



Sectoral Human Capital Study II

Material recovery sector

Survey results – 2nd edition
April 2022 – June 2023

About the study



Project name

Sectoral Human Capital Study II (SHCSII)
Material recovery sector – 2nd edition*



Study Objective

To increase awareness of current and future
demand for skills in the material recovery sector



Research dates

2nd edition of the study:
April 2022 to April 2023
including quantitative research:
January 2023 to March 2023


* The first edition of the survey was carried out from November 2020 to December 2021. The report from the first edition is available on the PARP website

Methodology

Qualitative research


Respondents

 Sector experts


 Education representatives

 Employers

Techniques

 Individual interviews
N=20

 Expert panels
N=3

 Delphi survey
N=40

 Desk research


Dates


July-September 2022

January-February 2023

Qualitative research

Respondents


 Employers
N=866

 Employees
N=856

Techniques

 CATI
N=1250

 CAPI
N=465

 CAPI on-line
N=7


Dates

January-March 2023

Research summary


Respondents

 Sector experts

 Education representatives

 Employers

Techniques

 Summary panels with the Sector Council
N=2

Dates

October 2022

April 2023

About the sector

The sector covers 3 subsectors:



waste collection



waste processing and
waste treatment



the recovery
of materials

The material recovery sector is:



7600
businesses



68000
employees

Source: Statistics Poland, data for 2022.

Key business processes and key positions

Collection and transport of waste			
plant manager	environmental protection specialist		sorter
foreman / shift leader / shift manager		driver	waste loader
trader		maintenance worker / service technician / mechanic	logistician / freight forwarder / dispatcher
Storage			
plant manager	environmental protection specialist	operator of specialised machines and equipment	warehouse worker
foreman / shift leader / shift manager		technologist / traffic engineer	logistician / freight forwarder / dispatcher
Preparation of waste for reuse or recycling			
plant manager	environmental protection specialist	driver	maintenance worker / service technician / mechanic
foreman / shift leader / shift manager	technologist / traffic engineer	operator of specialised machines and equipment	sorter
Waste processing			
plant manager	environmental protection specialist		operator of specialised machines and equipment
foreman / shift leader / shift manager		technologist / traffic engineer	maintenance worker / service technician / mechanic
Waste transfer			
plant manager	trader	driver	logistician / freight forwarder / dispatcher
foreman / shift leader / shift manager	environmental protection specialist	operator of specialised machines and equipment	warehouse worker

grey shading indicates an indirect connection between the position and the business process due to the impact of the position on the plant as a whole, green shading indicates a direct connection between the position and the business process in question



Situation of companies in the material recovery sector in 2022

65% of employers felt an increase in functional costs

57% of companies experienced an increase in operating costs

43% of companies saw a deterioration in the quality of segregated waste collection

43% of businesses reported an increase in the amount of waste generated by society

31% of companies experienced financial problems

31% of companies suspended or reduced important investments

Factors and trends affecting the sector



Moving towards a circular economy and decarbonisation



Automation and robotisation of processes in the sector



High variability in legislation and its inconsistent interpretation by various bodies



Continuing demand for low-skilled workers



The lack of a coherent a vision for the waste system



Employees' weakening attachment to the workplace



Environmental demands becoming stricter and more difficult to meet



Growing demand for highly specialised workers



Residents' concerns regarding new investments in the sector



Poor quality segregated waste collection



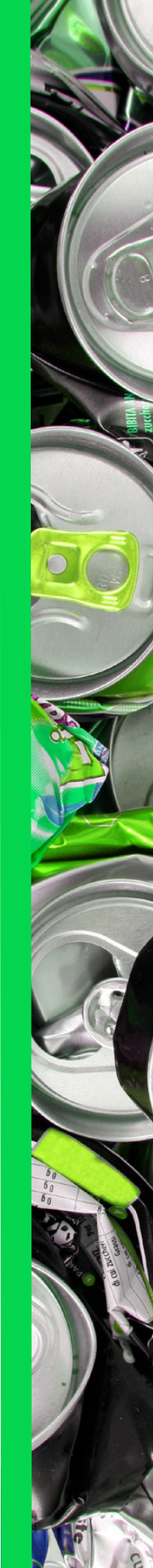
Bad image of the sector



Prolonged administrative proceedings

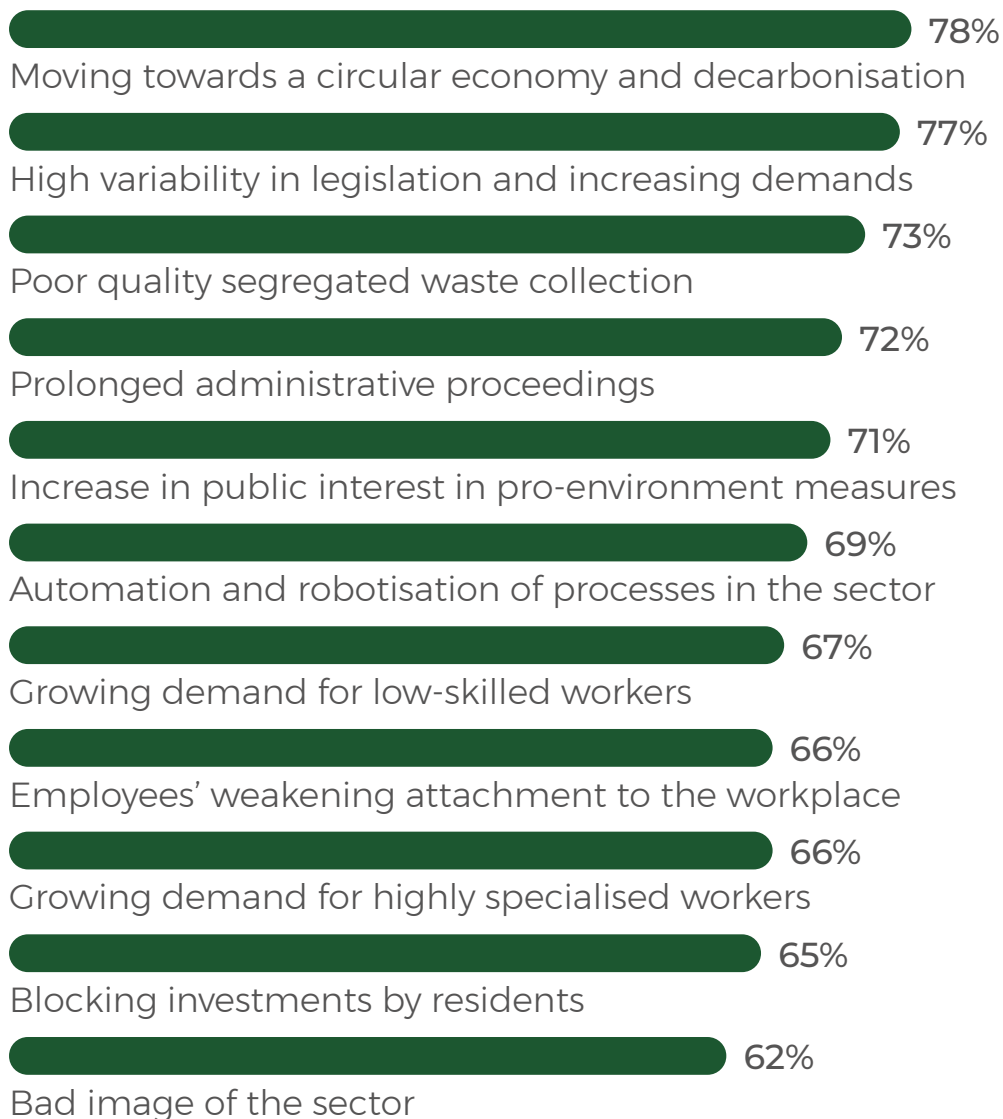


Increase in support in society for pro-environment measures



Factors and trends affecting the sector

Percentage of companies experiencing at least a moderate impact of selected factors and trends on business operations



Source: Own study based on SHCS II material recovery sector (employers) – 2nd edition 2023 (N=866).

More than **80%** of employers indicating that the analysed factors have a moderate or greater impact on their company said they were at least partly prepared for the related challenges

The most likely directions of change in the sector



Prolonged administrative proceedings for the issuance or amendment of environmental decisions will slow down investment processes, which for many businesses will mean a permanent increase in costs and increased business risk.



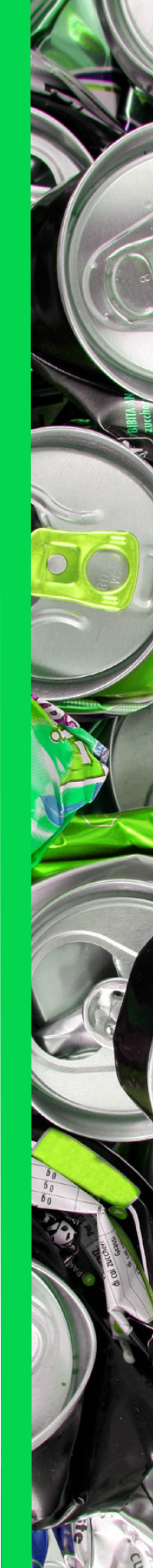
Increasing energy prices and uncertainty about energy security will prompt some enterprises to optimise energy consumption, invest in RES and look for alternative sources of savings. This will increase the demand for engineers and RES specialists and auditors capable of assessing the efficiency of enterprises and municipalities and proposing solutions for their optimisation.



In order to cope with labour shortages, plants will be forced to pursue automation or raise the wages offered, especially among the lowest-paid low-skilled workers. It will also be necessary to increase salaries and offer more attractive terms for specialists, who today often choose work in other sectors of the economy.



The constantly changing legislation means that the fixed costs of plants' operations are increasing, and companies will increasingly need the assistance of lawyers to continually adapt their operations to the new requirements and participate more effectively in administrative and other procedures.



Sector development scenarios

Based on the analyses conducted during the two survey editions, four scenarios were drawn up for the future of the of the material recovery sector in Poland:

Scenario I:
Rapid and intensive
modernization



Scenario II:
Stagnation – maintaining
business at the expense
of deteriorating quality



Scenario III:
Market crisis – collapse of
many enterprises and possible
oligopoly of the sector

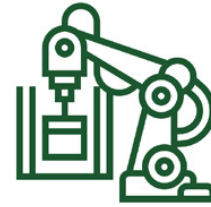


Scenario IV:
Deepening of disparities
and division into
a “two-speed” sector



Scenario I: Rapid and intensive modernisation

The scenario assumes that companies will invest in new technologies and build new facilities to process waste more efficiently and more effectively; **this is the most optimistic scenario**



Consequences for the sector:

- » Significant increase in the number of new investments
- » Widespread automation and robotisation of plants in the sector
- » Improvement in the financial condition of the sector's businesses

Key skills and positions in this scenario:

- » Plant managers with advanced competencies in strategic management and the optimisation of operational management
- » Highly skilled employees – engineers and specialists in new technologies, machine operation, and research and development
- » Knowledge of implementable modernisation, the ability to search for optimal solutions and adapt them to the plants, analytical skills including forecasting, and openness to change
- » The automation of jobs will lead to a systematic decline in the demand for low-skilled employees. However, those who remain will have to undergo additional training related to new procedures resulting from the introduction of new solutions in the plants



Scenario II: Stagnation – maintaining business at the expense of deteriorating quality



The rising cost of doing business and the constant variability of regulations will cause most companies to abandon investment and focus on ad hoc measures to maintain profitability, at the expense of long-term solutions, which in the long run will significantly reduce their competitiveness and belief that such business is unprofitable; this is a pessimistic scenario

Consequences for the sector:

- » Companies will stop growing, with each year of stagnation a step backwards for business
- » Technological regression
- » Steady decline in companies' profitability

Key skills and positions in this scenario:

- » For plant managers: the ability to optimise, to respond to crisis situations, and good organisation of work; assertiveness, the ability to manage human resources, and capacity to work under pressure will be important
- » There will be increased demand for non-specialist employees – primarily for sorters, warehouse workers, and drivers
- » Due to cost containment, few employers will decide to co-finance employee training. In addition, the high demand for labour and relatively low interest in seeking employment in the industry will lead to employers believing there to be no time for training employees
- » No need for professional development among people in specialist positions

Scenario III: Market crisis – collapse of many companies and a possible oligopoly in the sector



The market situation will be so difficult that only the largest and best-managed businesses, with state-of-the-art technology and significant capital, will be able to cope. Some smaller companies will collapse, move into other sectors, or be taken over; **this is the darkest and least desirable scenario**

Consequences for the sector:

- » Collapse of many smaller companies
- » Crisis on the market, and problems with legal waste management
- » Concentration of the market around the largest players

Key skills and positions in this scenario:

- » There will be a significant increase in demand for specialists in environmental issues, and lawyers specialising in EU law. Particularly sought-after will be competencies in corporate restructuring, skills in managing the bankruptcy process, settling outstanding debts, and debt enforcement
- » In companies acquiring smaller entities greater importance will be placed on organisational competencies enabling the creation of new teams, putting the organisation's rules into practice in new places, establishing the organisation's culture, and reviewing employees in acquired companies
- » The skills of analytical thinking and creativity, enabling financial losses to be kept down, will grow in importance
- » Experienced salespeople and plant managers, especially those with good negotiation skills, will play a bigger role



Scenario IV: Deepening of disparities and division into a “two-speed” sector



Steady growth in disparities and a deepening of the differences between companies in the industry will result in them splitting into two groups: businesses that are thriving and rapidly modernising, and those plunged into stagnation, with no major development opportunities; **this is the most likely scenario**, which combines many elements of the preceding three

Consequences for the sector:

- » Fragmentation and split into a “two-speed” sector
- » Potential conflict of interest and weakening of the material recovery industry’s position
- » More difficult to develop holistic (systemic) economic solutions that would bring the sector closer to a circular economy
- » Smaller companies wrapping up business or moving into the shadow economy
- » Some enterprises in the sector will see their financial condition improve

Key skills and positions in this scenario:

Leaders of change	Plunged into stagnation
<p>Faced with legislative uncertainty, managerial skills in planning and developing business development strategies, and in data and risk analysis, will be crucial.</p> <p>Plant modernisation will translate into an increase in demand for specialised services, and thus for highly qualified employees (engineers and specialists in new technologies, machine operation, research and development).</p> <p>The demand for low-skilled workers may gradually decrease due to advancing automation of the workplace.</p>	<p>Technological stagnation and the associated decline in the quality of services will make work in these companies increasingly less attractive to highly skilled employees for whom professional development is important. Consequently, many of them may decide to leave.</p> <p>In the face of the weakening condition of enterprises and the exodus of skilled workers, filling vacancies will become increasingly difficult.</p> <p>Due to the lack of innovation, the demand for workers with lower qualifications will remain steady (or grow slightly).</p>

Employment in the sector

27% of employers in the sector were looking for employees in 2022

- » sought most often by enterprises in the waste treatment and disposal sub-sector (**37%**).

Workers looked for most often between February 2022 and February 2023:

- » sorter – **36%**
- » waste loader – **36%**
- » driver – **35%**
- » warehouse worker – **18%**

Source: SHCS II material recovery, 2nd survey edition 2023, employers, n=866.

Recruitment difficulties

30% of employers looking for workers had difficulty hiring the right people

Reasons indicated most often for recruitment difficulties:

- » low interest in the job offer – **61%**
- » candidates unhappy with the terms of employment – **55%**

Positions for which recruitment was most difficult for employers:

- » sorter – **29%**
- » driver – **19%**
- » waste loader – **16%**
- » warehouse worker – **14%**

Source: SHCS II material recovery, 2nd survey edition 2023, employers, n=77.



Hiring foreigners

17% of companies in the sector employ foreigners

- » Almost all employers hiring foreigners indicated that Ukrainian citizens are among their workers (95%).
- » Foreigners are most often employed in medium and large enterprises (33%).

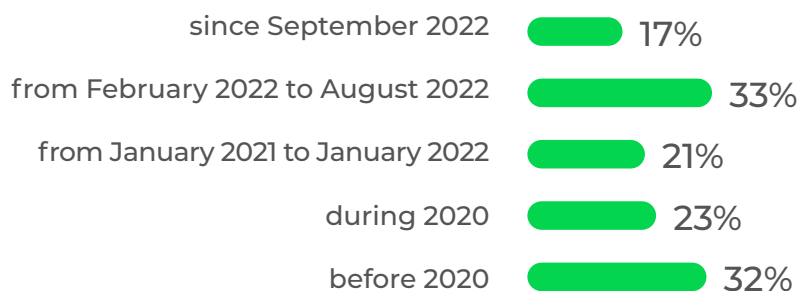
Foreigners employed in this sector most often have non-specialist positions:

- » 49% of companies with foreign employees hire them as sorters
- » 40% as waste loaders
- » 31% as drivers
- » 22% as warehouse workers

The percentage of companies employing foreigners increased after the outbreak of war in Ukraine.

- » **One in three** companies employing foreigners hired new foreign workers in the first six months of the war, and 17% after September 2022.

Period of employment of foreigners



Source: SHCS II material recovery, 2nd survey edition 2023, employers, n=151

Job satisfaction

The vast majority of surveyed employees in key positions report overall satisfaction with their job

- » satisfaction indicated slightly more often by technologists, drivers, environmental specialists and plant managers
- » employees in non-specialist positions, i.e. warehouse workers, waste loaders and sorters, are relatively less often satisfied
- » **91%** of employees say they would like to stay at their current workplace for the next 12 months

Reasons for wanting to stay in current workplace



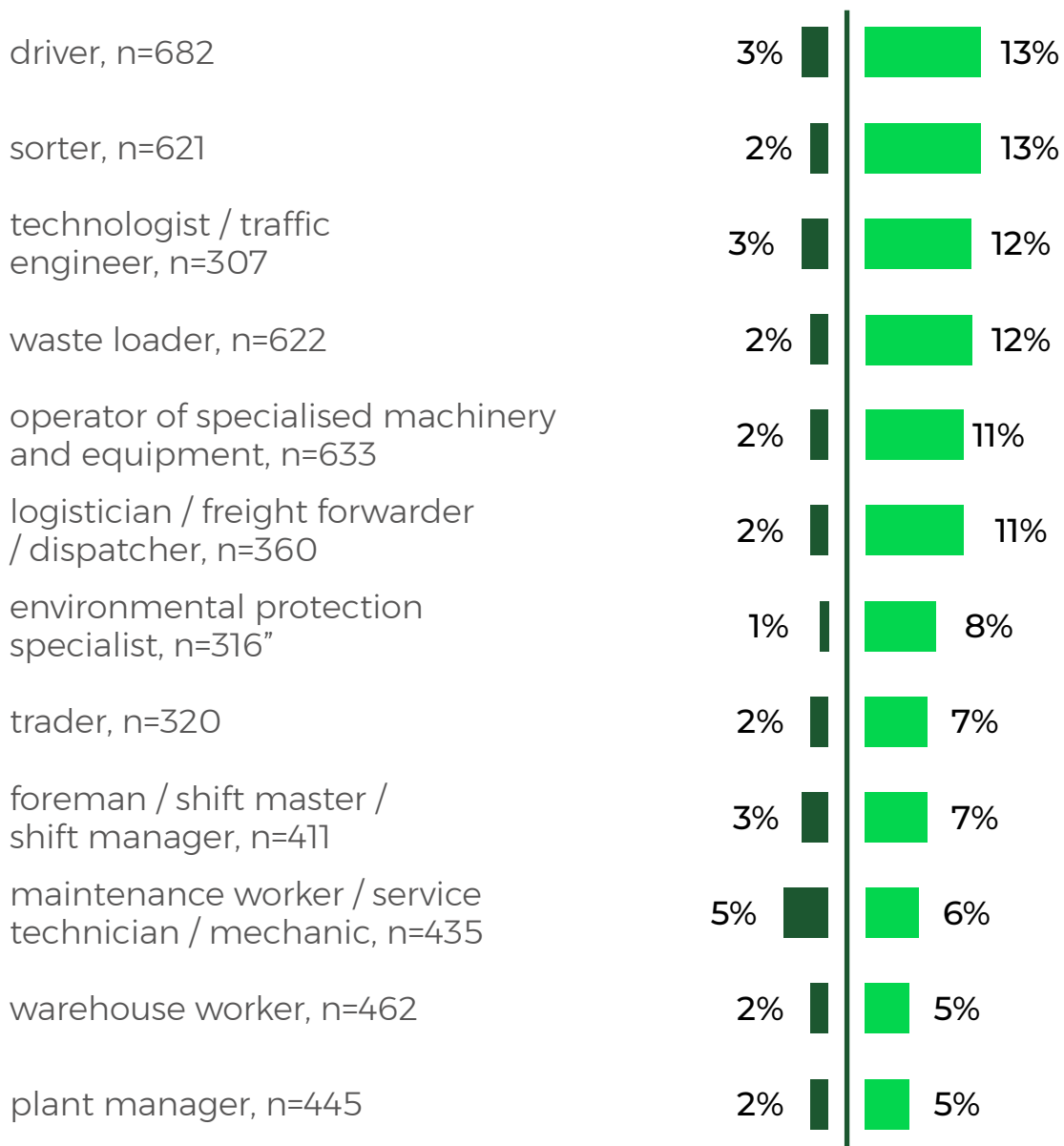
Source: SHCS II material recovery, 2nd survey edition of 2023, employees, n=856.



Forecast changes in employment

10% of employers expect an increase in employment levels in the industry over the next 2 years

Forecasted changes in employment in key positions over the next 2 years



employment will decrease

employment will increase

Source: SHCS II material recovery, 2nd survey edition 2023, employers n=866

Job positions of the future

According to industry experts, there are certain positions whose importance will increase in the future

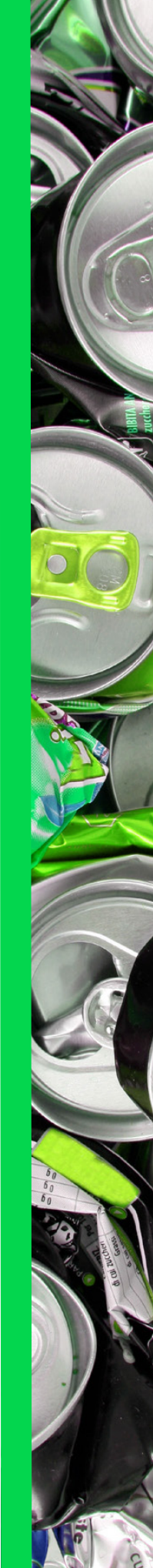
Positions related to key business processes:

- » auditor
- » technologist
- » logistician, freight forwarder
- » automation specialist

Support positions:

- » specialist in communication with public administration/
monitoring of administrative proceedings
- » lawyer specialising in environmental
protection and material recovery
- » data analysis/risk analysis specialist
- » circular economy specialist/artificial intelligence systems specialist
- » RES specialist
- » economic symbiosis specialist
- » strategic planning specialist
- » specialist in new technologies and transformation
- » circular economy specialist
- » LCA specialist

Source: Own study based on SHCS II material recovery sector (delph) – 2nd edition 2023, (N = 40, 2 iterations).



Evaluation of employees' skills

47% of companies evaluate the skills that employees need
29% of employers conduct regular assessments of employee skills, at least once a year

- » The larger the enterprise, the more attention is given to assessing employees' skills and training needs.

Methods of assessing employees' skills used most frequently in 2022:

- » interview with a supervisor
- » descriptive appraisal
- » evaluation of the achievement of goals
- » appraisal questionnaire
- » obtaining information from others (e.g. colleagues, immediate superior, subordinates, customers)
- » employee tests

Job positions assessed most often according to employees:

- » environmental protection specialist- **65%**
- » plant manager - **56%**
- » maintenance worker - **51%**
- » logistician - **48%**

Satisfaction with employees' skills

92% of employers believe the skills of employees in their companies are satisfactory, with 56% claiming they are fully satisfactory

The need to develop employees' skills increases slightly as the size of the company increases.

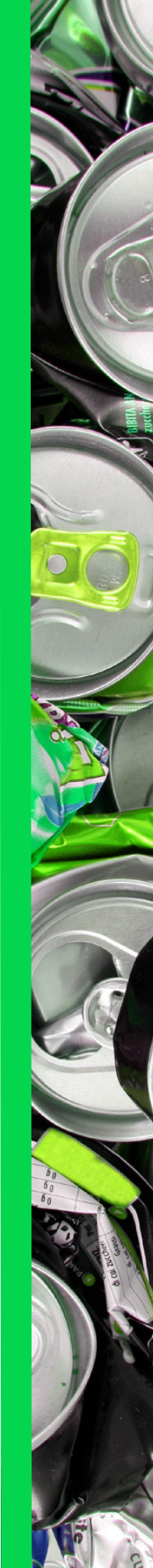
70% of surveyed employees indicated that they usually do tasks that match their skill level

Such declarations were made most often by:

- » traders (**83%**)
- » technologists / traffic engineers (**82%**)

Tasks that are too difficult compared to an employee's competencies are most often performed by **environmental protection specialists - 29%** (average for all **16%**)

Tasks requiring competency development were also indicated by those working in managerial positions.



Employers' action strategies in the face of competency deficits

In the 2nd edition of the survey, change was observed in employers' approach in regard to supplementing competencies lacking in their employees

- » less frequent training of current employees
- » significantly increase in the percentage of companies focusing on reorganisation of the company in order to make better use of existing competencies within the company
- » growth in the percentage of companies that, after observing a deficit of competencies among their employees, do not respond with concrete measures

What happens when competencies are lacking



Source: SHCS II material recovery, 2nd survey edition 2023 and 1st survey edition 2021, employers n=866 and n=809

Development of employees' skills

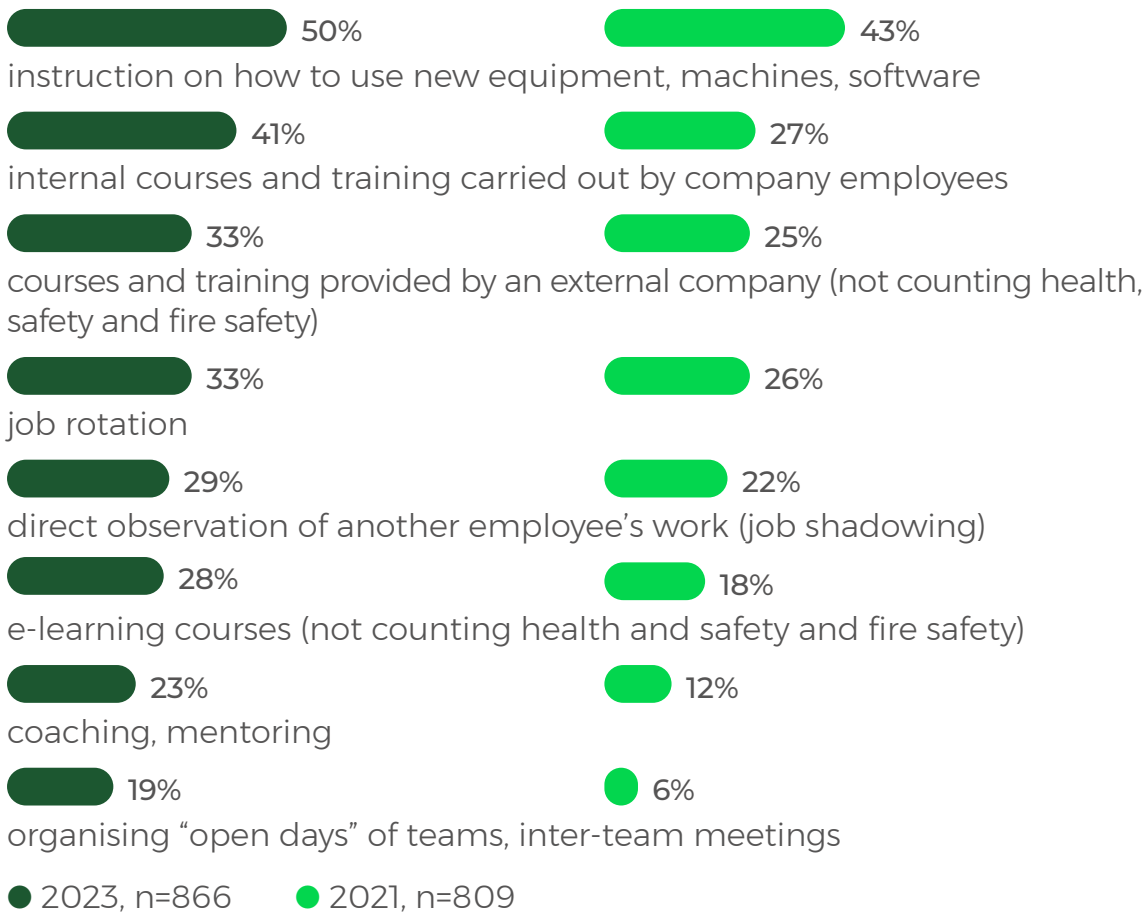
71% development activity index

In 2022, 70% of companies in the sector supported the development of employee competencies in the workplace.

In 2023, employers were more likely than in 2021 to declare offering employees each of the analysed forms of development.

All forms of development analysed are offered most often to employees by enterprises in the **waste collection sub-sector**.

Methods of developing employee skills in the workplace in the last 12 months – employers' indications for 2023 and 2021



Employee assessment of forms of competency development

The vast majority of employees surveyed, regardless of their position, rated the professional development options available in their company as sufficient.

59% of the surveyed employees furthered their occupational competencies in at least one form

Employee development in key positions in 2022.

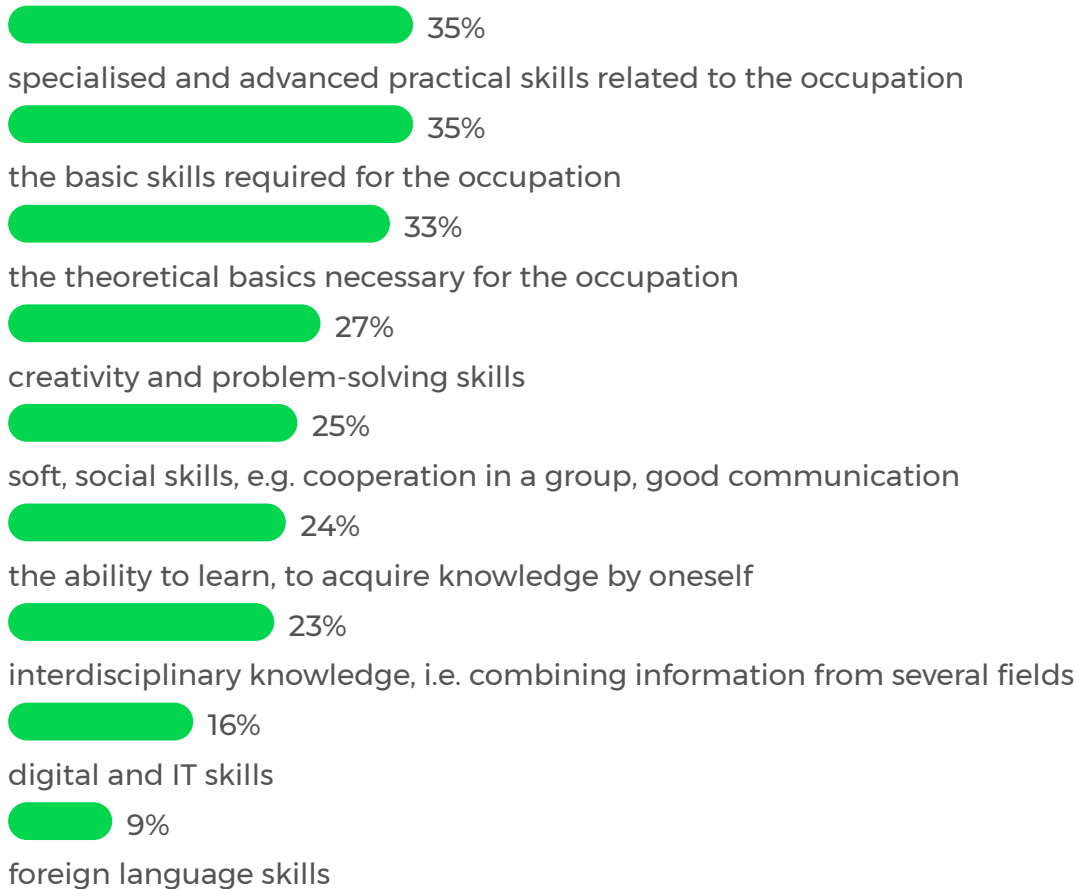
Position	Developing work competencies in the workplace and non-formally	Independent development of work competencies	Developing work competencies in any way	Employee development index	N
plant manager	66%	57%	75%	82%	68
technologist/ traffic engineer	62%	46%	72%	82%	50
environmental protection specialist	71%	65%	78%	81%	68
logistician / freight forwarder / dispatcher	58%	32%	63%	81%	57
operator of specialised machines and equipment	55%	27%	68%	71%	117
maintenance worker / service technician / mechanic	58%	34%	65%	66%	71
foreman / shift leader/ shift manager	52%	25%	61%	62%	61
driver	47%	18%	50%	53%	68
trader	37%	29%	46%	51%	59
warehouse worker	44%	17%	45%	48%	77
waste loader	43%	12%	43%	43%	83
sorter	39%	13%	40%	42%	77

Evaluation of curricula

66% of employers believe that the current school and university curricula meet their companies' demand for employee skills

68% of employees rate their preparation for work in their current position positively

The range of skills that schools and universities should teach in preparing for work in the industry – according to employers



Source: SHCS II material recovery, 2nd survey edition 2023, employers n=866 and employees, n=856



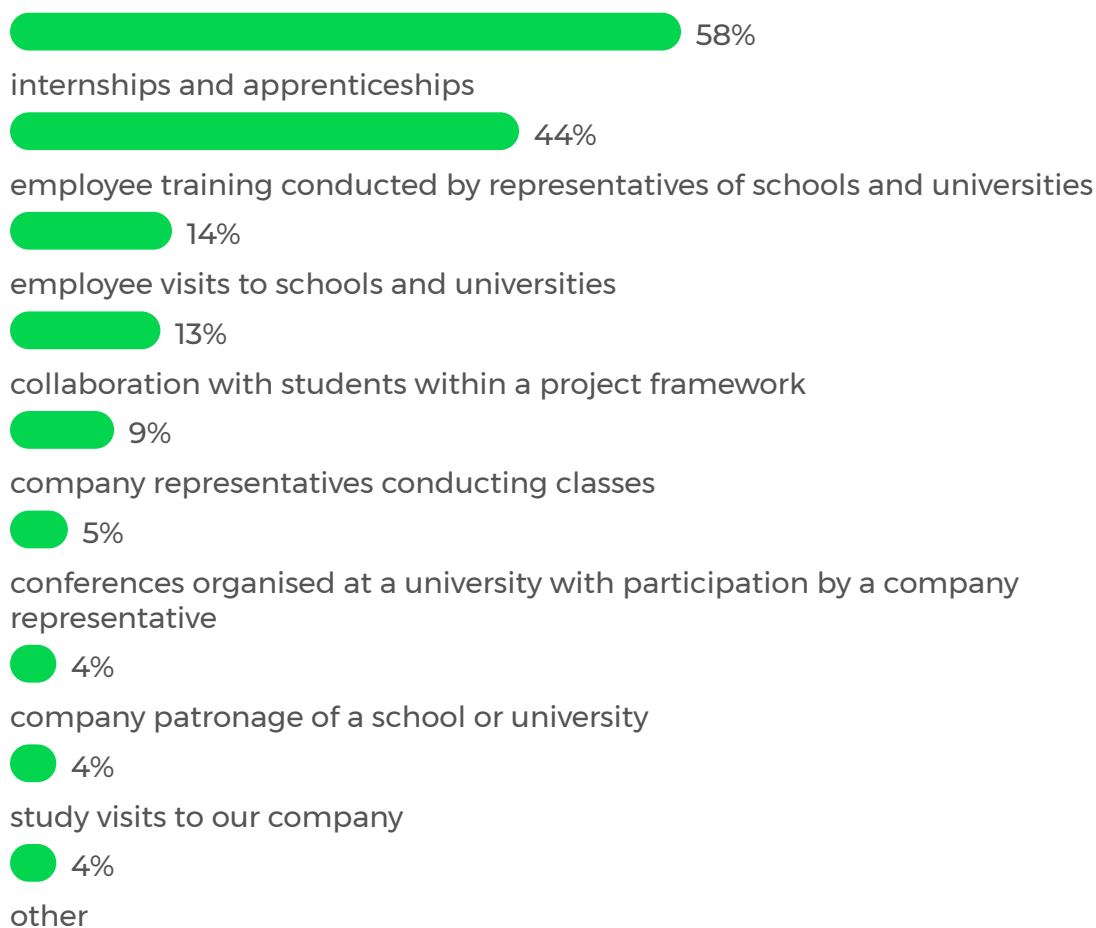
Collaboration between business and education

14% of employers claim to collaborate with education, primarily:

» 25% of medium and large businesses

The collaboration is most often with schools, and in particular with secondary-level vocational schools

Forms of cooperation with educational institutions



Source: SHCS II material recovery, 2nd edition of the 2023 survey, employers, n=124.

Balance of skills

Balance of skills – a compilation of assessments of key competencies for specific positions in the material recovery industry, from the perspective of employers and employees, for the purpose of achieving a better balance on the labour market in terms of the supply of workers with the right competencies and employers' demand for them

Key positions grouped into managerial, specialised and non-specialised positions:

Managerial positions:

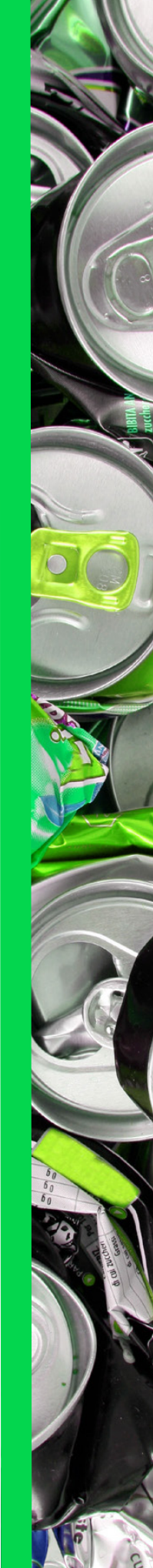
- » plant manager (52%)
- » foreman (47%)

Specialist positions:

- » environmental protection specialist (37%)
- » trader (37%)
- » technologist (37%)
- » logistician (43%)
- » maintenance worker (51%)

Non-specialist positions:

- » driver (80%)
- » operator of specialist machines and equipment (73%)
- » waste loader (74%)
- » sorter (73%)
- » warehouse worker (54%)



Balance of skills – managerial positions

Competencies of particular importance:

- » social skills, contributing to work quality
- » management skills
- » knowledge of plant operation

Skills that are difficult to find account for over 80% of the skills identified for these positions.

Skills that are difficult to find are:

- » **82%** of the skills identified for a plant manager
- » **81%** of the skills identified for a foreman

Skills that will become more important over the next 2 years:

- » **85%** of the skills identified for a plant manager
- » **13%** of the skills identified for a foreman

Hot skills in this group were identified only for the position of plant manager. These include:

- » knowledge of how to supervise the waste treatment process
- » knowledge of waste management processes used at the plant
- » awareness of trends and new technologies in waste processing
- » the ability to analyse information and find solutions to problems in the performance of their work tasks
- » knowledge of economic mechanisms in the waste and raw materials market
- » knowledge of the circular economy and European Green Deal issues

Employees in managerial positions **want to develop almost all skills** identified for these roles.

Balance of skills – specialist positions

Skills particularly important for specialist positions:

- » job-specific skills
- » social competencies contributing to work quality

Skills that are difficult to find are:

- » **82%** of the skills identified for a logistician
- » **79%** of the skills identified for a maintenance worker
- » **76%** of the skills identified for a trader
- » **48%** of the skills identified for an environmental protection specialist
- » **14%** of the skills identified for a technologist

Skills that will become more important over the next 2 years:

- » **100%** of the skills identified for a logistician
- » **100%** of the skills identified for a conservationist
- » **76%** of skills identified for a trader
- » **100%** of the skills identified for an environmental protection specialist
- » **97%** of skills identified for a technologist

Employees in these positions display a willingness to improve their skills, but this applies to far fewer skills than in the case of managerial positions.



Balance of skills – non-specialist positions

Particularly relevant skills are:

- » social skills related to attitude to work
- » specialist skills for specific positions

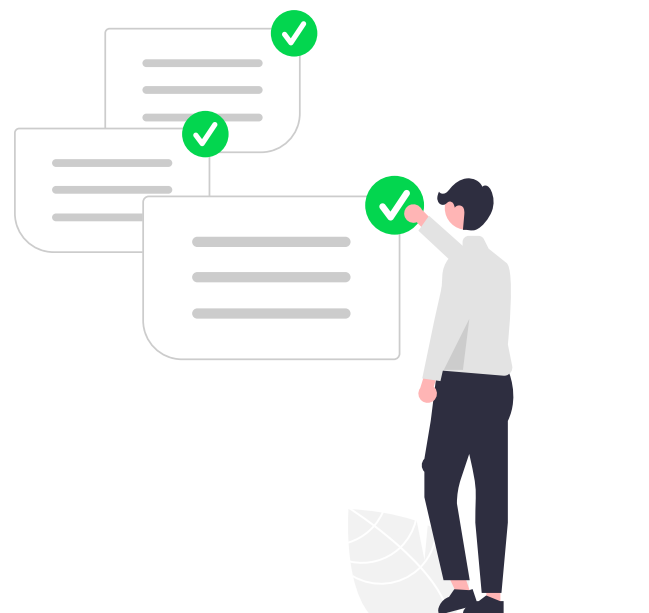
Due to the high demand for workers in non-specialist positions, with low interest among potential candidates in the job offers, **all skills for this group of positions were identified as difficult to find.**

Among the skills identified for the positions in this group, **no forecasts were observed indicating an increase in the importance of skills over the next 2 years.**

Employees in non-specialist positions relatively rarely show a desire to improve their skills.

For this group of hot skills, only one position was identified waste loader. These skills are:

- » the ability to identify the different types of waste
- » knowledge of procedures for dealing with hazards arising from the work performed



**Full survey results are
discussed in the study:**

Sectoral Human Capital Study II

Material recovery sector

2nd edition:

 **[https://www.parp.gov.pl/
component/site/site/bilans-kapitalu-
ludzkiego#wynikibadanbranzowych](https://www.parp.gov.pl/component/site/site/bilans-kapitalu-ludzkiego#wynikibadanbranzowych)**