INSTYTUT OCHRONY ŚRODOWISKA – PAŃSTWOWY INSTYTUT BADAWCZY
INSTITUTE OF ENVIRONMENTAL PROTECTION – NATIONAL RESEARCH INSTITUTE

Towards a European qualification for Solid Waste Facilities' Managers - SWFM-QF

National report on qualifications, knowledge, skills, competences and labour status of Solid Waste Facilities' Professionals

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EACEA Education, Audiovisual & Culture Executive Agency

National report on qualifications, knowledge, skills, competences and labour status of Solid Waste Facilities' Professionals

Outline

This report describes the qualifications, knowledge, skills, competences and labour status of solid waste facilities' managers and technicians.

The information in the report is based on the results of the survey on qualifications, knowledge, skills, competences and labour status of solid waste facilities' managers and technicians conducted among waste management facilities and authorities and on the data available in public statistics databases.

The survey was conducted via the distribution of 620 questionnaires to solid waste companies (246), vocational training organisations and experts (268), and associations and authorities (106).

Three different questionnaires were used in the survey for the following respondent groups:

- solid waste management facilities
- organisations providing training for waste management facilities' managers and specialists
- associations and authorities

Solid waste facilities concerned:

- waste collection companies
- waste sorting facilities
- waste recycling facilities
- incineration facilities
- landfills

Training organisations concerned:

- technical universities offering undergraduate and graduate programmes in the field of waste management
- training organisations and universities offering postgraduate studies in the field of waste management
- training organisations delivering short courses in the field of waste management
- VET experts

Associations and organisations concerned:

- relevant ministries
- waste management associations and chambers
- educational foundations
- educational institutes
- environmental protection inspectorates
- regional examination commissions
- employment agencies

National report on qualifications, knowledge, skills, competences and labour status of Solid Waste Facilities' Professionals

1. Introduction

1.1. Brief overview of the report

This report describes the qualifications, knowledge, skills, competences and labour status of solid waste facilities' managers and technicians.

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- regional examination commissions
- employment agencies

The existing National Qualifications Frameworks (NQF) will be identified.

The complete range of knowledge, skills and competences will be depicted.

In the same survey the status of the industrial waste management labour market will be examined, as well as the national legislation concerning the specific profession, the working conditions, the value of qualifications, the range of age of the professionals, and the status of Waste Management profession in industry and in society.

1.2. Information about authors

Anna Bojanowicz-Bablok – main specialist in Waste Management Department, Institute of Environmental Protection - NRI
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2. Overview of waste management industry in the country based on information collected by project partner

2.1. Waste streams

The main waste streams covered by national statistics are:

- industrial waste
- waste electrical and electronic equipment
- packaging waste
- municipal solid waste

Regarding waste treatment plants, there were more than 2500 operating facilities for processing of waste in 2010 (Table 1).

Table 1. Recovery and disposal facilities in Poland in 2010

Type of facility	Number of facilities
Energy recovery	724
Incineration	56
Recovery other than energy recovery (recycling and backfilling)	1071
Deposit onto or into land	12
Landfills for hazardous waste	48
Landfills for non- hazardous waste	610
Landfills for inert waste	8

Source: GUS, Environment 2012, Warsaw 2012.

2.1.1. Industrial waste

The data on industrial waste presented in this section show quantities and types of:

- waste produced annually, including quantities of waste recycled, disposed, deposited in repositories (landfills, heaps, ponds), incinerated, composted and temporarily stored
- waste stored (accumulated) at the premises of plants' landfills (dumps, heaps, ponds)
- number of plants generating waste

Presented information concerns the wastes from plants which produce at least 1000 tons of waste per year or accumulated 1 million tons or more of waste, regardless of the waste produced annually.

In Table 2 the amount of industrial waste generated annually in the period of 2000 – 2011 is presented.

Table 2. Industrial waste generated annually in 2000 – 2011

Waste generated [thous. tonnes]				
2000	**2005**	**2009**	**2010**	**2011**
125 484	124 602	111 060	113 479	123 524

Source: GUS, Environment 2012, Warsaw 2012.

In Table 3 the amount of waste generated, recovered, treated, landfilled, temporarily stored, and accumulated in 2011 is presented. The classification is presented according to the Polish Classification of Activities (PKD 2007). Polish Classification of Activities is fully methodologically, conceptually, in the scope and coding system, coherent and comparable with the statistical classification of economic activities in the European Community (NACE Revision 2).

Table 3. Industrial waste generated, recovered, treated, landfilled, stored and accumulated in 2011

Section		**Waste generated** [a] **[thous. tonnes]**						**Waste lanfilled (accumulated) so far (as of the end of the year)** [d]
		total	**recovered**	**treated**			**temporarily stored** [c]	
				total	**thermal**	**landfilled** [b]		
B	Mining and quarrying	60 946	45 487	14 841	1	14 839	617	809 489
C	Manufacturing	26 190	19 943	4 295	125	3 008	1 952	225 664
D	Electricity, gas, steam and air conditioning supply	22 634	13 506	8 773	5	8 494	355	253 683
E	Water supply, sewerage, waste management and remediation activities	6 105	2 227	3 477	182	200	402	328 616
F	Construction	6 817	6 741	37	-	37	39	26
G - U	Other sections	832	753	32	0,1	23	48	36 597
	Total	**123 524**	**88 657**	**31 455**	**312**	**26 601**	**3 412**	**1 654 074**

[a] Excluding municipal waste

[b] On own and other landfills (dumps, slag heaps, tailing ponds)

[c] storage or collection prior to its transport, recovery or disposal

[d] On own landfills (dumps, slag heaps, tailing ponds)

Source: GUS, Environment 2012, Warsaw 2012.

In Table 4 the number of plants generating industrial waste in the period of 2000 – 2011 and recovering, treating and landfilling own waste is presented.

Table 4. Plants generating industrial waste during 2000 – 2011

	Plants generating waste				
	2000	**2005**	**2009**	**2010**	**2011**
Total:	1393	1573	1746	1798	1936
- of which recovering the waste	1290	1402	1577	1 614	1814
- of which treating the waste	805	622	549	553	393
- of which landfilling the waste	738	417	317	288	281

Source: GUS, Environment 2012, Warsaw 2012.

2.1.2. WEEE

In Table 5 the mass of collected and processed in 2011 waste of electrical and electronic equipment is presented.

Table 5. Collected and processed waste electrical and electronic equipment in 2011

Collected waste [tonnes]	Processed waste [tonnes]
143 340	151 859

Source: GUS, Environment 2012, Warsaw 2012.

At the end of 2011 in the registry of companies and recovery organisations of electrical and electronic equipment[1] maintained by Chief Inspectorate of Environment Protection were:

- 10 458 companies collecting waste electrical and electronic equipment
- 161 companies processing waste electrical and electronic equipment
- 99 companies recycling waste electrical and electronic equipment
- 12 companies recovering waste electrical and electronic equipment using methods other than recycling
- 8 recovery organisations

The 161 companies processing waste electrical and electronic equipment (recovery operations R14 and R15) have the joint processing capacity of 589 364 tonnes/year.

The 99 companies recycling waste electrical and electronic equipment (recycling operations R2-R9) have the joint recycling capacity of 5 503 470 tonnes/year.

The 12 companies recovering waste electrical and electronic equipment using methods other than recycling have the joint recovering capacity of 495 490 tonnes/year.

2.1.3. Packaging waste

The amount of packaging placed on the market in 2019-2011 was 3827, 4293 and 4611 thousand tonnes, respectively. According to waste packaging materials treatment:

- in 2009 – waste recovered: 1900; waste recycled: 1392,9 (thousand tonnes),
- in 2010 – waste recovered: 2306,7; waste recycled: 1668,7 (thousand tonnes),
- in 2011 – waste recovered: 2576,5; waste recycled: 1901,7 (thousand tonnes).

Regarding types of waste packaging materials, waste recycled in 2010:

- plastic packaging – 147751 (tonnes),
- aluminium packaging – 46928 t,
- steel packaging, of which steel sheet packaging – 65364 t,
- paper and cardboard packaging: 755890 t,
- household glass packaging excluding ampoules – 435229 t,
- packaging made of natural materials (wood and textiles) – 217524 t.

[1] GIOS, Report on the functioning of the waste electrical and electronic equipment management system in 2011, Warsaw, June 2012.

2.1.4. Municipal waste

Municipal waste is waste generated by households, excluding end-of-life vehicles, together with waste from other producers of waste, which is similar to waste from households and which does not contain hazardous substances. In Table 6 the amount of municipal solid waste collected annually in total and separately in the period of 2005 – 2011 is presented. The data is presented individually for all waste collected and for waste collected from households.

Table 6. Municipal solid waste collected in the period 2005 - 2011

	Waste collected [thous. tonnes]							
	total				from households			
	2005	2009	2010	2011	2005	2009	2010	2011
Total	9 352	10 053	10 040	9 828	6 493.4	6 907.2	6 892.0	6 844.4
Separately, of which:	295.3	788.9	859.9	984.2	196.3	543.0	596.9	672.2
- paper and cardboard	95.8	151.0	169.9	174.6	36.4	81.2	94.8	97.2
- glass	99.2	199.8	215.9	268.7	79.7	157.2	176.0	212.2
- plastic	41.3	100.4	124.0	157.3	30.2	74.6	93.8	114.9
- metals	7.2	14.2	17.4	16.9	4.0	8.3	12.5	12.1
- textiles	17.5	36.0	35.7	31.0	17.0	35.2	35.3	30.2
- hazardous	0.2	0.7	0.8	0.8	0.1	0.4	0.7	0.6
- waste electrical and electronic equipment	0.1	18.2	12.0	22.0	0.0	16.5	10.8	20.6
- bulky waste	34.2	104.4	102.9	102.8	28.9	91.8	88.5	86.8
- biodegradable	-	164.1	181.3	210.0	-	77.8	84.8	97.5

Source: GUS, Environment 2012, Warsaw 2012.

2.2. Composition of waste management industry (public/private sector)

In Table 7 the structure of waste management companies in Poland at the end of 2012 is presented. The data come from the National Official Business Register (REGON), in which all legal persons, organisational units without the status of a legal person, natural persons running economic activities (including private farms) and local units of entities mentioned above are registered. The waste management activities include waste collection, processing and disposal, resources recovery and recycling.

Table 7. Structure of waste management companies in Poland in 2012

Total	Public sector	Private sector	
		total	natural persons running economic activity
8049	383	7666	4611

Source: REGON Register

2.3. Waste management industry associations and networks

Polish Chamber of Waste Management (PIGO) was established in 2003, as an organization of economic autonomy by 145 companies working in the field and interested in waste management. Now the number of companies is ca. 180. PIGO's main targets set in The Statute are representing and protection of member's interests, creating market and industry in waste management.

PIGO cooperates with municipal authorities, administration, and other national and international organizations and invites to cooperation and membership communal management companies, waste utilization and thermal treatment companies, landfills, manufacturers, etc.
PIGO promotes and develops sustainable waste management and modern communal technology by means of economic and legal instruments to decrease amount of produced waste. PIGO also develops recycling and recovery strategies and methods of disposal.
The Chamber supports member's economic initiatives and provides law creation opportunities along with high standards of security and communal hygiene.

National Chamber of Waste Management (KIGO) established in 2003 as an organization of economic autonomy. There are 135 members working in the field and interested in waste management.
KIGO is open to every company working at waste trade. All the companies working in the field of waste management, municipal authorities, administration, house of commons can join KIGO.
KIGO is often organising workshops, conferences and meeting for its members and local authorities.

National Board of Directors of Municipal was established in1992. There are 162 members.
National Board of Directors of Municipal is a national association consociating leaders of Municipal Services Office, production and other companies in urban cleaning industry field.
The statutory purpose of the association is to integrate urban cleaning and waste management industry, promoting the flow of information on the functioning of companies operating in different jurisdictions, the promotion and dissemination of new, standardized organisational solutions as well as creating conditions for the exchange of experiences in treatment of urban waste, management of raw waste materials, environmental protection and environmental education.
An important task of the National Forum of Directors is to create a specialized advisory opinion of it‘s members to the government, and local government administration.

Economic Chamber of Non-Ferrous Metals and Recycling (IGMNiR) was established in 1995. There are 56 members.
The main tasks performed by the IGMNiR include:

- representation of the interests of the Members towards the central government administration, local administration and local government authorities and national and foreign organizations and associations;
- protection of market interests of Members through cooperation with the **Chief Inspectorate of Environmental Protection and the** Office of Competition and Consumer Protection;
- co-participation in the creation of the economic law by comment on its amendments,
- supporting the development of non-ferrous metal industry and recycling in Poland and Europe.

IGMNiR belongs to the prestigious international industry associations such as: BIR, Eurometaux or EUROMETREC.

Waste Management Employers’ Association was established in 2004 and associate the employers working in the waste management field.
Waste Management Employers' Association is an organization of self-governing and independent politically and statutory from the state administration bodies, local government and other organizations.

Waste Management Employers' Association represents and protects the interests of employers, through participation in the creation and commenting of legislation, participation in legislative committees and the exchange of information.
Among the members of the Association are employers such as business individuals, budgetary establishments, partnerships, commercial companies and even co-operatives. The members are involved in: waste collection, waste treatment, disposal, recovery and recycling, supply of equipment for the waste management, municipal hygiene and cleaning services. Among the members of the Association are employers representing local businesses, as well as companies operating in Poland, whose parent company is located abroad.

Regional Representatives Council Of The Municipal Waste Treatment Instalations (RIPOK). The purpose of the RIPOK Council is:

- to identify the problems associated with the implementation of the waste legislations,
- to develop possible solutions and to transfer them to the competent authority in this field,
- to ensure the smooth functioning of the new model of waste management and the Regional Municipal Waste Processing Plant.

The possibility of direct exchange of experiences with representatives of legislative and executive authorities helps to find answers to many troubling questions and issues faced by RIPOK. Member of the Council can be any entity acting as a regional municipal waste treatment system in the Regional Waste Management Plan.

Association of Polish Entrepreneurs Waste Management was established in 2000.
Main objectives are as follows:

- supporting the development of Polish enterprises in waste management
- supporting projects aimed at development of Polish companies in the waste disposal
- promoting knowledge and research, and practice in the field of waste management
- helping small and medium-sized enterprises in the field of waste management
- creating a system of financial support for the Polish waste management companies
- conducting education and training
- preparing speeches, questions and petitions to the local and national authorities
- creating of a common lobbying of Polish waste management companies
- representing waste management companies in front of all government bodies
- business activities aimed at promoting and growth of Polish companies working in the field of waste disposal (publication of magazines, brochures, etc.)
- cooperation with other similar institutions, including international cooperation

GPP Ecology Association registered by the District Court for the capital city Warsaw, was established in 2009, bringing together and consolidating the Group of Polish Entrepreneurs (GPP) operating in the waste industry, cooperating with each other to improve and modernize the system of waste management, in particular the system of waste electrical and electronic equipment.
There are 20 members of the association.
Association brings together several SMEs on the Polish market, such as: WEEE collecting, and processing plants, recycling and recovery and disposal of WEEE waste.

GPP Ecology Association is engage in the creation and development of a nationwide, integrated system for selective collection and recycling of waste, creation of cooperative relations in the field of waste management and sustainable waste. Prerogative of the Association is to create a stable and transparent market for electronic waste in Poland.
GPP Ecology Association sets a task of integrating the environment and develop a compromise organizational and legal solutions.
Association works with state administration and local government, academic, educational, institutions, NGOs and entrepreneurs.

Polish Association of Industry Coalition Of Environmentally Friendly Packaging Eco-Pak was founded in 1995 and takes an active part in building used packaging system in Poland.
Members of the Association of Eco-Pak are: individuals, ordinary members and supporting members and manufacturing companies in the food and chemical industry associated with the production and use of various types of packaging.
Eco-Pak is an organization representing the industry in the field of waste management specially in packaging. Eco-Pak is independent from corporate and municipal waste management industry. The primary objective of the Society is to monitor and actively influence the legislative process to ensure the construction of a system of compulsory recovery of packaging at a reasonable cost.
Eco-Pak is a member of accreditation body of the European Parliament EUROPEN - The European Organization for Packaging and the Environment, based in Brussels (www.europen.be).
At the moment Eco-Pak association has 25 full members and 17 supporting members.

Polish Recycling Chamber of Commerce was founded in 1999 and has 100 members.
Polish Recycling Chamber of Commerce represents SMEs which act in waste management in Poland.
Chamber's purposes are:

- Improving natural environment's condition through creation of recovery and recycling system,
- Helping companies working in waste trade to do their best in global market economy,
- Integrating SME with EC regulations and standards.

Undertakes made by Chamber:

- Cooperation in creation and realization of national and local economic policies in waste recovery and recycling,
- Working out the method of covering the cost of selective waste.

3. Overview of solid waste management facilities in the country based on survey of waste management facilities

3.1. Number of employees

In Table 8 the number of employees in solid waste management facilities which responded to the survey is presented.

Table 8. Current number of employees in facilities

Range	Current number of employees [%]
< 10	10,0

10 - 50	20,0
51 - 100	26,7
> 100	43,3

Source: Survey.

In Table 9 the expected number of person employed in waste management sector at the end of 2012 is presented. The data come from the National Official Business Register (REGON), in which all legal persons, organisational units without the status of a legal person, natural persons running economic activities (including private farms) and local units of entities mentioned above are registered. The waste management activities include waste collection, processing and disposal, resources recovery and recycling.

Table 9. Number of persons employed in waste management sector in 2012

Range	Expected number of persons employed			
	total	public sector	private sector	
			total	natural persons running economic activity
0-9	6870	81	6789	4459
10-49	903	173	730	145
50-249	256	123	133	7
250-999	20	6	14	0
1000 and more	0	0	0	0
total	8049	383	7666	4611

Source: REGON Register

3.2. Age of employees

Average age of employees in waste management facilities which responded to the survey is:

- managers: 50 (SD = 7)
- technicians: 40 (SD = 5)

4. Description of how importance of knowledge in different areas for solid waste management facilities' managers and technicians is perceived by different stakeholders: waste management facilities/training organisations/authorities (survey)

In Figure 1, Figure 2, Figure 3, and Figure 4 the importance of knowledge in different areas for solid waste management facilities' managers and technicians as perceived by solid waste management facilities and authorities are presented.

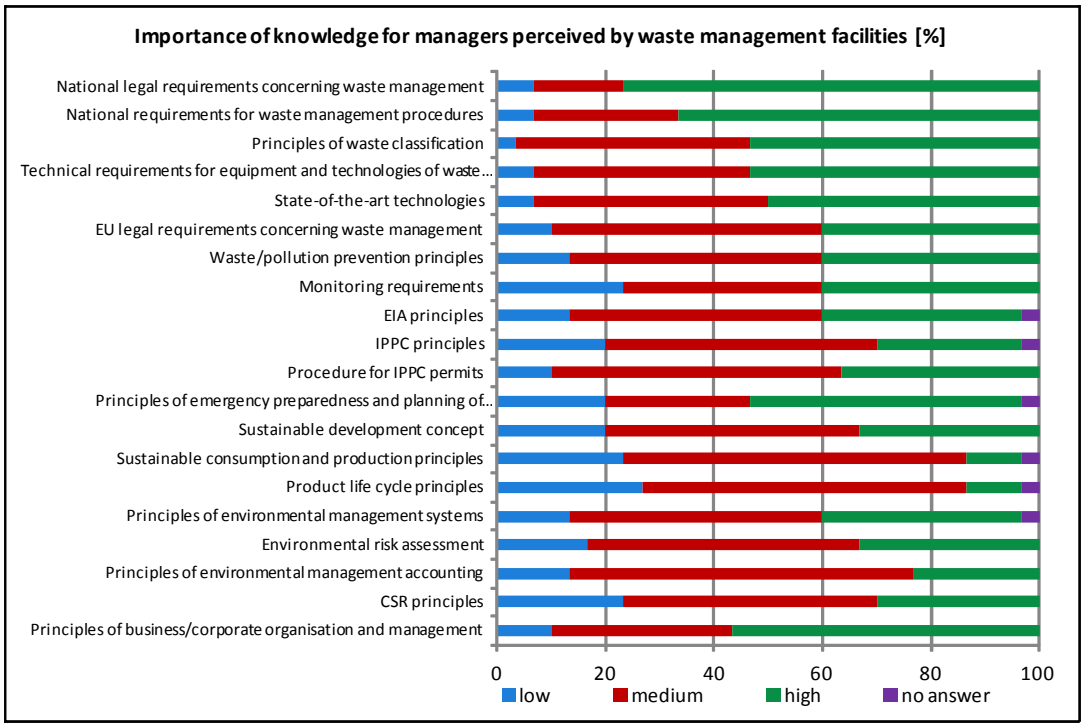

Figure 1. Importance of knowledge in different areas for solid waste management facilities' managers perceived by solid waste managemet facilities

National legal requiremens concerning waste management and national requirements for waste management procedures are the most important for waste management facilities regarding importance of knowledge for managers. Not much less important are principles of waste classification, technical reqiurements for equipment and technologies and principles of business/corporate organisation and management. As the less important the product life cycle principles, CSR principles and monitoring requirements are considered.

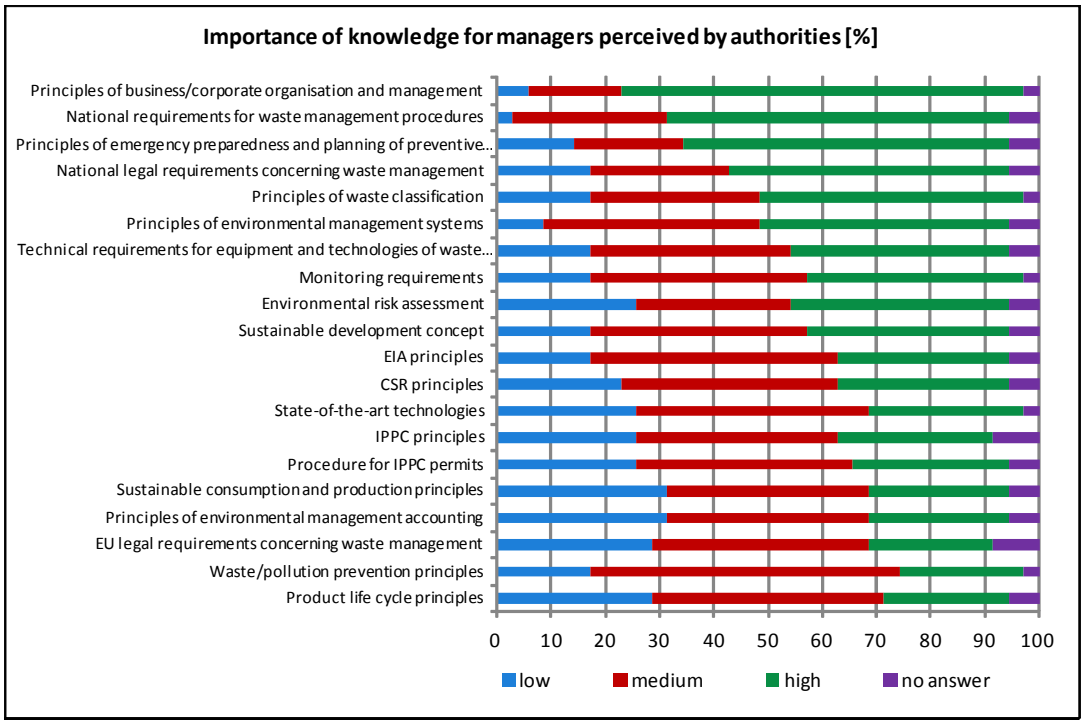

Figure 2. Importance of knowledge in different areas for solid waste management facilities' managers perceived by authorities

In authorities' opinion substantial for managers are: principles of business/corporate organisation and management, national requirements for waste management procedures, principles of emergency preparedness and planning of preventive actions and national legal requiremens concerning waste management. The importance of knowledge about waste/pollution prevention principles and product life cycle principles are considered as the least important.

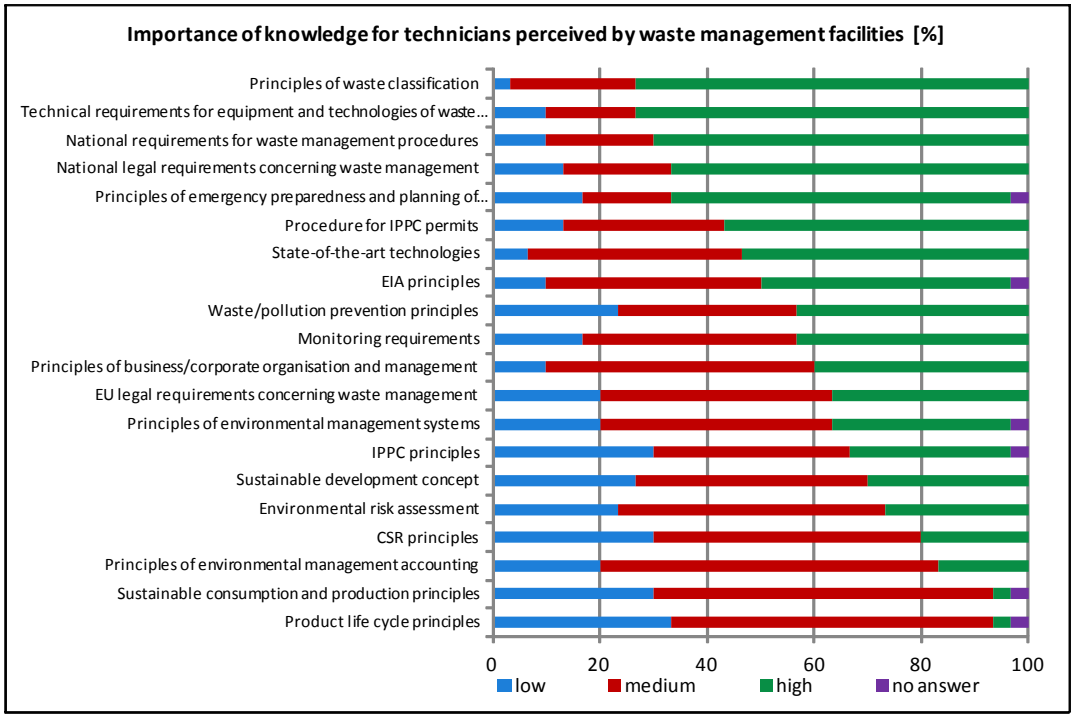

Figure 3. Importance of knowledge in different areas for solid waste management facilities' technicians perceived by solid waste management facilities

As regard to importance of knowledge for technicians, waste managemet facilities consider principles of waste classification, technical reqiurements for equipment and technologies, national requirements for waste management procedures, national legal requiremens concerning waste management and principles of emergency preparedness and planning of preventive actions as significant. Sustainable consumption and production principles, alike product life cycle principles are of low importance.

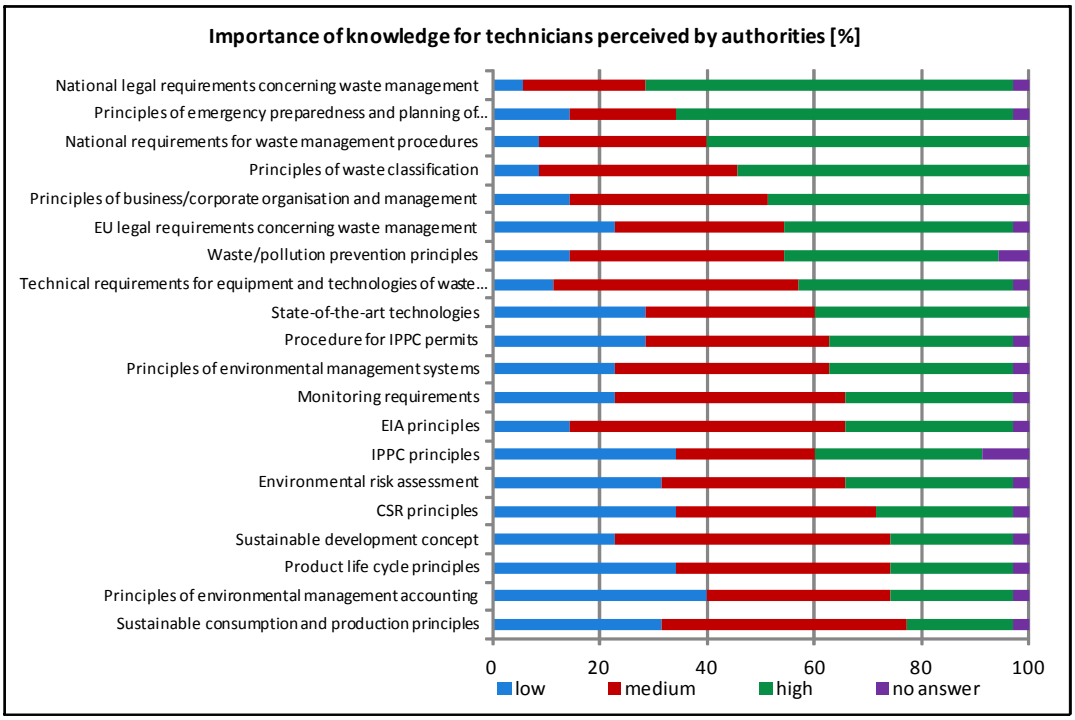

Figure 4. Importance of knowledge in different areas for solid waste management facilities' technicians perceived by authorities

The knowledge on national legal requiremens concerning waste management, principles of emergency preparedness and planning of preventive actions, national requirements for waste management procedures and principles of waste classification ought to be the most important for technicians, regarding judgment of authorities. Both 'sustainable consumption and production principles' and 'principles of environmental management accounting' are perceived as irrelevant.

5. Current qualification of solid waste facility managers and specialists in different areas based on opinions of different stakeholders (survey)

In Figure 5, Figure 6, Figure 7, and Figure 8 the current qualification of solid waste management facilities' managers and technicians in different areas as perceived by solid waste management facilities and authorities are presented.

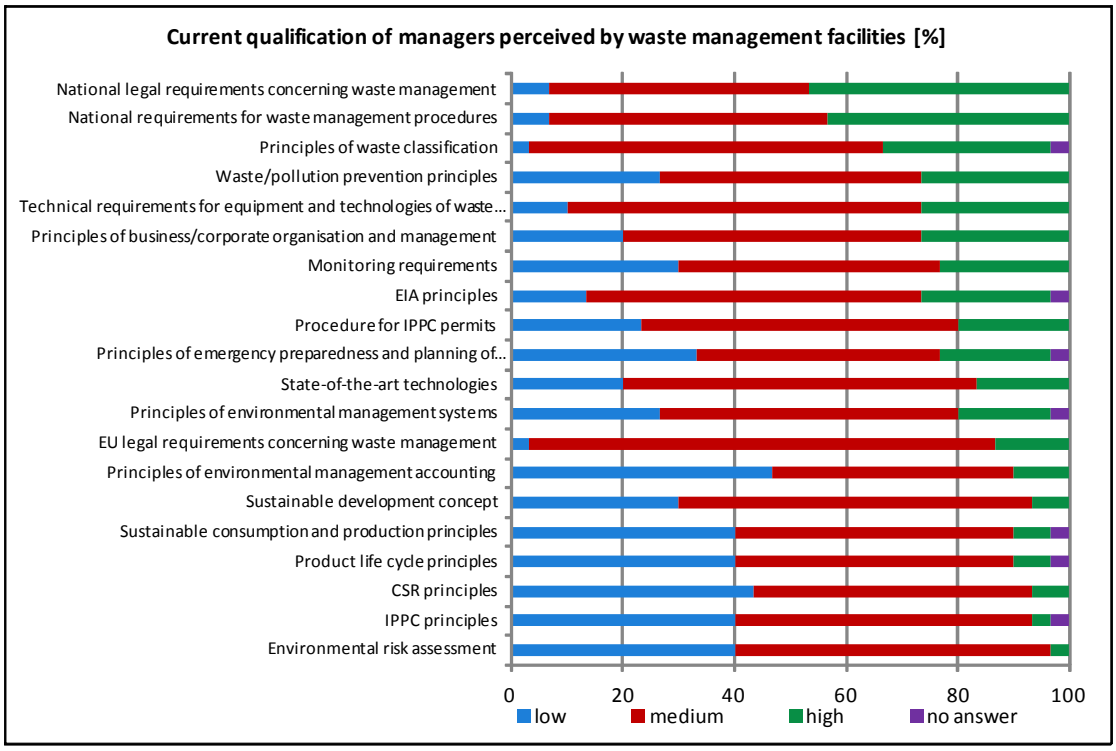

Figure 5. Current qualification of solid waste management facilities' managers in different areas perceived by solid waste management facilities

In waste management facilities' opinion managers ought to be qualified in national legal requiremens concerning waste management, national requirements for waste management procedures and principles of waste classification, primarily. CSR and IPPC principles, similarly to environmental risk assessment are considered as less important.

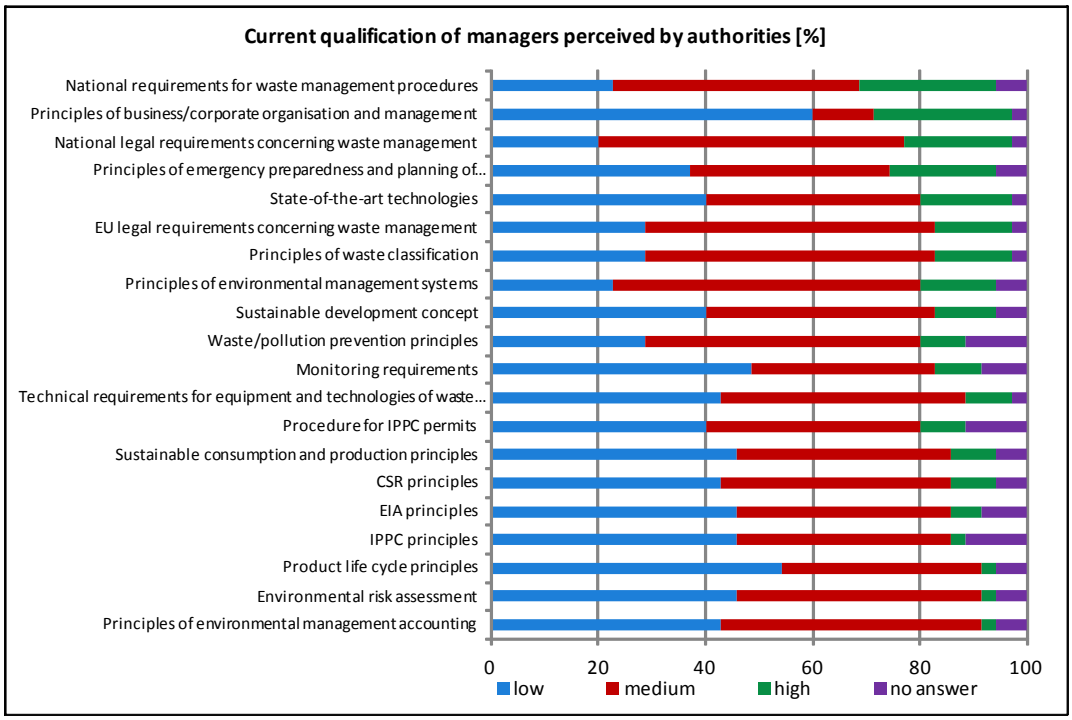

Figure 6. Current qualification of solid waste management facilities' managers in different areas perceived by authorities

Authorities' view on the current qualification of managers is diversed. Almost the same number of respondents perceive the qualifications of managers in national requirements for waste management procedures as high and as low, at the same time. Approximately 60% of respondents consider the qualification in principles of business/corporate organisation and management as low, while app. 25% perceive qualifications in that filed as high. Almost 60% of the respondents consider qualification of managers in national legal requiremens concerning waste management, EU legal requirements concerning waste management, principles of waste classification and principles of environmental management systems as medium.

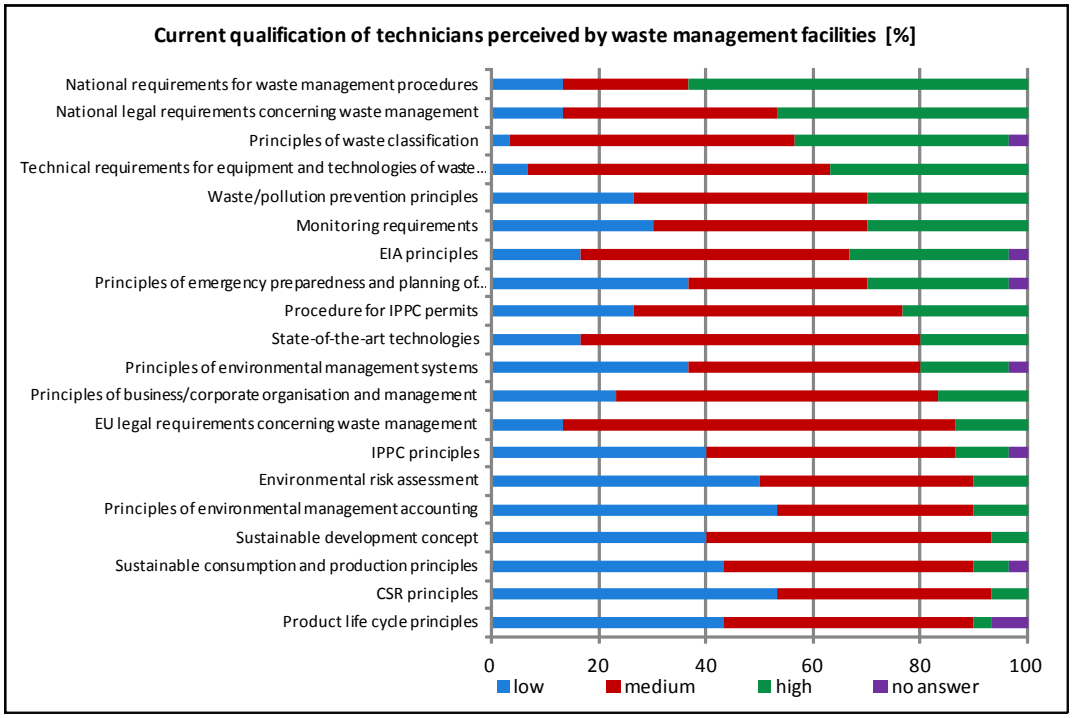

Figure 7. Current qualification of solid waste management facilities' technicians in different areas perceived by solid waste management facilities

According to waste management facilities technicians should be qualified mainly in national requirements for waste management procedures, national legal requiremens concerning waste management and principles of waste classification. As the least relevant are considered principles of environmental management accounting, CSR pronciples and environmental risk assessment.

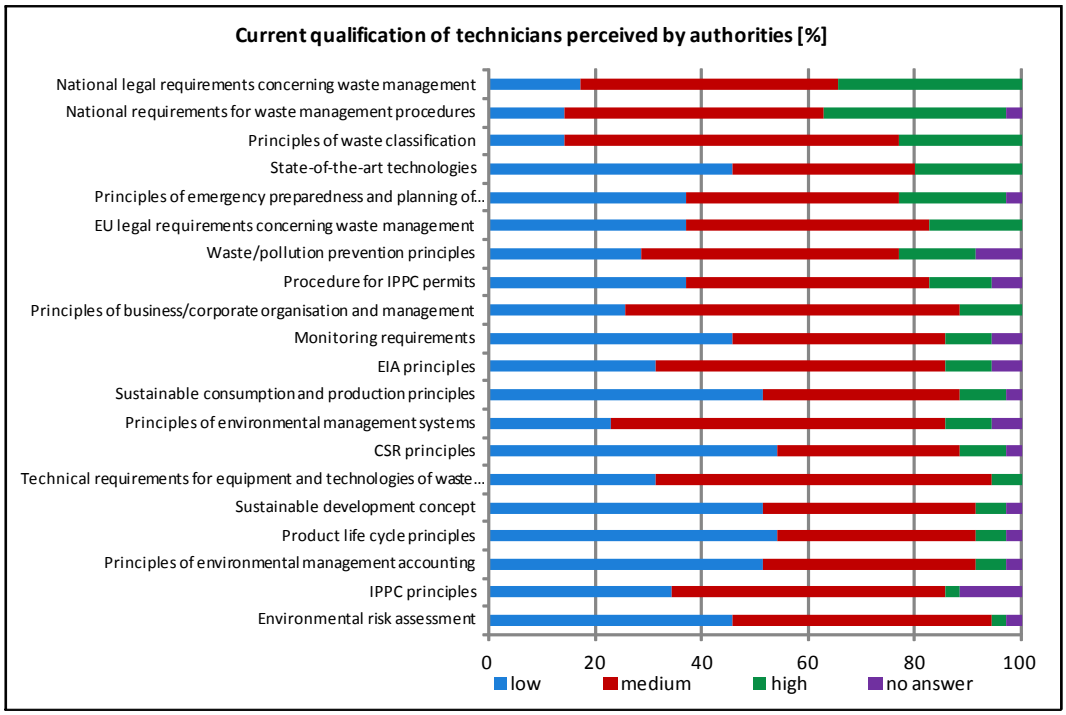

Figure 8. Current qualification of solid waste management facilities' technicians in different areas perceived by authorities

Authorities view is that technicians qualifications in national legal requiremens concerning waste management, national requirements for waste management procedures and principles of waste classification are moderately important (medium) or crucial (high). Qualification in sustainable consumption and production principles, CSR principles, as far as product life principles are perceived as rather low.

6. Description of how importance of practical skills in particular areas for waste management facilities' managers and technicians is perceived by different stakeholders: waste management facilities/training organisations/authorities (survey)

In Figure 9, Figure 10, Figure 11, and Figure 12 the importance of practical skills in different areas for solid waste management facilities' managers and technicians as perceived by waste management facilities and authorities are presented.

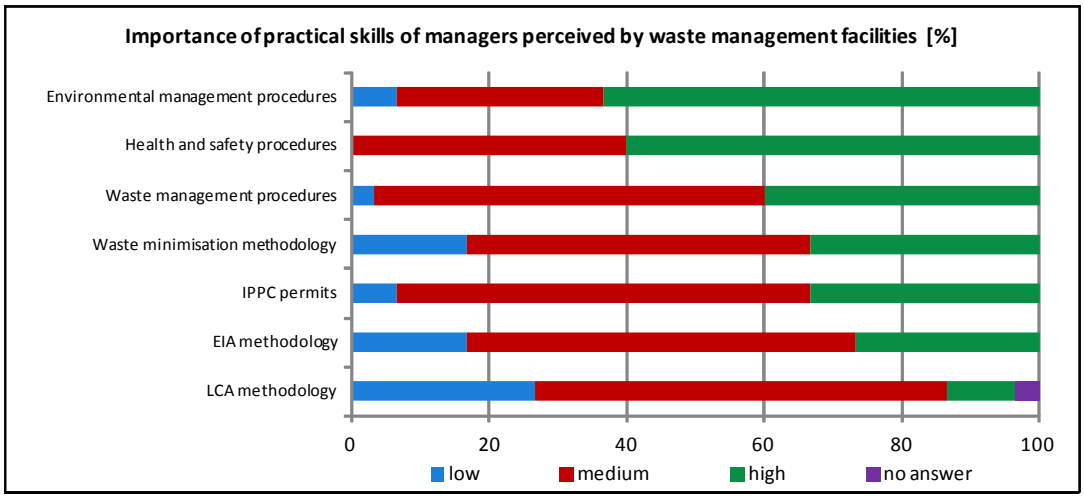

Figure 9. Importance of practical skills in different areas for solid waste management facilities' managers perceived by solid waste facilities

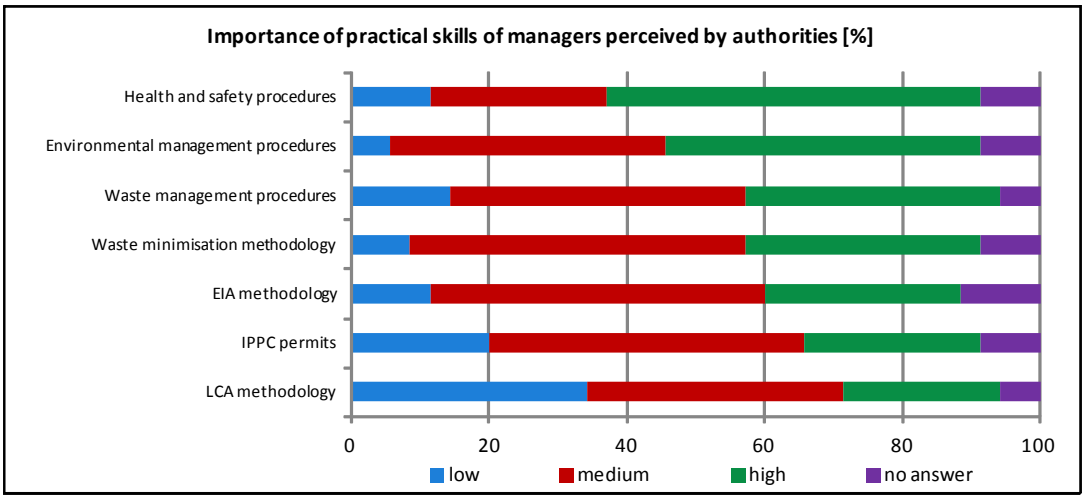

Figure 10. Importance of practical skills in different areas for solid waste management facilities' managers perceived by authorities

Regarding the importance of practical skills of managers, environmental management procedures and health and safety procedures are considered, by solid waste facilities, as important for waste management facilities (app. 63% and 60%, respectively) and the LCA methodology is perceived as fairly irrelevant. Authorities' view is similar.

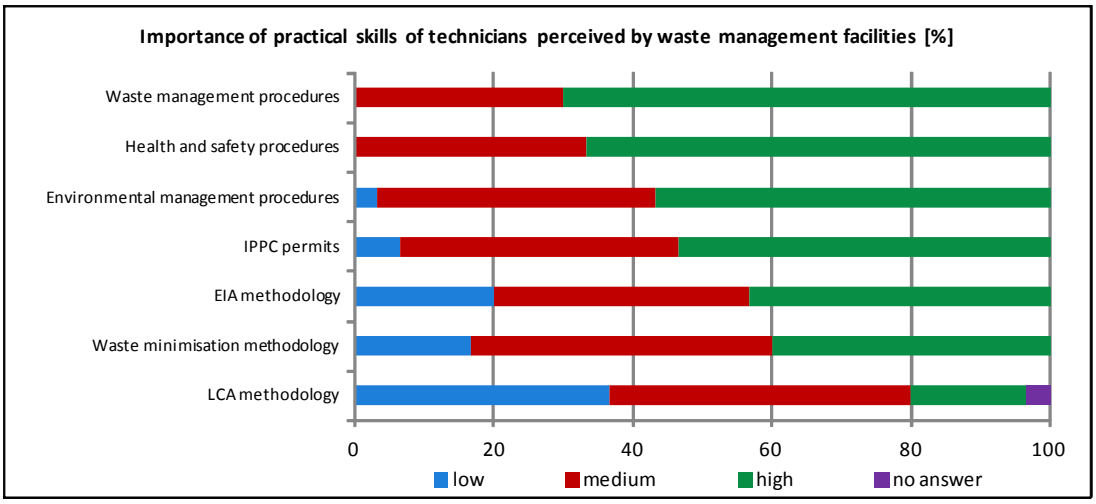

Figure 11. Importance of practical skills in different areas for solid waste management facilities' technicians perceived by solid waste facilities

According to the waste management facilities, practical skills of technicians in waste management procedures and health and safety procedures are important (respondents considered them as 'medium' and 'high' important). On the other hand importance of practical skills in the LCA mathodology is perceived as rather irrelevant.

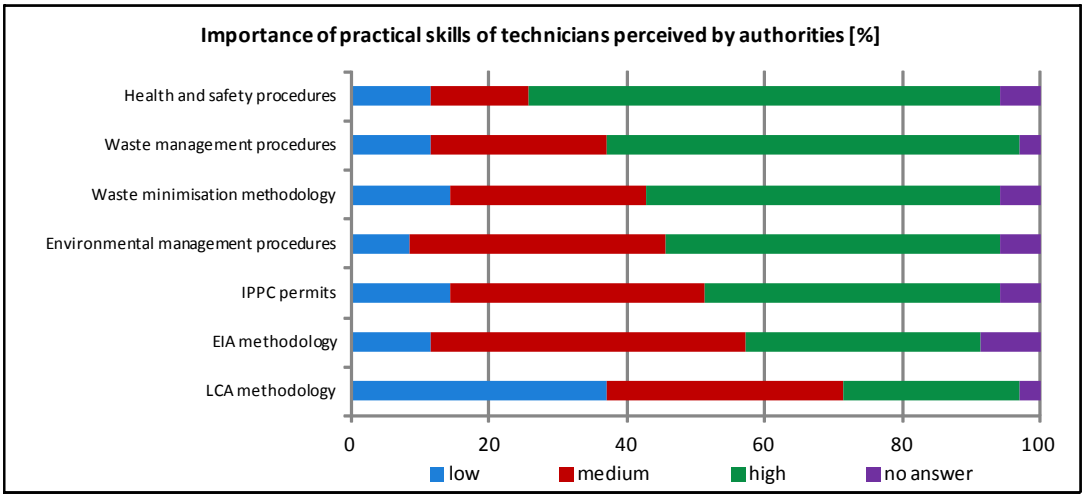

Figure 12. Importance of practical skills in different areas for solid waste management facilities' technicians perceived by authorities

Health and safety procedures and waste management procedures are perceived as the most important practical skills of technicians in authorities' opinions, while the LCA methodology was indicated as less relevant.

7. Current skills of solid waste facility managers and technicians in particular areas based on opinions of different stakeholders (survey)

In Figure 13, Figure 14, Figure 15, and Figure 16 the current practical skills in different areas of solid waste management facilities' managers and technicians as perceived by solid waste management facilities and authorities are presented.

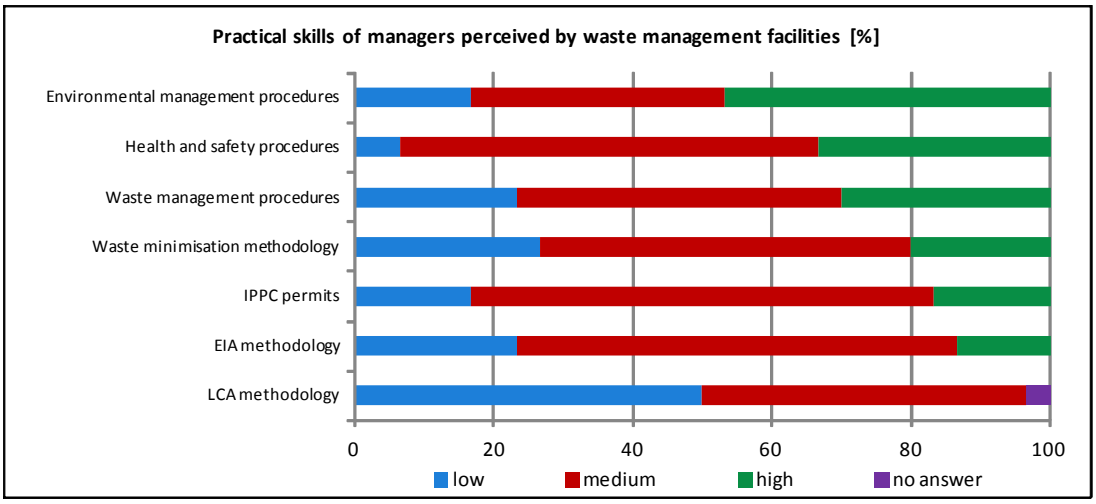

Figure 13. Current practical skills in different areas of solid waste management facilities' managers perceived by solid waste management facilities

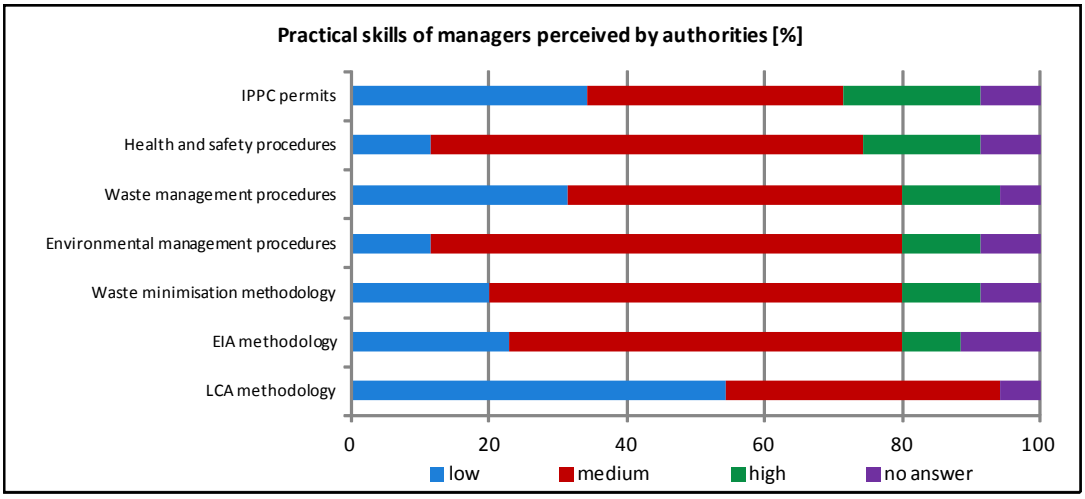

Figure 14. Current practical skills in different areas of solid waste management facilities' managers perceived by authorities

Both waste management facilities and authorities consider current practical skills of managers in health and safety procedures, environmental management procedures and IPPC permits as high or medium. In comparison, the practical skills in LCA methodology is considered as low.

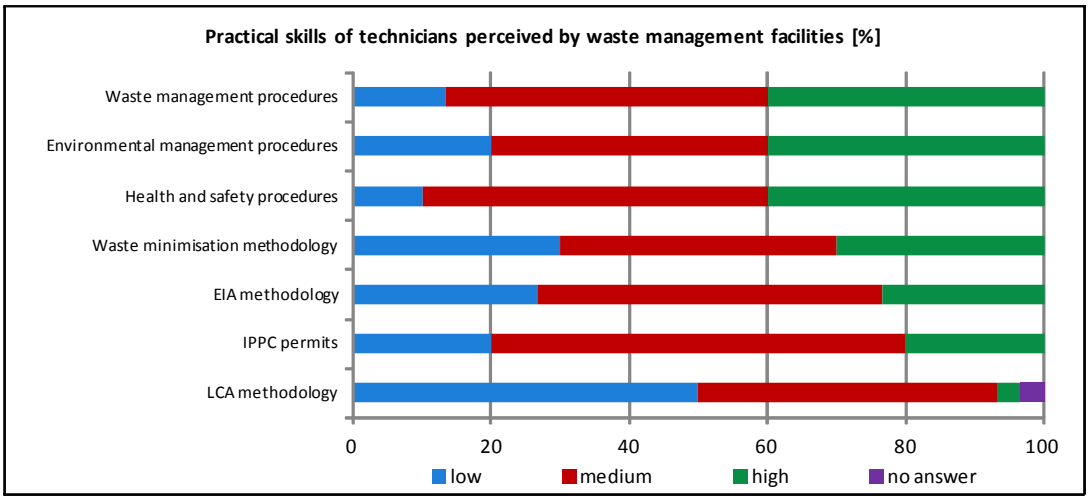

Figure 15. Current practical skills in different areas of solid waste management facilities' technicians perceived by solid waste management facilities

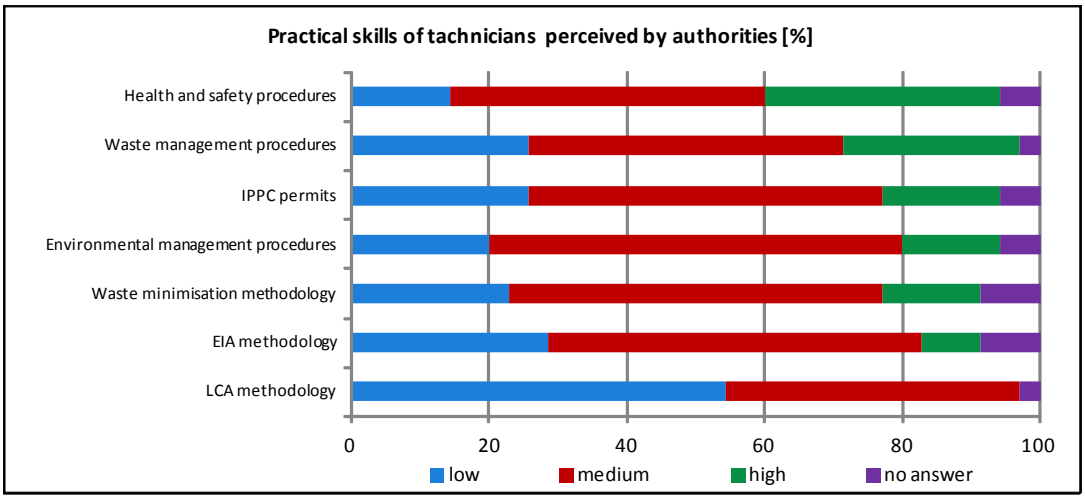

Figure 16. Current practical skills in different areas of solid waste management facilities' technicians perceived by authorities

Waste management facilities alike authorities view on practical skills of technicians is comparable. Practical skills of technicians in waste management procedures, health and safety procedures and environmental management procedures are perceived as high or medium. In comparison skills in LCA methodology are considered as relatively low (opinion of more than 50% of survey respondents).

8. Labour status (survey and statistical data)

8.1. Salary level of waste management facilities' managers and technicians

In Figure 17 salary level of waste management facilities' managers and technicians in respect to average salary in the country in particular waste management sectors (waste collection, waste sorting, waste recycling, incineration, and landfills) is presented.

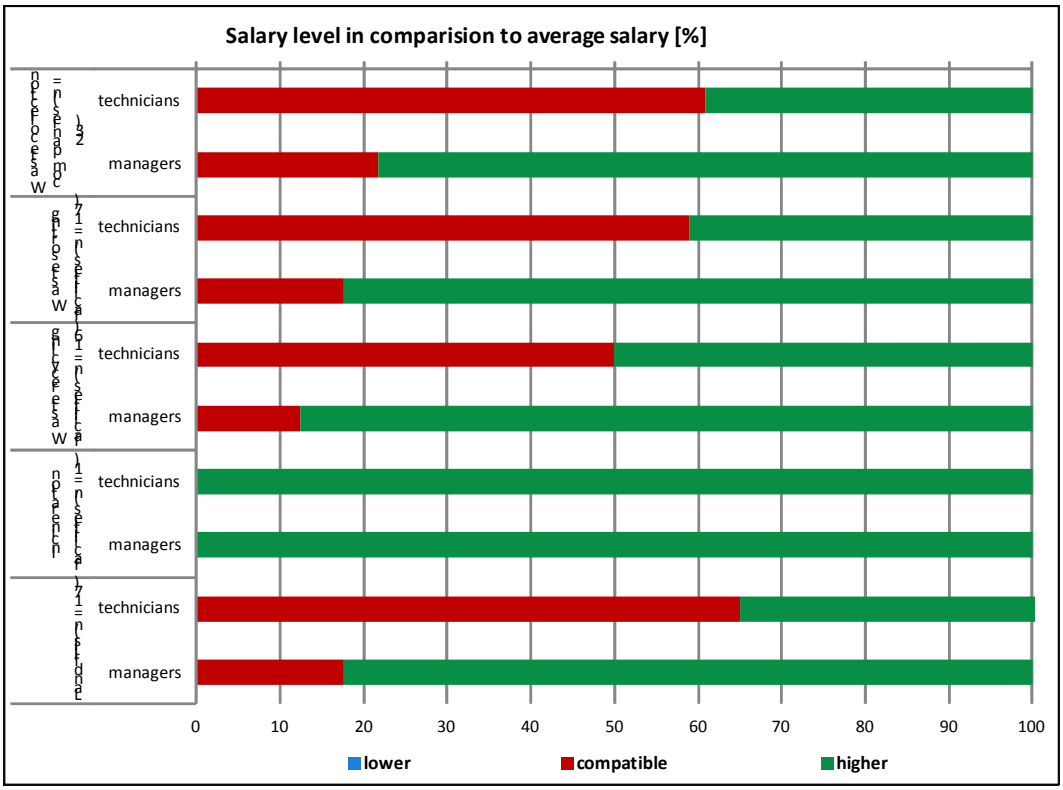

Figure 17. Salary level of solid waste management facilities' managers and technicians in respect to average salary in the country in particular solid waste management sectors

Salary level of waste management facilities' specialists in comparison to average salary in Poland is perceived as compatible or higher in each type of facility, both for technicians and managers.

8.2. Employee replacements in waste management facilities

In Figure 18 employee replacements (average number/3 years) in particular waste management sectors (waste collection, waste sorting, waste recycling, incineration, landfills) is presented based on questionnaire responses from waste management facilities.

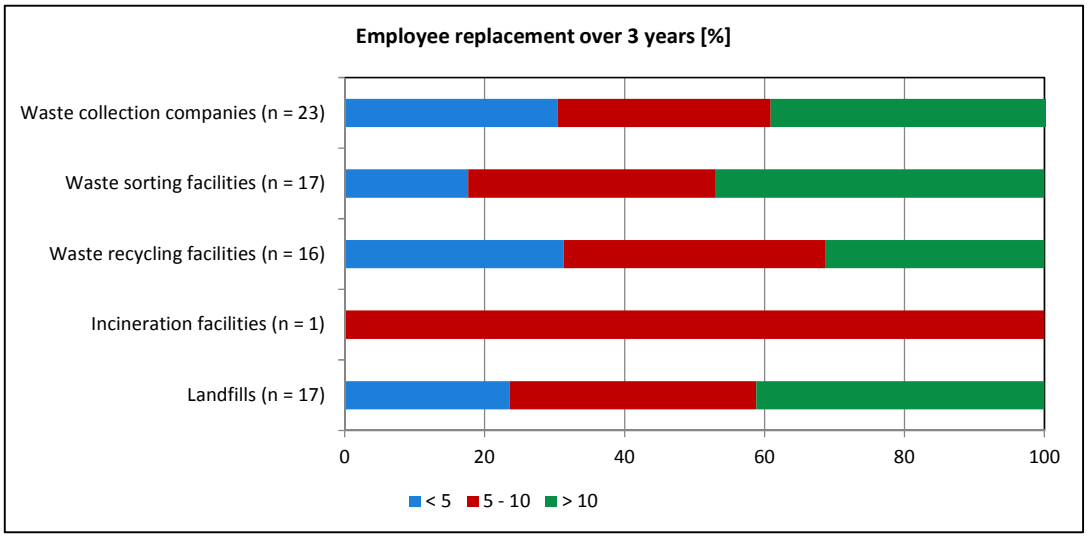

Figure 18. Employee replacement over 3 years in different sectors of solid waste management

Overall replacement rates in waste management sector seems rather low. The highest employee replacement among respondents was noticed in waste sorting facilities: employee replacement over 3 years

in 40-45% of companies was above 10 employees. Medium employee replacement is observed in landfills and waste collection companies. The lowest employee replacement is in waste recycling facilities.

8.3. Working conditions in waste management facilities

In Figure 19 opinions on working conditions (health and safety) in different solid waste management facilities are presented based on survey respondents from solid waste management facilities.

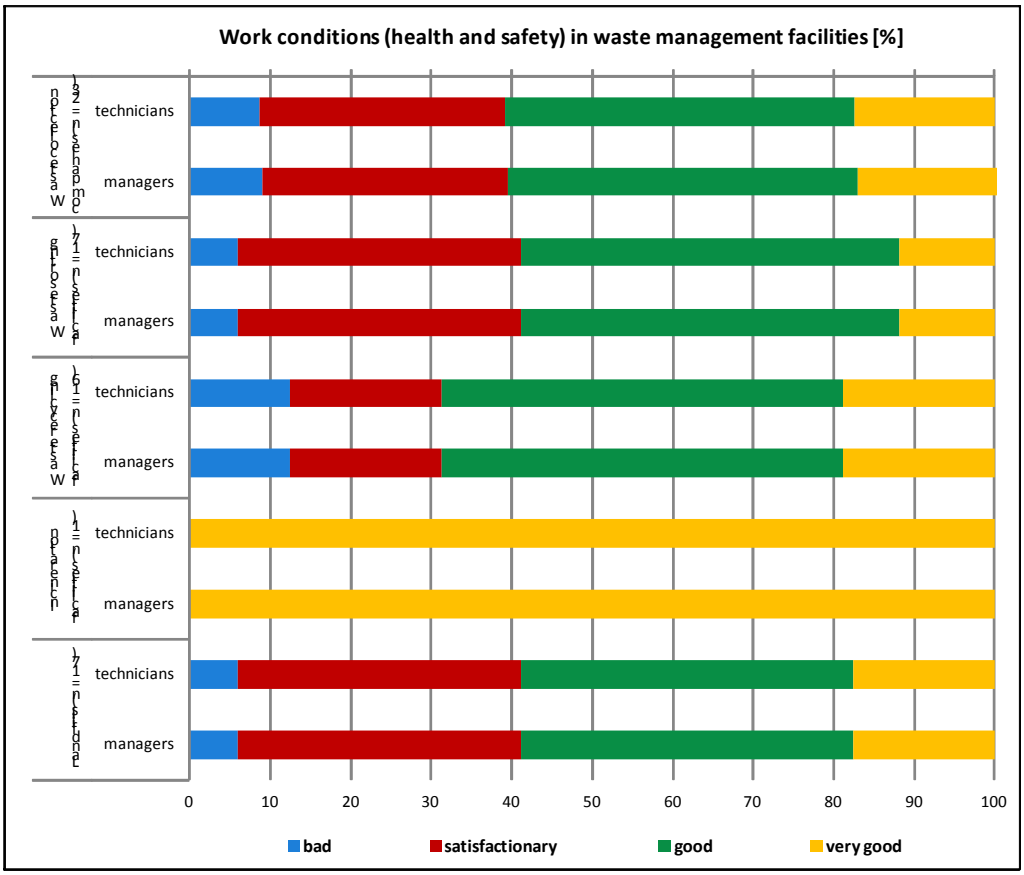

Figure 19. Working condtions (health and safety) in different sectors of waste management

There are no significant differences in the opinions on working conditions in different facilities. In general, 60% of respondents or more consider aspects of working conditions as good or very good.

8.4. Competition for employment in solid waste management facilities

In Figure 20 Figure 1the competition for employment in different solid waste management facilities is presented based on questionnaire responses from solid waste management facilities

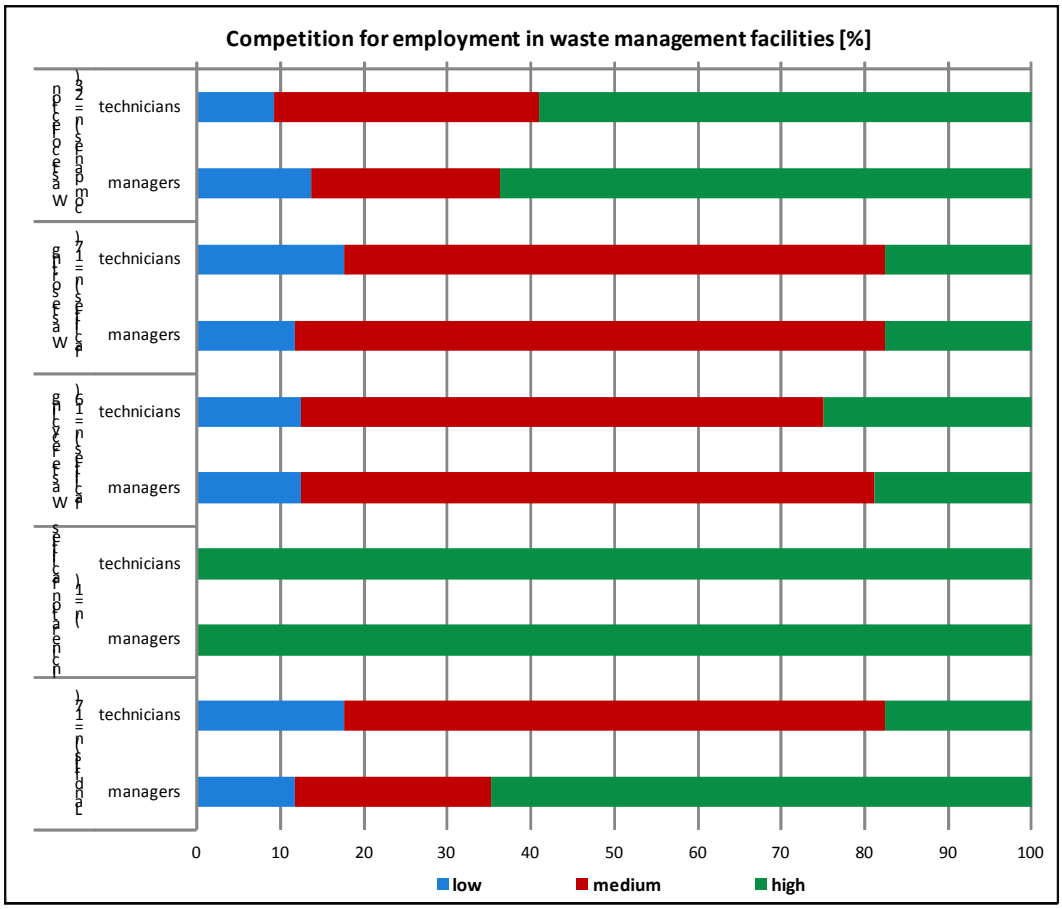

Figure 20. Competition for employment in solid waste management facilities in different sectors

Competition for employment in waste management facilities is perceived by the majority of respondents from each kind of facility as high to medium. Only 10-20% of respondents consider competition for employment as low. The highest competition for employment both for technicians and managers is among waste collection companies. In the case of managers the highest competition for employment is in landfills.

9. Conclusions and recommendations

In waste management facilities' opinion *managers ought to be qualified* in national legal requiremens concerning waste management, national requirements for waste management procedures and principles of waste classification, primarily. Authorities' view on the current qualification of managers is diverse; approximately two-thirds of respondents consider qualification of managers in national legal requirements concerning waste management, EU legal requirements concerning waste management, principles of waste classification and principles of environmental management systems as medium.

According to waste management facilities, *technicians should be qualified* mainly in national requirements for waste management procedures, national legal requiremens concerning waste management and principles of waste classification. Authorities view is that technician's qualifications in national legal requiremens concerning waste management, national requirements for waste management procedures and principles of waste classification are medium or high.

Regarding *the importance of practical skills* of managers, environmental management procedures and health and safety procedures are considered as important in the opinion of solid waste facilities and authorities. Both groups of respondents perceive practical skills of technicians in waste management procedures and health and safety procedures as important.

Both waste management facilities and authorities consider *current practical skills* of managers in health and safety procedures, environmental management procedures and IPPC permits as crucial or moderately important. Waste management facilities' and authorities' view on practical skills of technicians is comparable, as well. The importance of practical skills of technicians in waste management procedures, health and safety procedures and environmental management procedures is perceived as high or medium.

Salary level of waste management facilities' specialists in comparison to average salary in Poland is perceived as compatible or higher in each type of facility, both for technicians and managers.

Overall *replacement rates* in waste management sector seems rather low. The highest employee replacement among respondents was noticed in waste sorting facilities, the lowest employee replacement is in waste recycling facilities.

Working conditions in waste management facilities are highly valuated – more than a half of respondents consider working conditions as good or better than good.

Competition for employment in waste management facilities is perceived by the majority of respondents from each kind of facility as high to medium. The highest competition for employment, both fot technicians and managers, is among waste collection companies. In the case of managers the highest competition for employment is among landfills.