduling Microsoft Office Physical abilities **Customer handling** Writing Organizational skills Numeracy Communication Product knowledge and handling Hand trucks Knowledge of retail industry Manual Dexterity Sorting Sales and marketing skills Material handling skills Forklift operation Order picking skills

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Table ES 1. Changes in skills required, by skill level of occupation

SKILL LEVEL	NATURE OF CHANGE	TYPICAL SKILLS RESPONSE	EXAMPLE OCCUPATIONS
Low-skilled occupations	Occupations change in a generic way, e.g. requiring increased environmental awareness or simple adaptations to work procedures	On-the-job learning or short reskilling and upskilling programmes	Refuse/waste collectors, dumpers
Medium-skilled occupations	Some new green occupations Significant changes to some existing occupations in terms of technical skills and knowledge	Short to longer upskilling and reskilling programmes; TVET courses	New occupations: wind turbine operators; solar panel installers Changing occupations: roofers; technicians in heating, ventilation and air conditioning; plumbers
High-skilled occupations	Locus of most new green occupations Significant changes to some existing occupations in terms of technical skills and knowledge	University degree; longer upskilling programmes	New occupations: agricultural meteorologists, climate change scientists; energy auditors, energy consultants; carbon trading analysts Changing occupations: building facilities managers; architects; engineers







Table ES 2. Main core skills required for green jobs, by skill level of occupation

REQUIRED ACROSS THE LABOUR FORCE	REQUIRED IN MEDIUM- TO HIGH-SKILLED OCCUPATIONS
 Environmental awareness and protection; willingness and capability to learn about sustainable development 	 Analytical thinking (including risk and systems analysis) to interpret and understand the need for change and the measures required
 Adaptability and transferability skills to enable workers to learn and apply the new technologies and processes required to green their jobs 	 Coordination, management and business skills that can encompass holistic and interdisciplinary approaches incorporating economic, social and ecological objectives
 Teamwork skills reflecting the need for organizations to work collectively on tackling their environmental footprint 	 Innovation skills to identify opportunities and create new strategies to respond to green challenges
 Resilience to see through the changes required 	 Marketing skills to promote greener products and services
 Communication and negotiation skills to promote required change to colleagues and customers 	 Consulting skills to advise consumers about green solutions and to spread the use of green technologies
 Entrepreneurial skills to seize the opportunities of low-carbon technologies 	 Networking, IT and language skills to perform in global markets
and environmental mitigation and adaptation	 Strategic and leadership skills to enable policy-makers and business executives to set
Occupational safety and health (OSH)	the right incentives and create conditions conducive to cleaner production, cleaner transportation







Table ES 3. Nature and extent of occupational change in key sectors

SECTOR	NATURE AND EXTENT OF OCCUPATIONAL CHANGE TO DATE	EXAMPLES OF NEW AND CHANGING OCCUPATIONAL PROFILES
Renewable energy	One of the most significant sectors for development of new occupational profiles, spreading into closely related existing trades (solar energy systems installation)	MSL: solar photovoltaic/wind turbine/ biomass systems: installers, technicians, plant managers, quality engineers HSL: engineers and system designers (overlap with manufacturing)
Environmental goods and services, including water and waste management	Significant occupational change in waste and recycling, including R&D functions to create new or improved waste management and recycling New occupations of environmental consulting and environmental auditing	MSL: environmental engineering technicians; soil, waste and water engineers (conservationists); environmental science and engineering technicians; health and other protection technicians HSL: atmospheric and space scientists; soil and water conservationists; landscape architects; environmental engineers (restoration planners, certification specialists, economists); climate change analysts; industrial ecologists; energy managers (auditors)







SECTOR	NATURE AND EXTENT OF OCCUPATIONAL CHANGE TO DATE	EXAMPLES OF NEW AND CHANGING OCCUPATIONAL PROFILES
Construction and building services	Mainly skills being added on to and/ or adapted by existing occupations; all main trades and professions likely to be affected in some way, and increasingly,	MSL: carpenters, plumbers, electricians, heating engineers, roofers, painters and decorators, plasterers, building services technicians
	across all countries	HSL: facilities managers, architects, engineers, energy auditors and energy consultants (overlap with environmental goods and services)
Manufacturing	New skills are needed related to reduction of environmental impacts and this may involve new occupations, e.g. pollution control officers	MSL: occupations related to reducing environmental impacts, e.g. pollution control officers, energy auditors (overlap with environmental goods and services)
	Most strongly affected are manufacturers involved in design and manufacture of products for the "greenest" sectors, e.g. renewable energy and green construction	HSL: occupations related to design and production of new products and systems, e.g. product designers, production engineers







Agriculture and forestry



Mainly skills being added on to and/ or adapted by existing occupations. Greatest occupational effects likely to be felt at higher skill levels where new occupations are in demand **MSL:** adoption of organic farming techniques; agricultural technicians involved in crop diversification, application of improved technologies.

HSL: soil and water conservationists; environmental restoration planners (certification specialists, economists); water resource specialists and water/ wastewater engineers' agricultural meteorologists

Transportation services



Mostly changing existing occupations through addition of knowledge and skills, e.g. use of electric vehicles; conversion of existing vehicles to new technologies and compressed natural gas

MSL: occupations related to use, conversion (greening) and maintenance of existing vehicles

HSL: R&D occupations related to design of greener transport systems, e.g. engineers, systems analysts

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Tourism



Mostly changing existing occupations through addition of knowledge and skills, e.g. eco-tourism

MSL: occupations related to eco-tourism

Extractive industries



Mostly changing existing occupations through addition of knowledge and skills. Evidence of widespread effects to date lacking

HSL: R&D occupations related to design of greener extractive processes systems, e.g. engineers

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