



## HELLENIC NATIONAL REPORT ON THE EXISTING TRAINING PROCEDURES OF PROFESSIONALS IN SOLID WASTE MANAGEMENT INDUSTRY

SWFM-QF



### SOLID WASTE FACILITIES' MANAGERS - QUALIFICATION FRAMEWORK

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## **Introduction**

Solid Waste Management has become as one of the major environmental problems of modern societies. As European society has grown wealthier it has created more and more waste. Each year in the European Union alone we throw away 3 billion tonnes of waste - some 90 million tonnes of it hazardous. The same stands for the Hellenic society. The difficulty in dealing with solid waste management lies in the interaction of several parameters, namely:

- economic factors (i.e. cost of waste disposal and benefit the possible recovery of raw materials through a recycling program)
- energy parameters (i.e. relative energy requirements for transportation, treatment and disposal of waste and benefit from any energy waste treatment)
- environmental parameters (water, soil and air pollution depending on waste disposal options, i.e. causing fires due to uncontrolled waste disposal) and
- political and social issues (people protest against landfill sited near their premises).

The sector of waste management is rapidly changing and developing during the last decade, in Hellas, mainly due to the initiatives and policies adopted in European Union and the new technologies and techniques introduced, thus raising a huge need in highly qualified personnel.

The present report assesses the existing national VET systems on the professions of Waste Management. The learning procedures, including formal, non-formal and informal learning through which qualifications are acquired are mapped. The structure and content of VET programmes are presented, including their cost, the possible source of financing, their learning outcomes and their quality level.

## **Brief Overview of the Report**

The present report has resulted from the research conducted on the different Hellenic national VET systems and training programmes regarding solid waste management technicians and managers occupied at solid waste management facilities. The survey was conducted via:

- a) the distribution of more than 100 questionnaires (Annex II) to vocational training institutes that had organised at the past relative training courses
- b) direct contacts to managers of training centres and institutions, companies and competent bodies
- c) information collected from studies and reports issued by vocational training bodies, educational competent authorities, companies that conduct statistical surveys.

Eighteen (18) answered questionnaires received back.

The **National Organisation for the Certification of Qualifications and Vocational Guidance** (EOPPEP) is the Hellenic national authority that develops the regulatory framework for the certification of qualifications, i.e. the learning outcomes of non-formal education and informal learning, in response to labour market needs and priorities and in liaison with the accreditation of inputs, i.e. providers, trainers, occupational profiles and curricula standards. EOPPEP is also the statutory body for the development and implementation of the Hellenic Qualifications Framework (HQF) in correspondence with the European Qualifications Framework (EQF).

There is not any Hellenic Qualifications Framework formulated for Solid Waste Managers and Technicians.

The National Centre for the Accreditation of Lifelong Learning Providers (EKEPIS), has issued two occupational profiles which include several Solid Waste Management training topics. The only one certified is the occupational profile for the “**Technician for the Management and Control of Environmental Protection Systems**”

It has been also developed the occupational profile of the “**Technician of Hazardous Waste Management (except radioactive waste)**”, but it is not certified.

There is only one accredited vocational training course referred to solid waste management. The course is addressed to the graduates of high schools (over 18 years old) and is called “TECHNICIANS for the MANAGEMENT and RECYCLING of SOLID WASTE”. This course is organized by a public vocational training institute. Graduates are awarded the Vocational Training Diploma recognised both in Hellas and in EU member states (for lower secondary education graduates) or the Certificate Level I (for upper secondary education graduates).

University Departments and Technological Institutes (TEI) - formal training - offer only technical lessons on solid waste management either at graduate or post-graduate level.

Vocational training courses on solid waste management are usually organised whenever the Hellenic Ministry of Labour and Social Affairs foresees the existence of such a training need within the labour market. These training programmes are usually addressed to unemployed, educated people that will provide them with additional knowledge and skills and make them more eligible in the labour market of solid waste management.

During the last ten years three different series of training programs were organised by vocational training centres - non-formal training - all over Hellas for solid waste management professions. Those programs referred to:

- 1. Solid Waste Management and Treatment.**
- 2. Solid Waste Recycling.**
- 3. Landfill sites operation.**

Based on the survey results conducted at VET organisations the best covered training topic is the one that is referred to Health and Safety issues at Work.

Following, national and European legislative framework is also well covered.

As less important were graded the following topics:

- Procedures for the management of specific solid waste streams (i.e. packaging, electronic waste, etc)
- Technical requirements for equipment of waste management activity in concern
- National requirements for waste management procedures (licensing, waste accounting, reporting, etc.)

The topics with the lower score and the lower covered level are:

- the product life cycle principles and surprisingly
- the Principles of business/ corporate organisation and management.

Although, Solid waste facilities' owners seek for trained personnel, they are not willing to ask and/or pay a vocational training centre to organise a training seminar for their employees. This attitude is attributed to the fact that solid waste facilities' owners believe that a) university graduates acquire the necessary competences, during their academic studies, to operate a solid waste facility without further training.

Additionally in solid waste facilities are occupied a lot of foreign workers that are not able to attend training seminars due to linguistic difficulties.

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## 1. Overview of the Hellenic Waste Industry Vocational Training System

The **National Organisation for the Certification of Qualifications and Vocational Guidance** (EOPPEP) is the newly established Hellenic national authority, *whose mission is geared towards linking VET with labour market needs, upgrading people's occupational qualifications, reinforcing their employment perspectives and strengthening social cohesion.* EOPPEP operates under the supervision of the Ministry of Education & Religious Affairs, Culture & Sports. It has derived from the amalgamation of three national bodies:

- the National Centre for the Accreditation of Lifelong Learning Providers (EKEPIS),
- the National Organisation for the Certification of Qualifications (EOPP) &
- the National Centre for Vocational Guidance (EKEP).

EOPPEP is also the statutory body for the development and implementation of the Hellenic Qualifications Framework (NQF) in correspondence with the European Qualifications Framework (EQF).

Additionally, EOPPEP is the **National Coordination Point for EQF in Hellas** <http://en.nqf.gov.gr/>.

### 1.1. Certification of Qualifications – Hellenic Qualifications Framework

EOPPEP develops the regulatory framework for the certification of qualifications, i.e. the learning outcomes of non-formal education and informal learning, in response to labour market needs and priorities and in liaison with the accreditation of inputs, i.e. providers, trainers, occupational profiles and curricula standards.

EOPPEP's current fields of responsibility are the certification of the qualifications and the licensing of awarding bodies.

With the establishment of the Hellenic Qualification Framework (HQF) all forms of formal, non formal and informal learning at all levels are correlated with each other, their results are recognized and classified in levels taking into account the respective European Qualification Framework levels. HQF uses the same 8 reference levels with EQF based on learning outcomes to describe what a learner knows, understands and is able to make a person after completion of a learning process.

The Hellenic Qualifications Framework is planned to be developed in 4 stages. After a period of planning, public consultation, legal consolidation, and preparation, Hellas is now entering the 3rd phase, which is the Implementation Phase. This one consists the core phase of the HQF and it will be completed by engaging all stakeholders and the formation of the necessary Working Groups.

It is worthwhile mentioning that one of the main actions during the HQF implementation phase foresees the undertaking of pilot projects for the certification of specific continuing

vocational training on “green” jobs and tourism sector and respective On-the-Job Training courses.

Based on the above mentioned it is resulting that none National Qualification Framework has been developed in Hellas, so far.

## **1.2. Accreditation Bodies**

EOPPEP is the only accreditation body that has the right to accredit:

1. **Vocational Training Centres (KEK)**, which provide services of continuing vocational services complementing, updating and/or upgrading knowledge, skills and competencies of the labour force aiming at the integration & reintegration of learners into the labour market, job security and professional as well as personal development.

Vocational training centres can be accredited in different fields of training but only those that are accredited in the environmental field can provide training courses for solid waste management and facilities.

Vocational training courses on solid waste management are usually organised whenever the Hellenic Ministry of Labour and Social Affairs foresees the existence of such a training need within the labour market. These training programmes are usually addressed to unemployed, educated people that will provide them with additional knowledge and skills and make them more eligible in the labour market of solid waste management.

During the last ten years three different series of training programs were organised by vocational training centres, all over Hellas for solid waste management professions. Those programs were funded by the Hellenic Ministry of Labour and Social Affairs and referred to:

1. **Solid Waste Management and Treatment.**
2. **Solid Waste Recycling.**
3. **Landfill sites operation.**

All three training courses were addressed to unemployed university and technological institutes’ graduates.

2. **Public vocational training institutes (IEK).** There is only one accredited vocational training course referred to solid waste management. The course is addressed to the graduates of high schools and is called “TECHNICIANS for the MANAGEMENT and RECYCLING of SOLID WASTE”. The accreditation of vocational training and the certification of the vocational training institutes and graduates embed a national accreditation exam procedure conducted at national and regional level and based on the vocational training exam regulation framework.

EOPPEP organises at national level the accreditation examinations for IEK graduates of all specialities. Upon successful examination results, IEK graduates are awarded the Vocational Training Diploma recognised both in Hellas and in EU member states (for lower secondary education graduates) or the Certificate Level I (for upper secondary education graduates).

### **1.3. Accreditation of Awarding Bodies**

There are not accredited awarding bodies in the field of Solid Waste management. EOPPEP currently accredits Awarding Bodies certifying computer skills upon legislated criteria and specifications. EOPPEP plans to develop a system for the accreditation of awarding bodies certifying knowledge & skills in additional areas of expertise.

### **1.4. Awarding Bodies**

University Departments and Technological Institutes (TEI) are the bodies that can award diplomas, within the Hellenic Educational System. They do not award diplomas directly related to Solid Waste Management profession but mainly for Environmental Management. Both organisations (university and TEI) offer training for solid waste management including technical lessons within their Environmental Management curriculum. The same stands for post-graduate studies, usually offered by University and Polytechnical Schools depts. Solid Waste management lessons are included mainly to the curriculum of Engineering Departments such as Chemical Engineering, Mechanical Engineering, Environmental Engineering, Civil Engineering depts. The lessons focus on the technical part of solid waste management issues such as:

- Solid Waste origin, their classification and their characteristics (physical, chemical, qualitative and quantitative)
- The National Legislative Framework
- Temporary Warehousing, Collection and Transportation
- Separation at Source and Recycling
- Mechanical Separation
- Composting
- Thermal Treatment
- Landfill sites operation
- Biogas production

According to the Mechanical Engineering Dept of Aristotle University of Thessaloniki, the engineers are involved more and more into the processes of solid waste management, both indirectly (since any production process involves the production of waste) and directly (i.e.

as a facilities designer and/or operator, manager, equipment supplier, etc.). Therefore the modern engineer must:

- understand the methods of treatment and disposal of solid waste
- be able to assess the feasibility of harnessing the energy and raw materials contained in waste.

At the Dept of Environmental Engineering in Thrace University the Solid Waste Management course has the purpose to present the principles of science and technology that are the basis of Integrated Solid Waste Management. After successful completion of the course, the student will be able to do preliminary design, evaluation and combination of various solid waste management system, as: (1) Production (2) Temporary storage and processing of the source, (3) Collection and transportation, (4) a Recovery and Utilization of materials and energy and (5) Disposal. The curriculum includes the following lessons:

- Introduction in solid waste management
- National and European legislation
- Production (sources, types and composition) of solid waste
- Physical, chemical and biological characteristics of solid waste
- Hazardous wastes as components of solid waste
- Separation, temporary storage and processing at the source
- Collection of urban solid waste and materials separated at source
- Transportation and transfer stations municipal solid waste
- Mechanical processing and separation of solid waste
- Material recovery facilities
- Biological treatment technologies (composting, anaerobic digestion)
- Heat treatment technologies
- Landfill sites

### **1.5. Accreditation of Occupational Profiles & Curricula Standards**

EOPPEP accredits occupational profiles with the active contribution of the respective social partners during the process of their development. **An occupational profile is defined as the job functions and the required knowledge, skills and competencies for exercising an occupation or speciality.**

Based upon accredited occupational profiles, EOPPEP is planning to develop standards and specifications for modularised curricula with credits.

The National Centre for the Accreditation of Lifelong Learning Providers (EKEPIS) has issued two occupational profiles which include several Solid Waste Management training topics. These are:

1. The occupational profile for the **”Technician for the Management and Control of Environmental Protection Systems”**. As Technician for the Management and Control of Environmental Protection Systems is considered any employee of private and public

Sector performing technical operation and maintenance works, supervising the operation and control of devices, instruments and machinery of Environmental Protection Systems, aiming to pollution prevention and control, minimizing risks, of any source threatening human health and safety during the operation and maintenance of the pre-mentioned systems.

The job profile was developed by the joint collaboration of the following social partners and organisations:

- Vocational Centre of Hellenic Workers' Federation and of Hellenic Labor Institute,
- Federation of Hellenic Industries,
- Vocational Centre of the Hellenic Federation of Professionals and Traders,
- National Federation of Hellenic Commerce

under the coordination of the Hellenic Foundation of Economic and Industrial Research. and certified from the Ministry of Education, Lifelong Learning and Religious Affairs.

2. The occupational profile of the “**Technician of Hazardous Waste Management (except radioactive waste)**” was also developed but not certified. As Technician of Hazardous Waste Management (except radioactive waste) is considered any employee of private and public sector performing technical activities of mechanical equipment, operation, maintenance, surveillance and control at installations where hazardous waste is treated. This includes employees responsible for performing preventive and technical activities (collection, transport, storage, delivery, treatment and final disposal of hazardous waste) as well as those performing activities aiming to treat pollution caused by hazardous waste through cleansing and sanitation of the environment.

Additionally, during a Leonardo da Vinci project in 2006, the functional operations and the curriculum of the **Technician on (Solid) Waste Treatment and Recycling** was developed under the auspices of the General Secretariat of Lifelong Learning that belongs to the Ministry of Education, Lifelong Learning and Religious Affairs. Both functional operations and curriculum were not certified.

## **2. Description of Quality Assurance System for Vocational Waste Management Training in Hellas**

The Member States and the European Commission has established a European Quality Assurance Reference Framework (EQAVET) to promote and monitor continuous improvement of national systems of vocational education and training (VET).

EQAVET, which was adopted by EU Member States in June 2009, is a reference tool for policy-makers based on a four-stage quality cycle that includes goal setting and planning, implementation, evaluation and review. It respects the autonomy of national governments

and is a voluntary system to be used by public authorities and other bodies involved in quality assurance.

In Hellas, EOPPEP is the competent body that will implement a national quality system in the area of non-formal education drawing upon European and international experience. Availability of adequate and consistent data and indicators is the key to understanding the components of Vocational Education and Training, in order to strengthen lifelong learning and to assess in qualitative terms the progress in LLL development and promotion.

The design of the Hellenic National Framework for Quality Assurance in Lifelong Learning is in alignment with the recommendation of the European Parliament and Council 2009 / C 155/01 of June 18 in order to establish a European Reference Framework for quality assurance in Vocational Education and Training.

EOPPEP is the **National Reference Point for Quality Assurance in VET** and represents Hellas in the **European network for Quality Assurance in Vocational Education and Training (EQAVET)**.

EOPPEP aims at quality assurance in:

1. inputs: accredited Providers implementing VET programs, developed upon accredited standards & specifications, based on accredited occupational profiles, employing accredited Trainers for Adults, with the aid of accredited Support Services Professionals for social vulnerable groups,
2. outputs-learning outcomes: accredited knowledge, skills and competences acquired via non-formal & informal learning pathways and certification of qualifications,
3. vocational guidance & counselling services: viable services & tools for supporting citizens of every age, as well as educational information tools according to the latest ICT applications.

### **3. Availability of Education Programmes for Waste Management Facilities Managers and Specialists in Hellas**

- **Registered/ formal programs**

Registered and formal programs are provided only by Universities, Technological institutes and public vocational training institutions. There is one public vocational training institution that offers training for Technicians for Solid Waste Management. The graduates are awarded a Vocational Training Diploma recognised both in Hellas and in EU member states (for lower secondary education graduates) or the Certificate Level I (for upper secondary education graduates).

- **Other non-formal programmes** that cover topics of interest for waste management facility managers and specialists

Vocational Training centres provide only non-formal training programs. These programs are usually subsidised by the Hellenic Ministry of Labour and the Hellenic Ministry of Development, Competitiveness, Infrastructure and Transport.

Vocational Training Centres provide specific training programmes addressed to Solid Waste Facilities Managers and Technicians. These centres can issue certificates confirming that each trainee has attended the training course but without any further professional recognition. During the last decade the following three series of training programs were organised and implemented at national level:

- 1. Solid Waste Management and Treatment.**
- 2. Solid Waste Recycling.**
- 3. Landfill sites operation.**

All three training courses were addressed to unemployed university and technological institutes' graduates.

Non-formal training is often delivered by external suppliers or by equipment manufacturers as part of their supply contracts.

- **Availability of online training programmes**

The Hellenic Open University offers a training course on Waste Management, including solid waste management. This is a distant learning course with on line training programs.

#### **4. Cost and Possible Sources of Financing for Participation in Training Programmes**

- **Average cost**

The training provided by the vocational training centres is usually funded by the Hellenic Ministry of Labour. Therefore the trainees do not have to pay a fee for their participation in the training program. The cost for the organization and implementation of such a vocational training program is 16euro per hour per trainee.

Whenever the participants are unemployed people, then a subsidy of 500€ is given to each participant.

In case that a company will ask for an internship training for its staff then the cost will be near 700€/per trainee.

The course "TECHNICIANS for the MANAGEMENT and RECYCLING of SOLID WASTE" provided by **Public vocational training institutes (IEK) and provide Vocational Training Diploma** recognised both in Hellas and in EU member states (for lower secondary education graduates) or the Certificate Level I (for upper secondary education graduates) cost near 400€/per year. This is a 2 year course.

- **Availability of financial support/ subsidies for training**

As mentioned above Hellenic Ministry of Labour & Social Affairs and the Ministry of Development, Competitiveness, Infrastructure and Transport subsidises training programs addressed to green jobs including solid waste management. The typical cost for the organization and implementation of such a vocational training program is 16euro per hour per trainee.

## **5. Requirements for Training Programmes and Institutions**

There are no specific requirements for the training programs organised by the Vocational Training Centres (non-formal training) regarding their contents and structure. Contents and structure for each training program are matters organised by each training centre based on their experience, certified trainers that collaborate with, etc.

There is a requirement regarding the duration of the theoretical part and the practical exercise of the training program. The duration is specified within each declaration call for the organisation and implementation of the training program.

The EOPPEP certifies and licenses training institutions of non-formal vocational education and training centres. The certification and licensing are based on statutory quality standards for the:

- Trainers occupied by the training centre
- Curricula of the training programs
- the building infrastructure and
- equipment used,

as well as statutory requirements for the

- organization and
- operation

of the training organization, the overall provided services and its workforce.

A vocational training institution, in order to be able to deliver training programs in the field of solid waste management must be certified by EOPPEP in the environmental field.

In Annex I the contents, structure and duration of a training course on solid waste management, which was organised and delivered by a vocational training centre are presented.

In case of formal training, offered by Universities and Technological Institutes, as mentioned above, there are lessons for solid waste management included in the curriculum of Environmental Management and Engineering departments. The structure, contents and duration for these lessons are proposed and approved, initially, by the council of each University Dept. or Technological Institute and finally by the Ministry of Education and Religious Affairs.

## 5.1. Training Structure Elements Under Regulation

Usually, the only regulated terms are:

- a) the time schedule for theoretical lessons and practical exercise. The usual percentage ranges from 30-40% for theoretical lessons.
- b) the training in Health and Safety issues which is obligatory.

There are not any other training elements under regulation. Training institutions submit proposals which are evaluated by the organisation that has issued the call.

## 5.2. Topics Required to Be Covered by Training Programmes

Based on the survey results conducted at VET organisations, the training topics covered during the training programmes and referred to Solid Waste Management are shown in Figure 1 (the training programmes referred to a) Solid Waste Management and Treatment, b) Solid Waste Recycling and c) Landfill sites operation). The training programmes were organised and implemented by vocational training centres.

The survey was conducted aiming at the assessment of the nature, content and regulation of qualifications for Managers in Solid Waste Management Facilities. In the same survey it was also examined:

- the status of the industrial waste management labour market
- the national legislation concerning the specific profession,
- the most important training topics and the acquired knowledge of the personnel occupied in different solid waste management facilities,
- the working conditions, and
- the status of Waste Management profession in industry and in society.

The survey was conducted via the compilation of a structured questionnaire (attached in Annex II). The questionnaires were circulated in both hard copy and electronic versions. All the answers that were received on the hard copy format were transferred in electronic form as well. There was also the possibility of on-line completion and submission of the questionnaires via the following link:

[http://www.swfm-qf.eu/main/?page\\_id=6473&lang=el](http://www.swfm-qf.eu/main/?page_id=6473&lang=el)

The survey was conducted by the two Hellenic partners, SIGMA Consultants – LP and the **Hellenic Federation of Environmental Protection Companies (PASEPPE)** – P2.

The project partners exploited their existing networks and their previous collaborations with VET organisations in order to disseminate extensively the survey questionnaire.

The stakeholders' groups that were targeted in the Hellenic territory were VET

organisations, that had organised, in the past, training courses in solid waste management. The questionnaire was sent on behalf of the Hellenic partners to more than 100 different vocational training centres.

Eighteen (18) answers were received from the vocational training centres. The total number of the answered questionnaires along with the the solid waste facilities,, survey that were received was 104. This number fully complies with the minimum requirement that was set in the project proposal as a target per project country.

The best covered training topics are the Hellenic Solid Waste legislative framework and the Health and Safety issues at work. It is worthwhile mentioning that it is obligatory for all vocational training programs, in Hellas, to include Health and Safety courses specified according the subject of the offered training. Moreover, it is sufficiently documented and realised that workers occupied in pollution management activities were offered so far training programs which were targeting to the improvement of their qualifications at technical aspects. Recent surveys have shown that the training need for acquisition of skills, competences in Health & Safety issues have received the first or second highest ranking amongst all other training needs.

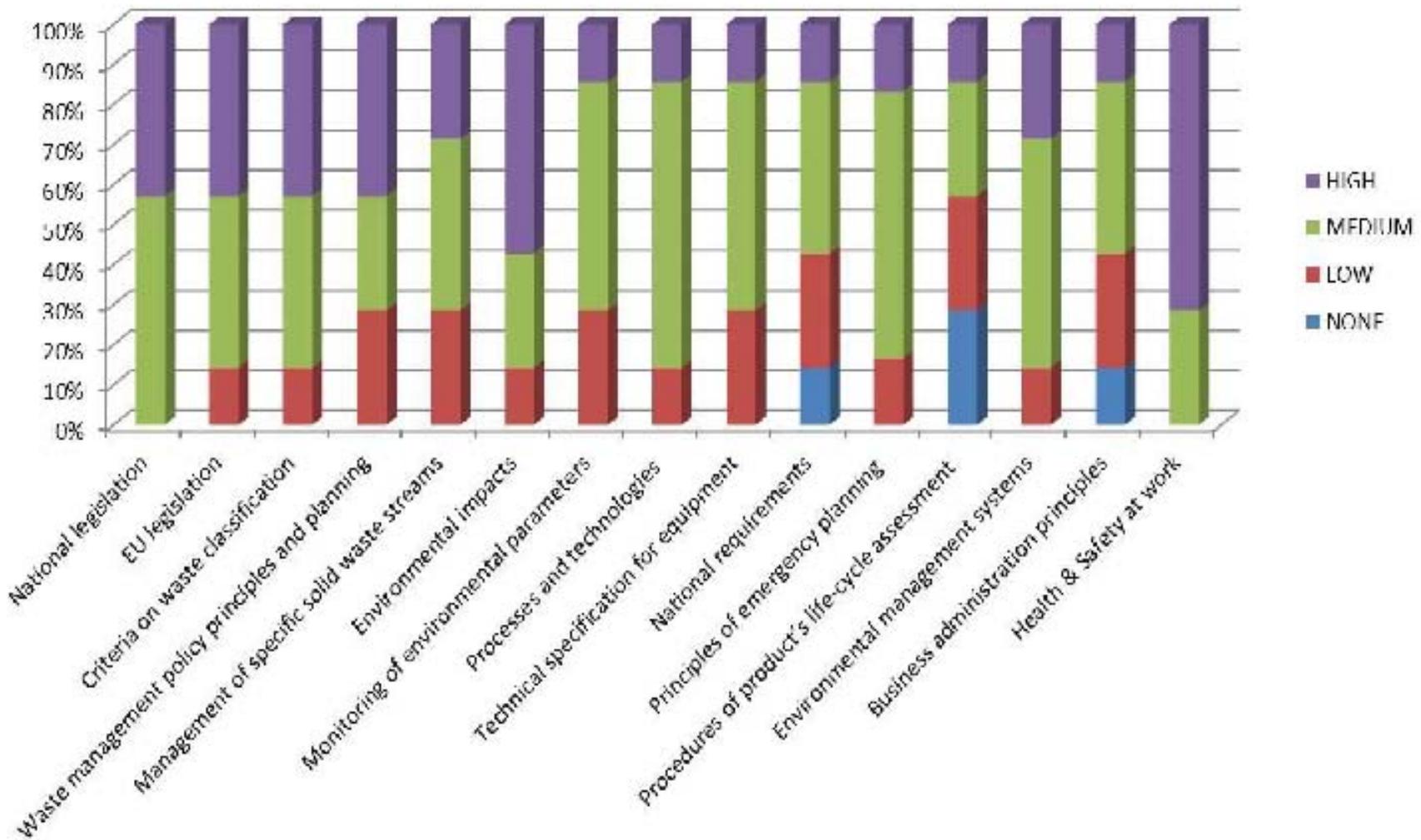
According to the results of the VET survey (presented in Figure 1), the following educational topics:

- European Solid Waste Legislative Framework
- Principles of waste classification including hazardous waste
- Waste management policy principles
- Environmental Impact Assessment principles
- Procedures for the management of specific solid waste streams (i.e. packaging, electronic waste, etc)
- Monitoring requirements
- Technical requirements for technologies of waste management activity in concern
- Technical requirements for equipment of waste management activity in concern
- Principles of emergency preparedness and planning of preventive corrective actions
- Principles of environmental management systems/ environmental risk assessment

have received medium scores, meaning that were sufficiently covered.

The topics with the lower score and the lower covered level are:

- Product life cycle principles
- Principles of business/ corporate organisation and management
- National requirements for waste management procedures (licensing, waste accounting, reporting, etc.).



**Figure 1.** Training Topics Covered during the Training Programmes, organised by Vocational Training Centres.

## **6. Evaluation of Quality of the Training Programmes available in Hellas**

The overall quality of the training programs organised and held by the vocational training centres fluctuates between high and medium scores. Attention must be given to the result that all trainees graded the qualification of trainers as excellent.

The majority of trainees marked with medium score the following quality indicators:

- Completeness of theoretical training
- Completeness of practical training
- Quality of training material

Respectively the majority of trainees marked with high score the scope/contents indicator of the training program that have attended..

In Table 2., in Annex II of the report you may find the numerical results extracted from the analysis of the received answers from VET organisations that have organised and held vocational training courses in the past, in Hellas, referring to the quality indicators.

It must be noted again that the abovementioned results were originating from the grading of unemployed trainees with limited or no past experience in solid waste management.

## **7. Interest/Willingness of SWF Professionals to Attend VET Courses**

According to the survey conducted at the VET centres and institutions the interest for organising training courses in the solid waste facilities professions were rated as medium with a percentage of 71,50%.

High interest/willingness declared the 14,25% of the VET organisations to organise new training programmes for SWF professionals. The same percentage (14,25%) expressed low interest for the organisation of respective training programs.

## **8. Overview of Learning Outcomes in Solid Waste Management Training Programs**

The learning outcomes which were designated by VET organisations (Vocational Training Centres), that conducted solid waste training programs were classified according the knowledge, skills and attitudes-behaviours descriptors:

**The learning outcomes in terms of knowledge** were:

- Provide basic knowledge to learners on the national mainly and European institutional - legislative framework for solid waste management with a list of the most important national regulations ruling the entire range of solid waste management.
- Description of the methodologies applied in the implementation of the current institutional – legislative framework, their interdependence as well as the timeline for their implementation.
- List the basic principles as well as technical specifications for the solid waste management and their differentiations depending on solid waste handling, existing local conditions and the respective framework implemented in the country.
- Identify the technologies applied in the preparation and sorting of different solid waste materials as well as a description of alternative equipment used in the collection and transport of recyclable materials.
- List the basic principles as well as technical specifications governing solid waste management operations (i.e. recyclable materials collection and sorting, the equipment used of mechanical separation, the necessary collaboration with the solid waste collection schedules) and methods to optimize their performance
- Reference to specific categories - streams of recyclable materials such as packaging waste, oils, batteries, electronic equipment and presentation programs for recycling and reuse them.
- Recovering of the organic fraction of municipal waste and its conversion in the form of compost, a product useful on soils and agriculture
- Identification of contaminants and environmental impact of solid waste facilities and description of the main methods of dealing with them taking in consideration local conditionalities.
- Learn the organizational structure of private companies and local authorities running solid waste management facilities, future planning of their activities and the needs emerged through the new institutional framework asking for cooperation between the private and public sector.
- Compilation of environmental impact studies.
- Corporate environmental accounting and economics of waste management
- Health and Safety at Work

**The learning outcomes in terms of skills** were:

- Implementation of the institutional - legislative framework for the planning and operation of solid waste management projects – facilities.
- Planning of an integrated solid waste management operation.
- Planning of collection and transport solid waste schemes
- Design of recycling programs, studies. Location of collection bins as well as collection timetables collection of garbage trucks.
- Developing awareness and citizens’ sensitization programs on issues of recycling and minimization of solid waste.
- Organize, control and monitoring of solid waste facilities operation (mainly landfills and recycling units), personnel administration.
- Raise awareness on environmental operation of solid waste facilities and implement environmental management procedures and systems
- Implement rules of health and safety, fire safety measures and emergency response procedures.
- Establishing of equipment maintenance plans and procedures, organization of tenders for the procurement of consumables and spare parts.
- Design projects for landfill’s rehabilitation and organization of aftercare activities.
- Compile reports
- Communicate with the public

**The learning outcomes in terms of attitudes-behaviors were:**

- Adoption of environmental and energy concept in the field of Solid Waste Management
- Support innate and acquired communication skills
- Critical understanding and crisis response in case of emergencies.
- Encourage the participation and take active role in teamwork.
- Development of a culture of cooperation in the learning process and the professional field afterwards
- Strengthening self-confidence through the acquisition of modern, updated knowledge in solid waste management field
- Understand the importance and adoption as a way of life, lifelong learning as a key factor in personal development to ongoing access to the labor market (employability and flexibility in work)
- Strengthening the characteristics of professional conduct in the workplace
- Configure working culture topics acceptance, compliance and control systems for quality assurance, safety, environmental protection
- Development of critical thinking of learners using multiple teaching resources and active involvement of learners in the educational processes.
- Contribute to pollution prevention and decrease solid waste generation

- Contribute and support to the implementation of environmental friendlier techniques and investments at their living places regarding solid waste management.

In ANNEX I of the report are presented the structure and the allocation of training hours for the theoretical and practical part of a vocational training course referred to waste management and especially solid waste recycling operations. The course was organized by a private vocational training center and was funded by the Ministry of Labor and Social Affairs. It was addressed to University and TEI graduates.

## 9. Conclusions and Recommendations

Waste management has been recognized as one of the most pressing environmental problems in Hellas, suffering of a low level of organisation and relying predominantly on semi-controlled landfills. During the last two decades the solid waste management sector, in Hellas, has been upgraded. While it is still generally considered as a major problem, progress has been increasingly observed, and solid waste management is becoming a well-structured, organized and environmentally responsible activity with specific goals, mostly in urban areas. The basic method of management of solid waste, in Hellas, is landfill. In 2008 had a share of 77% (vs. 40% in the European Union - EU), followed by recycling with a share of 21% (versus 23% in the EU) and composting with 2% (versus 17% in the EU).

Significant progress has been made in recent years in the alternative management of different recyclable waste streams, reflected in some quantitative data. The period 2007-2009 the number of new Recycling Schemes increased by 25.5%, while the number of sorting facilities for recyclable materials increased from 15 to 27 units.

The financial, technological, legal and environmental forces that are driving the changes in waste management have generated a need for suitably qualified Solid Waste Facilities Managers mainly at the fields of recycling and landfill.

Nevertheless the growing needs for qualified Solid Waste Facilities Managers, due to the increase of Solid Waste Management Facilities and the technological advances implemented in the respective facilities, vocational training in the solid waste management sector, in Hellas is still degraded.

The last organized vocational training programs for Solid Waste Facilities Managers were organized during 2004. Those programs were addressed to University and Technical Institutes graduates and were funded by the Ministry of Labor and Social Affairs.

There is none Qualifications Framework developed for Solid Waste Facilities Managers.

Only the job profile of the **“Technician for the Management and Control of Environmental Protection Systems”** was developed and certified. The specific job profile

includes some qualifications for the technicians involved in solid waste management and corresponds to European Qualifications Framework (EQF) level 4.

There is one public vocational training institution that delivers training for Technicians for Solid Waste Management. The graduates are awarded a Vocational Training Diploma recognised both in Hellas and in EU member states (for lower secondary education graduates) or the Certificate Level I (for upper secondary education graduates).

Although, Solid waste facilities' owners (private and public authorities) seek for trained personnel, they are not willing to ask and/or pay a vocational training centre to organise a training seminar for Solid Waste Facilities Managers. This attitude is attributed to the fact that solid waste facilities' owners believe that a) university graduates acquire the necessary competences, during their academic studies, to operate a solid waste facility without further training b) the training cost is high compared to the offered training level by VET organisations.

Despite increasingly positive perceptions of the value of skills development, financial pressures very much remain a barrier to employers providing training. Further raising awareness of the benefits of developing employee skills is seen as crucial to encourage training provision.

The major problem that VET organizations face during the planning and organization of vocational training programs in Solid Waste Management sector is the unwillingness of Solid Waste Facilities' owners, both from public and private sector to occupy trainees for their practical training.

VET organizations that organized and offered vocational training courses in solid waste management in the past did not cover well enough the topics of:

- Product's life-cycle principles
- Business Administration procedures.
- National requirements for waste management procedures (licensing, waste accounting, reporting, etc.).

The last two topics are considered very important for Solid Waste Facilities Managers.

The training programs have covered very well the topics of:

- National and European Legislative Framework
- Health and Safety at Work.

The topics of:

- European Solid Waste Legislative Framework
- Principles of waste classification including hazardous waste
- Waste management policy principles
- Environmental Impact Assessment principles

- Procedures for the management of specific solid waste streams (i.e. packaging, electronic waste, etc)
- Monitoring requirements
- Technical requirements for technologies of waste management activity in concern
- Technical requirements for equipment of waste management activity in concern
- Principles of emergency preparedness and planning of preventive corrective actions
- Principles of environmental management systems/ environmental risk assessment

were sufficiently covered.

Based on the above mentioned it is clear that a qualifications framework for Solid Waste Facilities managers is missing from the Hellenic Vocational and Educational system.

VET organizations expressed a medium level interest and willingness to organize new training courses. This can be attributed to the fact that:

- a) municipal solid waste facilities are currently operated by local authorities which are facing significant restructuring changes during the last three years
- b) industrial non-hazardous solid waste are usually managed by the producers themselves since they have low quantities and industrialists do not want to pay for additional training on this field
- c) hazardous waste are exported to other European countries, since there is no hazardous waste treatment facilities in Hellas, except for medical waste.

VET organizations expressed high interest for the outcomes of the SWFM-QF project and especially for the Competences Framework and the Info-Training Toolkit where the access criteria for the implementation of the SWFM future courses and the curriculum of the EU qualifications for Solid Waste Facilities Manager will be depicted in detail.

## **ANNEX I**

### **Timetable of a Vocational Training Course for Solid Waste Management**

#### **Protection of Environment & Sustainable Development**

(17 hours theory and 24 hours of practice)

serves the objective of informing and partial deepening of trainees in the subjects of global environmental problems, methods of environmental management in the context of sustainable development and economic techniques applied and relating to natural resources and environment.

#### **Institutional Framework - Quality & Quantitative Data for Solid Waste**

(30 hours theory and 64 hours of practice)

Serves the objective of providing basic knowledge to learners on the institutional – legislative framework for solid waste management. The module includes two main subsections.

- Analysis of key regulations governing solid waste management
- Presentation of quantitative and qualitative data of municipal solid waste

#### **Solid Waste Collection and Transfer Systems**

(36 hours theory and 120 hours of practice)

principles and technical standards governing the solid waste collection and transfer systems, as well as skills for organizing collection - transfer of solid waste. The section includes four subsections:

- Specifications for Collection system
- Specifications for Temporary storage
- Specifications for solid waste transfer
- Specifications for solid waste transshipment

#### **Recycling Systems, Engineering & Sorting Waste - Composting** (42 hours theory and 136 hours of practice)

basic principles and specifications governing the recycling systems and mechanical sorting as well as the skills to design recycling programs. The section includes four subsections:

- recycling systems by the method of sorting at source
- Centers sorting recyclables & mechanical sorting units
- Units of composting the organic fraction of municipal solid waste.
- Recycling facilities for bulky waste (from demolition and construction works)

#### **Technical Specifications for Landfills** (54 hours theory and 160 hours of practice)

Technical specifications applicable to solid waste disposal systems with particular emphasis to landfills. Necessary studies as well as licensing procedures that are necessary for the

establishment of a landfill. The different phases of construction of a landfill will be identified and will be described:

This section includes 8 subdivisions.

- General principles
- Technical infrastructure & machinery
- Stormwater management projects - fire protection
- Insulation - final coating
- Systems management biogas & leachate
- Control and monitoring
- Program and Operating
- Dealing with emergencies

**Health And Safety At Work** (20 hours theory)

Serves the aim of understanding the critical elements related to occupational health and safety as well as the skills to plan measures, take actions and deal with emergencies.

## ANNEX II

### QUESTIONNAIRE FOR ORGANISATIONS PROVIDING TRAINING FOR WASTE MANAGEMENT FACILITIES' MANAGERS AND TECHNICIANS

**1. What kind of VET suitable for waste management facilities' professionals do you deliver?**

- Registered trainings for waste management facilities' professionals
- Unregistered trainings on obligatory/ compulsory topics
- Other non obligatory training

**2. Indicate the time share for theory/ exercise/ practical work (development of skills):**

Training element	Time share, %
Theory	
Exercises	
Practical work	
Other (please specify:.....)	

**3. Please indicate how well the following topics are covered in the existing training programmes**

Topic	Legally required	Programmes for managers	Programmes for technicians
National legislation in the Waste Management Sector	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
EU legislation in the Waste Management Sector	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Criteria on waste classification (hazardous or not)	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Waste management policy principles and planning	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered

Management of specific solid waste streams	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Environmental impacts of waste management facilities	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Monitoring of environmental parameters in waste management facilities and activities	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Processes and technologies applied in waste management facilities	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Technical specification for equipment using in waste management facilities	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
National requirements for waste management procedures (licensing, waste accounting, reporting, etc.)	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Principles of emergency planning and response measures	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Procedures and principles of product's life-cycle assessment	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Environmental management systems (EMAS and the EN ISO 14000 series)	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently

		covered <input type="checkbox"/> well covered	covered <input type="checkbox"/> well covered
Business administration principles	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
Health & Safety at work	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered
<i>Other (please specify):</i>			
	<input type="checkbox"/> yes <input type="checkbox"/> no	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered	<input type="checkbox"/> not covered <input type="checkbox"/> slightly covered <input type="checkbox"/> sufficiently covered <input type="checkbox"/> well covered

**4. How trainees and trainers have evaluated the training programmes that you have organized and implemented in solid waste management sector?**

<b>Quality indicator</b>	<b>Programmes for managers</b>	<b>Programmes for technicians</b>
Scope/ contents	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high
Integration of theoretical and practical training	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high
Quality of training materials	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high
Qualification of trainers	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high
Training facilities	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high
<i>Other (please specify):</i>		
	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high	<input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high

**5. Which are the foreseen learning outcomes in respect with knowledge, skills and competences (attitudes) levels that the trainees will acquire during the training program?**

.....  
.....  
.....  
.....

**6. What is average cost for participation in the training programme? (in EUR/ person)**

<b>Programmes for managers</b>	<b>Programmes for technicians</b>

**7. Who covers the cost for participation in training programmes for waste management facilities' managers and technicians?**

- Facilities for their employees
- Participants themselves
- Third parties (e.g. public subsidies)

.....

**8. Your opinion about the interest/ willingness of waste management facilities' professionals to attend vocational training programmes:**

<input type="checkbox"/> <b>Low</b>	<input type="checkbox"/> <b>Medium</b>	<input type="checkbox"/> <b>High</b>
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**9. What is the educational level of waste management facilities' professionals who participate to vocational training programmes?**

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**10. What are the main problems/ obstacles related to vocational training for waste management facilities' managers?**

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