

## **Development and improvement of the quality of training and professional competence of employees in waste management area – transfer of European good practices**

Rozwój i podnoszenie jakości szkoleń i kompetencji  
zawodowych pracowników w obszarze gospodarki  
odpadami – transfer dobrych europejskich praktyk

**Słowa kluczowe:** gospodarka odpadami, kompetencje zawodowe, kształcenie i szkolenia zawodowe, Erasmus+.

**Key words:** waste management, professional competence, vocational education and training (VET), Erasmus+.

**Abstract:** W artykule zaprezentowano wybrane wyniki prac badawczych nt. doskonalenia zawodowego pracowników w obszarze gospodarki odpadami na poziomie technika, tj. 4–5 poziom Europejskich Ram Kwalifikacji (EQF). Przedstawiono doświadczenia polskie oraz wybrane zagadnienia i dobre praktyki ze Szwecji – światowego lidera w zakresie edukacji proekologicznej, gospodarki odpadami, recyklingu i pozyskiwania energii z odpadów. Wyniki analizy jakościowej przeprowadzonej z wykorzystaniem metody *desk research* obejmowały dostępne dokumenty pochodzące ze źródeł internetowych, raporty, opracowania i zostały uzupełnione doświadczeniami własnymi partnerów projektu w zakresie prowadzenia szkoleń (obserwacja uczestnicząca) i opracowywania materiałów szkoleniowych. Prezentowane wyniki stanowią dorobek międzynarodowego partnerstwa projektu *Transfer of good practices and development of professional competences of employees in waste management area supported by IT tools* (GreenCompIT) realizowanego w ramach programu *Erasmus +*.

**Introduction.** An increasing amount of industrial and municipal waste and improper way of proceeding with them constitutes a serious threat to people and the environment. Waste management is a quickly developing market in the EU generating new jobs requiring new and/or updated knowledge, skills and competences from employees. The labour market lacks professionally prepared middle level technical staff,

which would deal with waste management in small and medium enterprises and would render services from this scope.

Therefore, the GreenCompIT project assumed the development of an international standard of professional competence for the new occupation *Technician/ Organizer of Waste Management in an Enterprise*, which constituted a benchmark for preparation of a training offer supported by ICT tools and e-learning content. In Poland, the market of training services within this scope is at an initial stage of development. Therefore, it was necessary to use experience of those European countries that have practically verified educational, substantial, IT and organisational solutions. The European partnership (Poland, Sweden, Germany, and Portugal) established in the project met such requirements. The article presents selected feedback from Poland and Sweden, intentionally chosen from all the partner countries as these representing the most contrasting level of waste management performance in terms of the research subject.

**Methods and procedures.** The paper attempts to answer the following research problems:

- What are the occupations/professional competences in waste management in Poland at level 4-5 EQF/NQF?
- How is the acquisition of the key competences promoted at national/regional level in Sweden and what is a VET offer in Sweden?

The main objective of the research was to identify the current training offer in the waste management field. A desk research method was applied to analyze the current training offer through a critical qualitative analysis (Gibbs, 2008) of available documents from online sources, national and European reports, studies, including the project partners' own experience in training (active observation) and training materials development. The feedback from the analysis were verified with the assumptions and supplemented with own experience of the partners carrying out multicultural research projects.

**Professional competences and training offer in waste management area in Poland.** For nearly 30 recent years, the Institute for Sustainable Technologies – National Research Institute (ITeE-PIB) has been specialising in building up innovation performance in the areas of machine construction and maintenance, technical and environmental safety. The Centre for the Research and Development of Vocational Education, a separate unit in the structure of ITeE-PIB, revolves around the issues of life-long learning and continuing vocational education, modelling of technology and knowledge transfer processes for the development of an innovative economy human capital, improving quality in VET, standardization of professional competences/qualifications. Several international projects have been already carried out in the area of so called “green education” and continuing vocational education and training (C-VET), among others:

- Implementation and Validation of Non-formal Training on Sustainability for Environmental Testing Laboratories workers (ECVETlab), Erasmus+.
- Training and certification model for photovoltaic trainers with the use of ECVET system, Erasmus+.

- Development of the GreenPoint Qualification Standard and its implementation in small enterprises of the metal sector (Green Point), Leonardo da Vinci.
- Model Regional Centre of Technological Competence (Green-Job), Operational Programme Human Capital.

Considering the previous experience and the need for further development of a training offer particularly for a technical staff who deals with waste management in SME sector, the international *Green-Comp-IT* project: *Transfer of good practices and development of professional competences of employees in waste management area supported by IT tools* has been launched under the Erasmus+ programme.

The aim of the Green-Comp-IT project was the transfer of European good practice, development and improvement of the quality of training and professional qualifications of employees in waste management area with use of IT tools supporting processes of competence management and development of training modules based on the learning outcomes (knowledge, skills, competence). The project also assumed the development of an international standard of professional competence for the new occupation: *Technician-Organiser of Waste Management in an Enterprise*.



**Fig. 1. Internet portal of GreenCompIT project**

Source: <http://greencompit.eu/> access: 12.01.2017.

As the preparatory analyses have shown, the European Union has no one methodical approach to describe professional requirements towards employees in defined occupations in waste management area functioning on the labour market. Therefore, it was particularly interesting to find out what is the state of the art training offer in waste management in all countries and what are the professional competences defined in the occupations.

In Poland, for the descriptions of professional competences corresponding to the labour market a responsible body is the Ministry of Family, Labour and Social Policy. However, when referring to formal and non-formal education, the Ministry of National Education and Centre for Education Development (ORE) are responsible for vocational and continuing education, curriculum bases, curricula, professional development of teachers (Report 2015).

The identified occupations relating to waste management area for a technician level (4-5 EQF) in Poland and Sweden are presented in Table 1.

**Table 1. Occupations relating to waste management area for a technician level (4-5 EQF) in Poland and Sweden**

POLAND		SWEDEN	
No.	Name of an occupation	No.	Name of an occupation
1	Waste management Technician 32551	1	Bio-energy technician
2	Environment protection technician 325511	2	Environmental and quality Manager
3	Technician of environment engineering and land reclamation 311208.		

Source: Own study based on: Identification and comparative analysis... (Report 2015).

The professional tasks describing professional competence for Waste management technician in Poland are as follows:

T1. Waste management activities in the workplace according to the health and safety rules and regulations, fire and environmental protection.

T2. Preparation of plans, estimating costs, issuing and obtaining various kinds of permits, keeping of registers and records as well as databases related to waste management.

T3. Waste prevention, preparing waste for re-use; material and biological recycling of waste.

T4. Keeping the handling of hazardous waste.

T5. Collecting and transporting various kinds of waste and waste removal from the place not allotted for waste storage.

T6. Storage and disposal of waste running processes.

T7. Transfer of waste and responsibility for waste management.

T8. Waste treatment and neutralization in systems and equipment.

T9. Selling and/or waste broking.

T10. Supervising and controlling separate stages of waste management.

Referring to non-formal education, in Poland courses are offered by both private companies and public institutions, mostly for a fee. There are some flagship institutions offering professional courses and training, e.g.:

- Institute for Environmental Protection – National Research Institute:
  - a) Waste management in the light of new legislation. Training for employees dealing with environmental protection services in local administration (offices of poviats and communes).
  - b) Basic course on new legislation and measurement methodology in environmental protection against noise. Course organized for employees of Voivodship Inspectorates for Environmental Protection and Delegates.
  - c) Environmental protection – working methods with children.
- Polish Cleaner Production Association:
  - a) Environmental Specialist (90h). The participant is required to have basic knowledge in biology, geography, geology, chemistry and mathematics. The training offers not only theoretical perspectives but also the improvement of practical knowledge management skills in the environmental industry.

The training courses in Poland in waste management are organized mostly in the form of seminars, lectures with interactive presentation, active discussion, case study presentations and group work. Participants of the training courses are issued a personal certificate of completion. The average duration of the training is 1-3 days (approx.

20 hours). There are also offered preparatory courses for employees, among others for an environmental specialist (Szpilska, Kupidura 2016).

In Poland, there were identified some documents describing the requirements for the qualifications, professions competences, skills, work posts related to waste management area:

- Descriptions of occupations,
- Professional competence standards,
- Curriculum base for vocational education in an occupation,
- Standard of qualification description (entered into the Register of Qualifications),
- The curriculum for an occupation,
- Modular vocational training programmes,
- Plan for qualification course,
- Database for professional competence standard.

**State of the art green market in Sweden.** In Sweden and in the EU generally, there is a need to adapt to new life situations, career shifts, job changes, the need to have more than just job related skills. People need to participate in further learning and acquire key competences. In Sweden like in other countries it is an effective opportunity to develop and acquire the skills using VET and Web platforms. EU has given all the countries questions how to accomplish the “Riga conclusion” and the “European cooperation in education and training”. It’s in the overall important to help more people to acquire the core set of skills necessary to reach a level of knowledge to have the possibility to work and live in Sweden. The need in Sweden for education is very high and low skilled jobs are very few.

The Swedish National Agency for Higher Vocational Education has worked with coordination and supporting the national structure for validation of prior learning. The Agency has presented a guideline on validation of prior learning in cooperation with providers of education, sector organizations and regional representatives. In 2015 the Swedish government decided to organize a committee consisting trade unions, employers’ associations and national authorities. Its main task is to follow up, support and promote coordination of work to develop validation and a national strategy for validation. In Sweden the question of validation is now becoming more focused on issues relating to the labour market. Due to the sharp increase in the number of asylum-seekers to Sweden in 2014-2015 there is a priority for validation of immigrants learning and knowledge. To find the validation of immigrants’ competences and find ways to have “fast tracks” so to have faster pathways for immigrants with prior high education and work experience in occupations where there is a strong demand on the labour market.

Sweden has still a long way to go and the main focus are:

- Provide suggestions for a national strategy for validation,
- Work to establish a consensus between educational institutions and the labour market regarding validation,
- Analyse and monitoring results of validation within the institutions and the labour market,
- Spread knowledge of validation,
- Make validation visible for specific individual needs,

- Provide suggestions to the government and take initiative that strengthen the development of validation.

An economic boom in Sweden has led to a shortage of skilled workers and difficulties to attract people with vocational competences to enter the educational system as vocational teachers. Schools face a general shortage of people who can teach VET and a particular shortage of teachers with a degree and certificate in teaching relevant VET subjects. The legislation, therefore, has exempted VET teachers from the formal qualifications and certificate requirements that have been in full effect since July 2015. The state has given the National Agency for Education comprehensive mandate to raise interest in training to become a VET teacher, to support workplace-based learning with incentives for practical training instructors in the workplaces, to aid schools in establishing sustainable links and cooperation with the local work life and to support VET teachers' continuing professional development (CPD).

The need for skills and competences in all areas are growing and our work on the waste management education programme for technicians in a company is a small part in the development of educational training specialized in the area of waste handling, environmental knowledge and safety at the work within the waste management. In Sweden there is a lot of environmental educational programmes, specialized education opportunities for people working within the green business but not so many VET educational programmes for people at companies handling waste at their premises. One of the reason is lack of time and money for the employees to participate in seminars and/or stationary training.

**Examples of educational offer in Sweden.** Avfall Sverige, the Swedish Waste Management and Recycling association with 400 members from both the public and the private waste management and recycling sectors. 99, 9 per cent of the Swedish population are represented through Avfall Sverige. Avfall Sverige represents its members in dealings with politicians, other decision makers, authorities and media, both in Sweden and internationally:

- to monitor development and safeguard member's interests,
- to exchange experience,
- to work with development and investigations,
- to educate and disseminate knowledge,
- to provide information.

Avfall Sverige offers its members several educational programmes on different subjects, organized as one -two days seminars, e.g.: "Personal at the recycling yards", "Individual sewage – disposal and recycling of sludge" etc. It also offers an internet training programme specially designed for politicians, new persons in the business and for workers who want to know more and have a possibility to improve their career. The seminars on the web are interactive, with films and storytelling.

Content of the training programme:

- A journey through the history of waste management,
- Organization and responsibility in waste management,
- Collection of waste,

- Waste treatment,
- Legislation,
- Public procurement law,
- Health and safety at work,
- Customer,
- Test (after the course is completed).

In Sweden there are a lot of consulting companies dealing with educational programmes concerning environmental issues. They are often having a broad spectrum of educational programmes but they are not often specialized in waste management. More often they are working with sustainable work in the organizations, CSR, working health, eco-driving or are specialized in ISO 14000 and ISO 26000. “EcoEducate” is one example on these companies working in environmental education.

The educational/training institutions want their customers to improve their sustainable work, have environmental management system e.g. ISO 14000 or ISO 26000 or have a diploma for their environmental work as a company not for individual basis therefore some of the courses are tailor-made for employees in the customers` companies.

To know the chain of processes in the companies operation is crucial to minimize the risks, prevent problems and be aware of the regulation demands. If there is a need for a special education programme on waste management it can be a possibility for the companies to inspire participants on other programs to do this platform of modules (<http://www.miljoutbildning.se/>).

**Gästrike återvinnare and the “Green business” waste management programme.** Gästrike återvinnare ([international.gastrikeatervinnare.se](http://international.gastrikeatervinnare.se)) has developed an educational program for waste management called “Green business”. The program is an international educational program based on four blocks, 80 hours, including different subjects. The course can be changed according to the demands of the client.

The content is:

- Introduction of a modern waste management system,
- Environment and its impact on the planet,
- Current state of waste management in EU,
- System perspective,
- Interaction/communication/behaviour changes,
- Classification and separation of waste,
- Collection of waste,
- Waste Treatment,
- Hazardous waste,
- Recycling of materials,
- Procurement law,
- Environmental aspects of waste management,
- The waste management company – business models, opportunities and management.

Gästrike återvinnare is responsible for the household waste but also works as a partner to companies at the private market. It delivers solutions and education. Many of people being in touch with Gästrike återvinnare are responsible for the waste solutions and environmental work in their organization/company. The GreenCompIT

platform would serve as a solid starting point for continuing education for them or as a part after introduction/education/delivery of equipment to the company. A certification of the responsible technician at the company might be an improvement and would cause an increase of the competence level both for the company and individuals.

**Green education in Sweden – junior high school and university level.** In Sweden there are professional junior high schools (15-18 years old students) preparing the students to be ready to work in a profession directly after graduating a school. In this case it can be useful to use the GreenCompIT outcomes, particularly the e-learning platform and ICT Tool as an introduction to the green business. The students can do the pretest and the programme during their practical education and receive a certification that they have the competence and skills according to the needs for a technician working in a company. The educational material of GreenCompIT project may be offered to the trainees when they start the practical education at Gästrikre återvinnare. It would be used as a supplement to the study visit around Gästrikre återvinnare, when the students get to know how people work both in the office and within the waste collection and treatment handling.



**Fig. 2. A study visit for international guests: a short introduction to waste management, Gästrikre Återvinnare, Sweden, author: Per-Olof Hallberg**

The University of Gävle and the University of Lund offer special education programmes at higher studies in waste management. In Gävle there is offered a COOP-education programme within which the students can choose to have 10 weeks practical training each year at a company within the area of Waste management, water or energy.

**Conclusion.** Today it's not enough to graduate school or university, than perform work and think it will last. Today everyone needs to take lifelong learning to get new skills and competences even in low skilled jobs or jobs requiring more practical training. Within the waste management business there are employees with high practical skills as drivers, mechanics, service personal, recycling yard employees but also low skilled workers such as people working at sorting lines. The GreenCompIT platform might be an easy way to gain more knowledge to people working already in the business but not



being really aware of the waste management system and the environmental issues that are important for the planet and that the recycling and reuse are a big part of the changing from “a buy and throw away society” to “circular economy”.

As the article shows, the development of professional competence of employees in waste management area both in Poland and Sweden is based on formal and non-formal education. Sweden is one of the European leaders and an example of best practice for Poland in terms of “green education”, building environmental awareness, systems of recycling and waste management. A new and important aspect to be considered in vocational education and training is building environmental awareness (including recycling), but also the development of social competences in waste management. The international composition of the GreenCompIT partnership has made it possible to analyze the educational offer, qualifications and competences in waste management area at levels 4-5 of EQF/NQF in four EU countries and the results have constituted a vital benchmark to prepare the European standard of professional competence for a new profession: *Technician-Organiser of Waste Management in an Enterprise* and e-learning training material both in line with the labour market needs.

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**dr Małgorzata SZPILSKA**

**dr Tomasz KUPIDURA**

Instytut Technologii Eksploatacji – PIB, Radom, Poland

[malgorzata.szpilska@itee.radom.pl](mailto:malgorzata.szpilska@itee.radom.pl)

[tomasz.kupidura@itee.radom.pl](mailto:tomasz.kupidura@itee.radom.pl)

**Per-Olof HALLBERG**

Gästrike Återvinnare, Sweden

[per-olof.hallberg@gastrikeatervinnare.se](mailto:per-olof.hallberg@gastrikeatervinnare.se)