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# EXTERNAL EVALUATION REPORT

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QUALIFICATION  
FRAMEWORK AND  
INFO-TRAINING TOOLKIT

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For the project Towards a European  
qualification for Solid Waste  
Facilities' Managers

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# 1. Executive summary

The report presents evaluation results of the two deliverables prepared by the project “Towards a European qualification for Solid Waste Facilities’ Managers “. That is Qualification Framework and Info-Tool Kit.

The evaluation has been conducted in the light of personal experience in delivering trainings for waste treatment facility managers and specialists, mainly thinking about the national (Lithuanian) relevance of the proposed Qualification framework and training materials, also considering their EU relevance.

The evaluated materials are not in the form of conventional report, but can be found as on-line materials in the project home-page. Both Qualification Framework and Info-Tool Kit are dealing with the following qualifications: environmental; financial and contractual; health and safety; human resources; new projects; operational; and technical (anaerobic digestion; composting; landfill site; mechanical biological treatment; recycling; thermal treatment; MSW sorting facilities).

The advice is given to make the materials on qualification framework and training materials accessible in some more convenient way. The structure of and relationship between Qualification frame and Info-training toolkit could be more clearly explained.

The materials are lacking an in-depth introduction, at least with an overview of legal acts. The rationale behind the prepared materials should be explained, together with explanations on who and how these materials should / could use.

Waste management is a very wide municipal service, but at the same time it can also be industrial or individual activity. Therefore the advice is given to the project to clearly define what type of waste it is dealing with.

Waste management facilities should be characterised according to IPPC permit conditions; in this project the term “average permit conditions” could maybe be used. It would be useful to base Qualification framework for waste treatment facility managers on the analysis of IPPC permit implementation feasibility. Currently some sections seem to present too general information.

The advice is given not to forget the importance of technological process quality control, and the importance of separate waste collection for all further waste treatment processes. The section on Thermal treatment has the most complete coverage of all the process, starting from what kind of waste gets to a facility. The same structure could be applied to other sections as well.

The other comprehensive sections are on composting and landfilling. It is advisable that countries take into the consideration technological solutions for composting, presented by the project, what would ensure stable quality of compost.

## **2. Introduction**

### ***2.1 Brief overview of the report***

The report presents evaluation results of the two deliverables prepared by project “Towards a European qualification for Solid Waste Facilities’ Managers “ (SWFM-QF). That is:

- Qualification Framework, and
- Info-Tool Kit.

The proposed (by the project team) Template for External Evaluation has been followed to evaluate the mentioned deliverables and to write them down. The major chapters of the report are:

- Introduction;
- Description of the external evaluation process;
- Results;
- Conclusions.

### ***2.2 General information about evaluation method***

The evaluation has been conducted in the light of personal experience in delivering trainings for waste treatment facility managers and specialists, mainly thinking about the national (Lithuanian) relevance of the proposed Qualification framework and training materials, partly also considering their EU relevance. The author is familiar with Lithuanian requirements for qualification of trainees and trainers, with training requirements, also with a current situation of trainings, of used training materials and facilities. All this made it possible to judge whether Qualification Frame proposed by SWFM-QF, and prepared materials could be suitable and useful, and to what degree suitable and useful for the country(-ies).

### ***2.3 Information about author/evaluator***

Evaluator, Jonas Motiejūnas, is a doctor in natural sciences, who is involved in issues of hazardous and other waste management and treatment technologies since 1993. The previous interests were chemical (electrochemical) metal treatment technologies. He is a director of Ekobaltas Ltd, and has experience working together with environmental specialists from Denmark, United Kingdom, Sweden, etc. In 1998-2002, he has been involved in development of Lithuanian regional municipal waste management system together with representatives of Lithuanian Ministry of Environment and specialists from Danish COWI AS. He was leading the group of Lithuanian State Strategic Waste Management plan development. Later on, J. Motiejūnas has been involved in development of several regional waste management plans, and also provided consultancy to regional waste management centres. In 2014, J. Motiejūnas took part in providing service of qualification training for managers of regional waste management centres.

## **3. Description of the external evaluation process**

### ***3.1 Overview of the process***

#### **3.1.1 Evaluation context**

Waste treatment capacities in Lithuania are not very big, as there are just few bigger industrial enterprises, number and density of inhabitants is also small. One of the biggest waste management problems in the country is irrational organization of waste collection: waste generated in households and in organizations as well as in small enterprises is collected without a proper source-sorting. Apparently, some waste from small and medium manufacturing enterprises also goes to the stream of municipal waste. However, composition of that waste differs significantly from the composition of household waste, especially with respect to the possibility of presence of hazardous ingredients. As a result 1.3 mln. tones of mixed waste is collected, which largely end up in landfills. Attempts to separate mixed waste for further possibility of high quality recycling are not successful. Organizational improvement of waste management system is slow due to unreasonable legal provisions and shortcomings in waste recording. Thus, the experience of our country points out to the importance of waste treatment terminology and infrastructure development.

Qualification and knowledge of solid waste facility managers in Lithuania are based on general, mainly only theoretical, engineering and ecological higher education, but little practical training and experience, which could be obtained either in municipal waste treatment facilities, or in training centres.

Being introduced to qualification requirements for trainees and trainers in Lithuania, also to training requirements, I can comment the current situation in Lithuania. In my opinion, practical training of environmental specialists, both at the level of managers and workers, is weak; there is too much of theoretical learning from books, or from pictures found in Internet. Qualification courses often collect groups of participants having very different background, and the structure of the courses usually consists of pure theory, without practical exercises or measurements of technological process parameters.

It is recommendable that SWFM-QF provides readers with the comprehensive training materials. It is interesting and useful to see the proposed training means and/ or methodologies, which could be useful especially for East-European countries, most of which are still in the transitional phase of their waste management systems development.

#### **3.1.2 Evaluation scope**

The presented for evaluation materials are not in the form of conventional report prepared according to standards, e.g. requirements of waste standards. The materials can be found in the project home-page, and need to be viewed section by section. Registration is required prior to the possibility to review the materials.

The following deliverables have been evaluated:

- Qualification Frame;

- Info-Training Toolkit.

There is a short introductory description before both Qualification Frame and Info-Training toolkit.

A *harmonized qualification framework*, which is intended to fulfill the needs of managers occupied in different types of solid waste management facilities, consists of the following sections:

- Environmental;
- Financial and Contractual;
- Health and safety;
- Human Resources;
- New Projects;
- Operational;
- Technical:
  - o Mechanical treatment;
  - o Composting;
  - o Landfill;
  - o Recycling;
  - o Thermal treatment;
  - o MSW Sorting Facilities.

Each of these sections has a short codified title (e.g. Environmental – ULO EM). Each section presents a number of required qualifications (from some 2 (e.g. for anaerobic digestion) to 8 (e.g. for landfill site and thermal treatment)). Descriptors of qualifications contain the following information:

- Title;
- Work tasks;
- Weighting;
- Learning outcomes;
- Knowledge, skills and competences for every learning outcome.

*Info training toolkit* intends to present the curriculum for the vocational training of Solid Waste Facilities' Manager. There are the following sections:

- Environmental;
- Financial and Contractual;
- Health and safety;
- Human Resources;
- New Projects;
- Operational;

- Technical:
  - o Anaerobic Digestion;
  - o Composting;
  - o Landfill site;
  - o Mechanical Biological Treatment;
  - o Recycling;
  - o Thermal treatment;
  - o MSW Sorting Facilities.
- Glossary.

Each of these sections present information under the following sub-sections:

- Structure and contents:
  - o A number of courses are proposed; every course has its sub-units, course description, and the proposed informative course materials that can be used.
- Trainers' requirements;
- Trainees requirements;
- Training facilities and infrastructures.

### **3.1.3 Evaluation process**

The evaluation of the mentioned project deliverables was conducted in summer of 2014, after having accessed the prepared materials on Internet project home-page, and having received the template for evaluation.

### **3.1.4 Problems or other relevant information**

It seems that project internal control, or rather internal evaluation, could have deserved more attention. I would be happy to be *introduced to the technical task* and to a complete project report. In case of my early involvement into the project, I could maybe present some more practical proposals based on my rather big experience in implementing regional and also state municipal waste management systems.

Please note that this report will be further using a term "municipal waste" rather than "solid waste".

The advice is to make the materials on qualification framework and training materials accessible in some more convenient way. The current half-secret way of material presentation is not acceptable, as it is not convenient.

### ***3.2 Evaluation criteria***

Project materials were evaluated considering the following criteria:

- Correspondence to EU and national legal requirements;
- Correspondence of proposals and materials to the real needs of waste facility managers (based on personal knowledge of waste management systems, facilities and treatment processes, also national Lithuanian trainings and trainees);
- Possibility to overtake some training ideas into the national trainings, regarding qualification, training topics, means of training, proportion of theory and practise, etc.
- Possibility to use the proposed informative materials in national trainings;
- General quality of materials, such as understandability, convenience to use.

### ***3.3 Preparation works***

Evaluator has looked through both Quality Framework and Info-Training toolkit, has analysed all their sections. The report represents personal opinion of the evaluator. It can be ensured that the expressed opinion is authentic. Validity and reliability of the evaluation report can be supported by the experience of the evaluator. The project team has to decide if they find evaluation as being sufficient. However, the evaluator thinks that if being involved in the earlier projects stages, he could maybe present some more practical proposals regarding the prepared project materials.

## 4. Results

The project report is lacking an in-depth introduction: there is no overview of EU legal acts that are effective in the field of waste management. The most relevant are those legal acts that provide for requirements related to waste management, which is being implemented in Member-states using EU support. For example, waste management is recognised as a proper one if products are produced from waste and sold on the market. Waste ceases to be waste and obtains a status of a product (or a secondary raw material) when end-of-waste criteria are satisfied. In that case a sustainable use of natural resources can be achieved. The level of waste obtaining a status of a product is still varying between different countries; co-operation between different economy branches and subjects is often too weak, there is lack of organizational measures and even legal acts.

Waste management is a very wide municipal service, but at the same time it can also be industrial or individual activity. Therefore the project should clearly define what type of waste it is dealing with: household, municipal, industrial; maybe waste arising from consumption, commercial activities, manufacture, and/ or other type of waste.

The choice of waste treatment technology depends on waste formation sources, waste source-sorting or other sorting system, waste amount and properties. Waste description (characterisation) has an influence on obligations of waste possessors how they should treat this waste, what kind of waste management systems need to be developed, operated and financed. For example, EU directive on landfills allows accepting municipal waste to landfill sites without any additional examination of that waste. Thus, it is not worth talking about waste management and treatment in general. The project should define which waste they are dealing with, present waste treatment terminology and related specific qualification requirements, including economical and environmental aspects.

At the end, Glossary is prepared according to the old text-book examples. It is missing information on engineering environmental protection measures in waste management, e.g. smells, emissions and their control. It is also advisable to present a definition of advanced waste management.

Consistency in terminology is lacking in the presented materials themselves. For example, we have “qualification frame”, “qualification framework”, “harmonised competence frame” (under Deliverables). Very minor, but still inconsistent: Landfill (under Qualification frame), and Landfill site (under Info-training toolkit).

The structure of Qualification frame and Info-training toolkit could be more clearly explained, including explanations of the used terminology and links between the two parts (Qualification frame and Info-training toolkit). For example, what is it meant by “Weighting” in the descriptions of qualifications? How and what for shall it be used? Another inconsistency is with technical qualifications, mainly regarding mechanical treatment, mechanical-biological treatment, and anaerobic digestion.

## ***4.1 Evaluation of Technical qualifications***

### **4.1.1 Qualification framework**

Comments and suggestions:

Waste management facilities should be characterised according to IPPC permit conditions; in this project the term “average permit conditions” could maybe be used. It needs to cover also supplementary materials used for securing environmental requirements in enterprises or facilities. Only then it is acceptable to talk about qualification requirements for managers of these facilities, and about a role of these facilities (their employees) in the planning of waste management system.

Qualification framework Menu does not completely correspond to Menu of Info-Training Toolkit. E.g. Anaerobic digestion hides under “Mechanical treatment”, although it is one of biological treatment methods. In Info-training toolkit there is already a separate section with materials on “Anaerobic digestion”.

The currently proposed requirements for knowledge, skills and competences, also learning requirements for waste treatment facility managers seem to be more suitable for managers of waste management consultancy companies. The reason is a general nature and diversity of these requirements. As mentioned before, it would be more useful to base Qualification framework for waste treatment facility managers on the analysis of IPPC permit implementation feasibility.

Technological aspects, which are important in side activities, e.g. control of container closing or coverage, often remain without a proper attention. If enough attention is not given to the mentioned example of container closing / coverage, as a result we transport rainwater, pay for this, and often even are unable to fulfil obligations to reduce landfilling of biodegradable waste. Therefore I would like to stress that the Project could have paid more attention to the technological waste treatment processes control.

Training on waste identification and reception is dealt in training materials by 2 sections – ULO INC-1 and ULO TS-1. However, the training materials do not specify what kind of waste they are talking about. In Lithuania, it would not be viable to teach general principles of waste identification and reception for employees from sophisticated waste treatment facilities. In such cases, a concrete technical regulations and responsible business plan should be developed. The same is recommendable for ULO AD/MTB-1 and ULO COM-1, although without a need to develop technical regulations.

### **4.1.2 Info-training toolkit**

Comments and suggestions:

Info-training toolkit presents suggestions for training conditions regarding training duration, training facilities and infrastructure, trainers’ and trainees’ requirements. All this raises a number of questions. In most cases it is suggested that requirements for facilities and infrastructure are basic classroom and premises for practical work. When analysing e.g. the section on composting, one can realize that 39 lectures and 20 practical sessions with various tasks need to be carried out. In my opinion, qualification trainings needs a thorough thinking regarding the training contents, formation of training groups,

conducting practical tasks in functioning facilities, carrying out monitoring activities, supplementing trainings with lectures given by experienced practitioners.

A number of solid waste treatment facilities, such as waste transfer stations, waste recycling centres, landfill sites, mechanical biological treatment facilities, waste incinerators and composting sites are listed in the Introduction of the technical section. As the project is oriented towards the future objectives, the list of waste treatment facilities could be updated with facilities for production of biohumus and/ or other supplements (substances) for improvement of soil quality.

After the listing of waste treatment facilities, the description should follow on what kind of waste and were from (from what sources, in which way collected) goes to these facilities, how waste treatment objectives are established, and how implementation is ensured.

#### MSW sorting facilities

I think Info-training toolkit of the project does not pay enough attention to the collection of separated waste. Small fractions of municipal waste are not covered in the presented materials, although they constitute 60-70% by weight in the stream of municipal waste and cause the biggest problems in the treatment of biodegradable waste (mainly due to formation of unpleasant smell). In Lithuania, we have problems with waste recording; figures on waste quantity and composition are written down without their exhaustive practical checking. Municipal and/ or regional waste management plans have many times foreseen to check the expected results in pilots projects prior to introducing one or another technological or waste collection requirement. Unfortunately time and/ or financing is lacking for conducting pilot projects. Info-training toolkit of SWFM-QF project has been developed largely based on manuals, recommendations and good practise guides from a few EU Member-states (Germany, UK including Scotland, Italy, some others). Thus, there is no need to have doubts and comment on these sources. Nevertheless based on Lithuanian experience, which shows that municipal waste treatment facilities is a part of municipal waste management system greatly influenced by waste collection companies, I doubt whether it is enough to limit yourself to the mentioned facilities and exclude collection.

#### Anaerobic digestion

It is worth to add course unit "Fermentation of biodegradable waste" to the section on Anaerobic digestion. The proposed course unit could deal with waste fermentation without a production of biogas, which is loss-making due to high investment needs and operational costs (especially if capacity is small and there is no possibility of rational use of heat energy).

#### Composting

A very comprehensive training course requiring well technically equipped premises is foreseen in this section. It is difficult to ensure such training in the Eastern countries.

Section ULO COM-1 presents a detailed description of composting process, including experiences in planning, construction and exploitation of composting site. Legal requirements in Lithuania for composting facilities and technological process of composting are similar to those recommended by the SWFM-QF project. However, practical experience in implementing these requirements is still small. It also needs to be acknowledged that too little attention in the country is paid to the control of technological process, as well as to the quality of composting mixtures. Therefore it is highly advisable that the country takes into the consideration technological solutions, presented by the project, what would ensure stable quality of compost.

### Landfill site

The section on Landfilling can be evaluated as being a really good one. Formation of training groups is well-reasoned. Training of non-qualified workers is also foreseen. However, preparation for and getting of IPPC permit is lacking in this section as well.

### Mechanical-biological treatment

There is a reference to Italian manual on MBT. It is not clear how it can be read. Thus, information is “absent”.

### Recycling

There is a rather big number of references to various legal acts and programming documents for management of various waste streams. More detailed references would be required in order to be able to use these documents. I would like to pay attention to the fact that state environmental institutions from Member States, when they develop some kind of waste management recommendations, usually do not send (provide) them to private organisations. It is thought that course participants will learn enough to become recycling consultants in international market, and thus there will remain nobody to work in places.

### Thermal treatment

The only section on Thermal treatment comprises waste management starting from waste collection, reception of waste suitable for incineration, implementation of incineration complex, and finally facility exploitation. The trainings need special premises and training conditions. 6 groups of trainees and 2 groups of trainers are foreseen. It needs to be agreed with a necessity of such training version, although its implementation is not cheap.

A similar structure of a section is advisable for other sections as well. Analogous contents comprising all waste treatment process, starting from waste collection, would be useful in case of all types of treatment facilities.

Once again it needs to be stressed that in all cases, when waste gets separated, a considerable quantity of small fraction is formed; this fraction contains biodegradable waste, which stinks when decaying. Therefore it is always important to consider health protection measures.

## ***4.2 Evaluation of Common qualifications***

### Comments and suggestions:

This section could be started with a sub-section characterising the advanced municipal waste management system. For example: “Important characteristics of an advanced solid waste management system are source separation, waste treatment in licensed facilities, reduction and control of emissions and smells, ... etc.”. The chapter should also contain information on IPPC permits, gaining the permits, preparation of applications; it is maybe worth to mention IPPC in all sections.

Please pay attention that in addition to having contacts with waste (usually solid waste), employees of waste treatment facilities have also to deal with various emissions (gaseous or even liquid from gas cleaning and / or waste storage installations) and smells from waste treatment processes. Thus managers need additionally to know treatment methods and technologies for control of such complex

processes. Problems are of course specific for specific facilities. Also, please pay attention that waste treatment health aspects are regulated by provisions of Member State national legal acts issued by ministries responsible for health care. Collaboration between ministries responsible for environment and for health care is unfortunately not always rational; legal acts prepared by different ministries are not always compliant. It is recommendable in such a situation to present a comprehensive overview of waste management legal acts, especially those dealing with environmental and health aspects. Only then such sections as ULO HS-1, ULO HRM-1, ULO OM-1, ULP EM-1 should follow. Currently these sections contain a lot of general propositions. And it is not always clear which of data should be used for concrete training programmes, especially when there is no information on IPPC permits, and how these programmes will comply with the needs and implementation possibilities in Member States.

Section ULO NP-1 presents an understanding about strategic planning by a manager of a conventional manufacturing company. In my opinion, strategic planning in waste treatment facilities has a number of peculiarities: instead of resources, waste treatment facilities receive waste for treatment according to EU and / or national requirements; special waste management legal acts are in force and regulate activities of both waste treatment facilities, and related state and municipal institutions (e.g. regarding state and regional waste management plans, waste treatment targets). Sections NP-3 and NP-4 could be adjusted to emphasize importance of separate collection for further treatment processes. In principle all waste treatment facilities should be interested in accepting only such waste, which is suitable for production of a product. In case of mixed waste collection, its subsequent separation does not result in high quality resource for further recovery (e.g. an example of Hamburg city, which got evidence in this). Regional waste management plans in Lithuania foresee implementation of separate biodegradable waste collection and its subsequent composting starting from 2016. It is important to solve issues of co-operation between several organisations, e.g. when financial means go to municipalities, while expenditure – to different companies (waste collecting and treating companies). Even more institutions can be involved, e.g. in case of compost or humus production, when user of a product is in agriculture. Some economists in Lithuania cause frustration, when they do not take expenditure of waste possessor into the calculations.

## **5. Conclusions**

### ***5.1 Main comments & suggestions***

The advice is to make the materials on qualification framework and training materials accessible in some more convenient way. The structure of and relationship between Qualification frame and Info-training toolkit could be more clearly explained.

The materials are lacking an in-depth introduction, at least with an overview of legal acts. The rationale behind the prepared materials should be explained, together with explanations on who and how these materials should / could use.

Please pay attention to the terminology and clarify what type of waste the materials are dealing with.

Considering IPPC permit conditions would be a great advantage in the proposed Qualification framework. Currently some sections seem to present quite general information.

Please do not forget the importance of technological process quality control, and the importance of separate waste collection for all further waste treatment processes. The section on Thermal treatment has the most complete coverage of all the process, starting from what kind of waste gets to a facility. The same structure could be applied to other sections as well.

The other comprehensive sections are on composting and landfilling. It is advisable that countries take into the consideration technological solutions for composting, presented by the project, what would ensure stable quality of compost.

It would be valuable to update section on Anaerobic treatment with a sub-section on fermentation without a biogas production.

The section of Info-training toolkit on MBT provides a reference to Italian materials; it is not clear how it should be read. A number of references for management of various waste streams are provided in section on recycling. More detailed information would be required in order to be able to use these references.

Glossary could be updated with terminology on environmental aspects of waste treatment, definition of advanced waste management. Terminology of the prepared materials also needs careful screening in order to ensure its consistency.

### ***5.2 Summary and rationale for suggested changes***

Waste treatment is considerably different from the work with ordinary substances, as a number of specific legal requirements are applicable to waste, e.g. estimation of “end-of-waste” status.

Waste management is a very wide municipal service, but at the same time it can also be industrial or individual activity. Therefore the project should clearly define what type of waste it is dealing with:

household, municipal, industrial; maybe waste arising from consumption, commercial activities, manufacture, and/ or other type of waste.

Waste management facilities should be characterised according to IPPC permit conditions; in this project the term “average permit conditions” could maybe be used. It would be useful to base Qualification framework for waste treatment facility managers on the analysis of IPPC permit implementation feasibility.

Technological aspects, which are important in side activities, for example control of container closing or coverage, in real life often remain without a proper attention. Therefore it is important that the Project pays enough attention to the technological waste treatment process control.

In principle all waste treatment facilities should be interested in accepting only separated waste, which is suitable for production of a product. In case of mixed waste collection, its subsequent separation does not result in high quality resource for further recovery. Lithuanian experience shows that municipal waste treatment facilities are greatly influenced by waste collection companies. Thus, it is important to include waste collection into the project materials, and to pay enough attention namely to the collection of separated waste.

In my opinion, the project should also pay attention to the organisational infrastructure of waste management. That is, countries should ensure information availability for all stakeholders on environmental and public health issues, accessibility to consultancy network on all municipal waste management and treatment issues, including on technological aspects. The qualified involvement of society into discussions on environmental projects is especially important (Arhus convention; the often situation for misunderstanding is the use of environmental data for their comparison with data of World Health organisation, e.g. when debating problems of incinerator construction). Note: such an infrastructure could comprise also other spheres, not just municipal waste.



