

INTEGRATED WASTE MANAGEMENT. APPROACH AND IMPLEMENTATION IN ROMANIA

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ABSTRACT

Waste management has become particularly important in the analysis of the sustainable development of any territory, given the pressure they exert on local systems, human health, environmental costs or the aesthetic value of landscapes. As a result of industrial development and accelerated urbanization, collection, processing, storage and final disposal of waste has become a major challenge of the present. The present paper provides with a holistic image of waste management, focusing on the role of public administration in managing waste in an environmental sustainable way. The paper points out the need for an integrated waste management, as waste management is built up of many closely related processes, reality proving that slow results are achieved if focusing and comparing individual options. After shaping the concept of integrated waste management, the paper approaches waste management at national level and provides with relevant statistical data that mirror the achieved level in the field and existing dysfunctions. At the same time, the paper points out the main progresses or burdens related to integrated waste management at county level in Romania, available financing instruments, impact at socio-economic level, stakeholders involved, results achieved or political implications towards reaching the environmental targets negotiated by Romania as an EU member. In the end, the paper identifies the main problems faced in the implementation of integrated waste management systems and proposes viable and applicable solutions.

KEYWORDS: *integrated management, sustainable development, waste*

JEL CLASSIFICATION: *Q53*

1. INTRODUCTION

Planning for the management of municipal solid waste becomes increasingly important as the complexity of management needs expands, the tools and procedures for addressing these needs require greater sophistication, and competition increases. In addition, as the roles and responsibilities of states and their subdivisions in the management of solid waste have evolved, both state and local or regional solid waste planning is required (Tchobanoglous & Kreith, 2002).

In Romania, the progress in the field of waste management is slow and delayed, taking into account the starting premises, namely: the annual quantity of generated waste is continuously increasing; the mixed collection percentage equals about 96% of the total quantity of municipal waste, a category which also includes construction and demolishing waste; about **98% of the municipality waste is discarded through disposal**, while just a small percentage is **recovered (about 1%)** (Annual report on the environmental state, 2009, EUROSTAT, Statistics waste streams, 2010).

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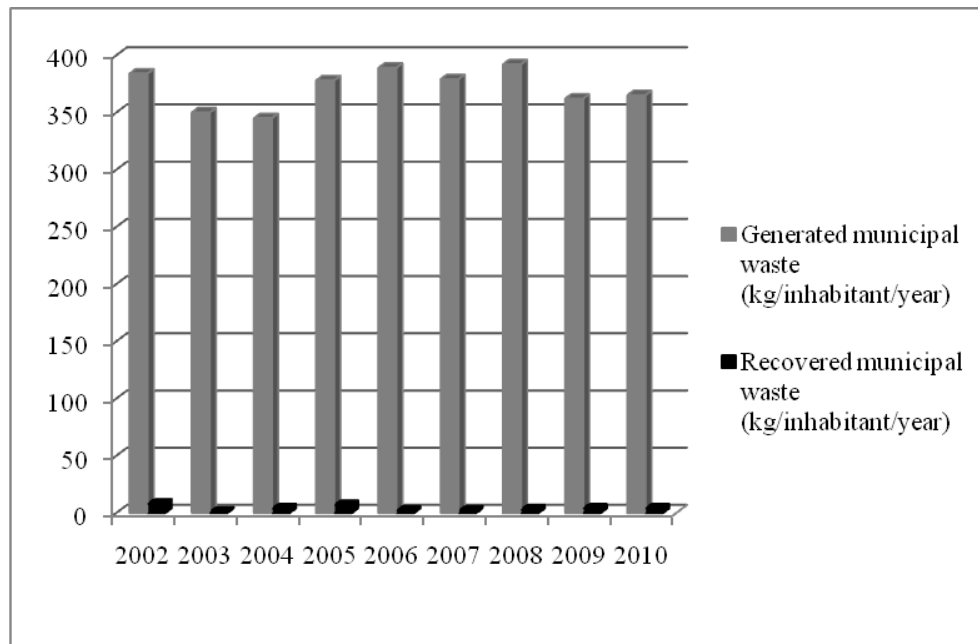


Figure 1. Generated municipality waste/ recovered municipality waste

Source: adapted from EUROSTAT, Statistics waste streams (2010, http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database)

The present paper points out the main progresses or burdens related to integrated waste management at county level in Romania, available financing instruments, impact at socio-economic level, stakeholders involved, results achieved or political implications towards reaching the environmental targets negotiated by Romania as an EU member.

2. THE CONCEPT OF INTEGRATED WASTE MANAGEMENT

The treatment and disposal of waste has developed from its early beginnings of mere dumping to a sophisticated range of options including re-use, recycling, incineration with energy recovery, advanced landfill design and engineering and a range of alternative technologies, including pyrolysis, gasification, composting and anaerobic digestion. The further development of the industry is towards integration of the various options to produce an environmentally and economically sustainable waste management system.

Integrated waste management has been defined as the integration of waste streams, collection and treatment methods, environmental benefit, economic optimization and societal acceptability into a practical system for any region (Warmer Bulletin 49, 1996).

Integrated waste management implies the use of a range of different treatment and disposal options, including the areas covered in this book, i.e., waste reduction, re-use and recycling, landfill, incineration and alternative options such as pyrolysis, gasification, composting and anaerobic digestion. However, integration also implies that no one option of treatment and disposal is better than another and each option has a role to play, but that the overall waste management system is the best environmentally and economically sustainable one for a particular region (McDougall et al 2001, Williams, 2005).

Environmental sustainability means that the options and integration of those options should produce a waste management system that reduces the overall environmental impacts of waste management, including energy consumption, pollution of land, air and water and loss of amenity (White et al 1995; Williams, 2005). Economic sustainability means that the overall costs of the waste management system should operate at a cost level acceptable to all areas of the community, including householders, businesses, institutions and government (White et al 1995).

In assessing the most environmentally and economically sustainable system, the local existing waste management infrastructure, such as availability of landfill sites, existing incinerators, the types of waste to be managed, waste tonnages generated etc., should all be considered (Williams, 2005).

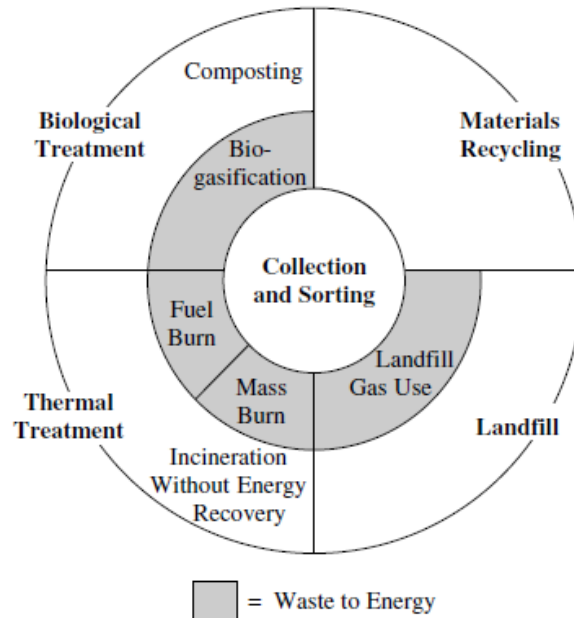


Figure 2. Elements of an integrated waste management system

Source: Warner Bulletin 49, 1996, Williams, 2005

In a truly integrated waste management system, wastes such as demolition products, sewage sludge, hazardous, agricultural, industrial and household wastes, would all be included in the waste management system. However, such diverse wastes are often covered by different authorities, are subject to different legislation and arise in different amounts, and are therefore more difficult to integrate than, for example, municipal solid waste.

Tchobanoglous et al. (1993) define integrated waste management in terms of the integration of six functional elements: 1. Waste generation; 2. Waste handling and separation, storage and processing at the source; 3. Collection; 4. Separation, processing and transformation of solid waste; 5. Transfer and transport; 6. Disposal.

The inter-relationships of the six functional elements of an integrated solid waste management system are shown in Figure 3.

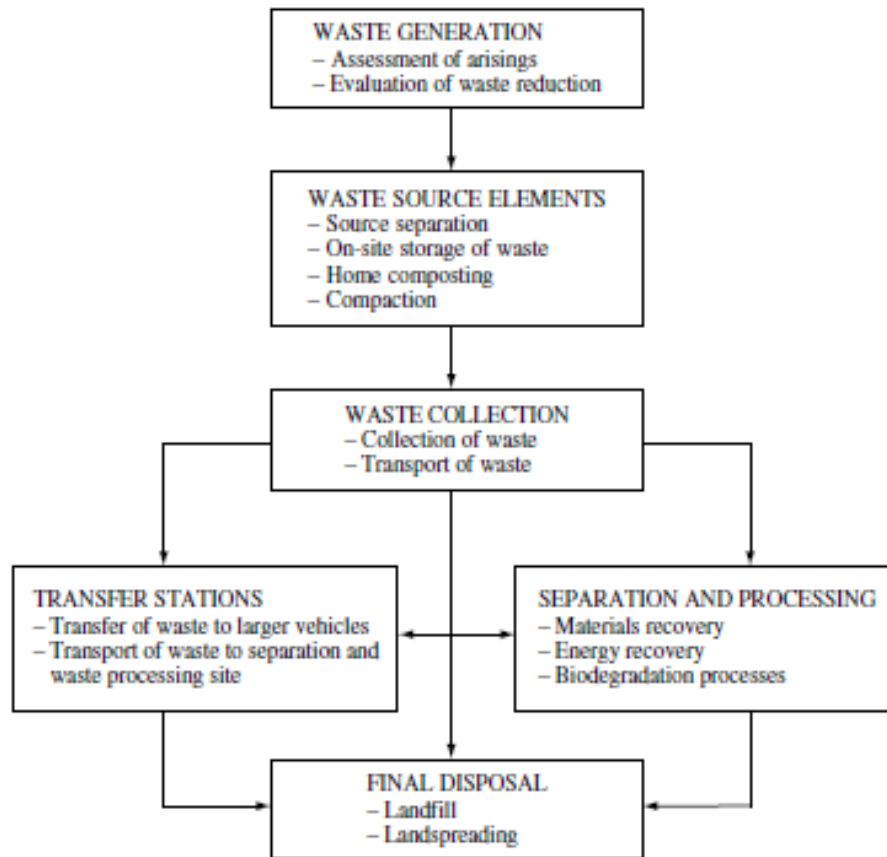


Figure 3. Integrated solid waste management system

Source: Tchobanoglous et al. 1993, Williams, 2005

Integrated waste management as described by Tchobanoglous et al (1993) involves evaluation of the use of the functional elements and the effectiveness and economy of all the interfaces and connections, to produce an integrated waste management system. They define integrated waste management as the selection and application of suitable techniques, technologies and management programs, to achieve specific waste management objectives and goals (Williams, 2005).

3. IMPLEMENTATION OF INTEGRATED WASTE MANAGEMENT SYSTEMS IN ROMANIA

The EU policy regarding waste management, particularly the one referring to municipal waste emphasizes the need for an integrated approach to the problem, to solve all its aspects, in compliance with the waste management hierarchy principles, reiterated in the new Waste Framework Directive (Directive 2008/98/EC). The integrated approach refers primarily to the legal aspects of waste management and, based on the legal provisions, to the development and implementation of practical issues: waste prevention, waste recovery through recycling, reuse, waste treatment and, for the waste that cannot be recovered, their storage under minimal environmental impact, in ecological landfills.

The national legislation on waste management is currently in compliance with the European Union provisions. In order to access to the EU membership, Romania fully transposed the framework and the specific Directives on waste, and obtained in the negotiation process, transition periods to meet the legal obligations. Thus, Romania was granted transition periods (staged) until 2017 for municipal landfills, in order to ensure the gradual reduction of waste deposited in the 101 non-compliant urban landfills.

In addition, Romania should reduce the amount of biodegradable waste annually landfilled to 2.4 million tons by the year of 2013. The figure represents 50% of the amount of biodegradable

municipal waste produced in 1995. There were also other negotiated transition periods for certain mandatory targets for waste recovery and total recycling, and targets related to the different types of materials, established by the Directive on packaging and packaging waste.

In order to support the achievement of these goals, converted into commitments by signing the Accession Treaty, strategic documents on waste management, adopted at all administrative levels (national, regional, county) identified and prioritized the investment needs at regional/county level for this sector. These documents, the National Waste Management Plan, Regional Waste Management Plan and the County Waste Management Plans have been developed in a consultative process with key national/regional/county stakeholders and approved through the means of regulatory acts, hence becoming mandatory.

This integrated approach in Romania requires the development of numerous investments for the purpose of creating integrated waste management systems for each county. Before addressing this goal, local communities initiated a number of local projects or projects involving several communities with support from the European investment funds ISPA and PHARE. ISPA fund investments helped 7 counties (Arges, Dambovita, Teleorman, Neamt, Valcea, Galati, Bacau) to initiate several activities part of the integrated waste management system (even the construction of ecological waste deposits).

The PHARE funded investments did not have a major character, having been initiated once with the ESC PHARE 2001 projects, the last stage of this funding being currently represented by PHARE 2006.

A current situation of ESC PHARE funded projects and the level of these investments are presented below, for each of the Romanian developing regions:

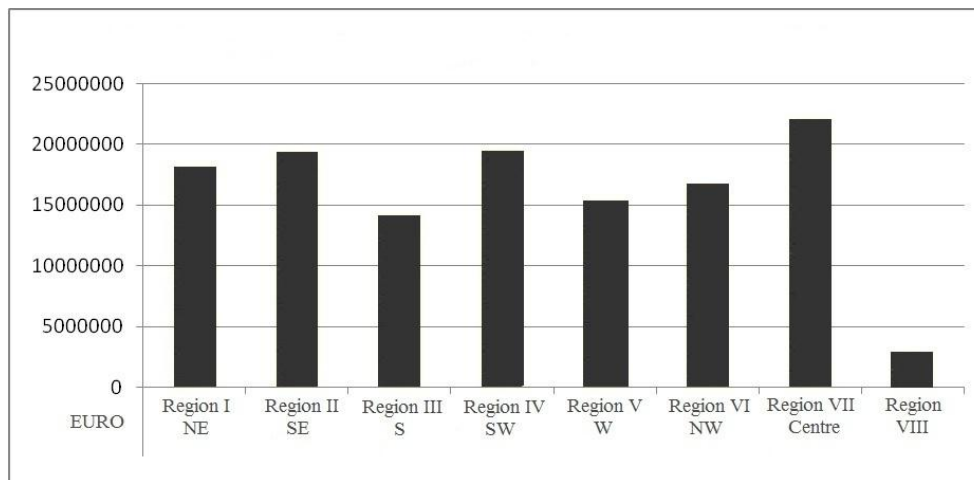


Figure 4. Value of waste management projects financed by PHARE ESC

As shown in the graph above, there was an interest in waste issues in all regions, the inter-regional differences in the number of funded projects were not related to the amount of financing. The reason is represented by the large variety of investments for which the financing was solicited. Thus, some PHARE projects financed the purchase of waste collection equipment (e.g. containers, composting units), the purchase of machinery for the transport of waste (e.g. garbage compactors), while others have financed larger investments, such as transfer stations or waste treatment facilities: sorting facilities, composting facilities, mechanical biological treatment facilities and, in some cases, even closure of waste landfills. On the other hand, there were counties with no interest from the local or county communities to finance such investments through the means of PHARE ESC projects.

All these projects, some already functioning, operate more or less independently, bringing their contribution to the increasing quantities of recyclable waste collected separately and to the reduction of biodegradable waste disposed, however they do not provide an integrated approach to

the issue of waste, solving only certain aspects. Also, the results achieved by the operation of these investments are not sufficient to meet the commitments assumed by Romania and the targets imposed by the Directive on waste in the time limits established by these documents.

This goal can only be achieved through a systematic approach and long-term investments in municipal waste management. This desideratum is made possible by the Sectoral Operational Programme Environment, a strategic document which serves as a reference for the financing of priority environmental projects in 2007-2013. The specific objective of this programme in terms of waste management is to *develop sustainable waste management systems by improving the waste management and reducing the number of historically contaminated sites in at least 30 counties by 2015.*

In the framework of the Sectoral Operational Programme Environment, Priority Axis 2, the Key Area of Intervention 1 "Development of integrated waste management systems and extension of waste management infrastructure" is a continuation of ISPA Strategy (updated in 2013), to which were added the priorities of the Accession Treaty, taking into account also the commitments made during the negotiations. The objectives of this priority, financed by the European Regional Development Fund are:

- Increasing the coverage of population benefitting from appropriate municipal waste collection and management services at acceptable fees;
- Reducing the amount of waste deposited;
- Increasing the amount of waste recycled and recovered;
- Setting up effective structures for waste management.

The projects promoted by the Sectoral Operational Programme Environment – Priority Axis 2 pursue the achievement of these objectives, including activities related to waste management (e.g. prevention, separate collection, recovery, recycling, treatment and disposal), along with activities related to the closure of non-compliant landfills and not least, with awareness activities and public information. Each project covers both urban and rural areas.

In the process of promoting this financing programme, priority has been given to the counties where major investments have been undertaken so far (approximately half of the 41 counties in Romania), addressing in an integrated manner the need to fulfill the commitments on waste. The value of investments in major projects exceeded 50 million euro. Smaller projects are also financed with funding values below 50 million euro. The maximum value for eligible costs is about 98% (80% from the European Regional Development Fund and 18% from the state budget). The project beneficiary must ensure the 2% difference, also the remaining eligible costs and ineligible expenses. The beneficiaries are local and county authorities constituted as Intercommunity Development Associations. These are private entities with public utility status, created in accordance with the provisions of Government Decision no. 26/2000 regarding the associations and foundations, subsequently amended, with the specific purpose for achievement of joint projects and joint management of the activities representing the sanitation services, according to Law no. 51/ 2006 on community services of public utilities, subsequently amended. After the completion of the investment, the operation of sanitation services is offered by public auction, as required by law.

Thus, to date, have been submitted funding applications for Integrated Waste Management System projects in 33 counties of Romania, 20 being approved and under implementation, and the rest being in evaluation.

So far, for the projects already under implementation, the absorption of the EU funds allocated is only 11.68% of the initial allocation provided.

The situation of the Integrated Waste Management Systems, funded and under evaluation or approval is shown in the following chart:

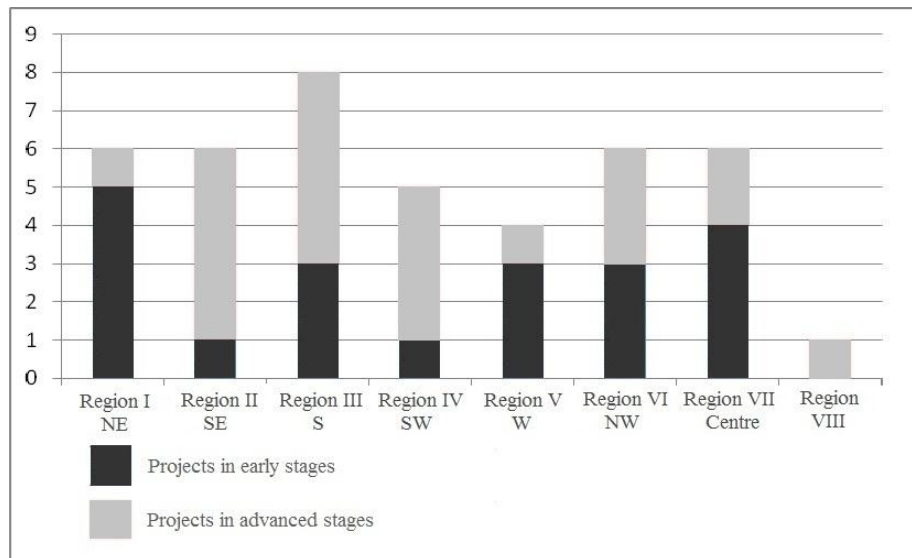


Figure 5. Situation of IWMS projects in Romania

None of the above mentioned projects is completed; the implementation stage of each of these projects is being closely dependent on a number of political, administrative, institutional, financial and socio-economic factors.

4. CONCLUSIONS

The dysfunctions in the implementation of waste integrated management systems fall into two main categories: institutional dysfunctions and technical dysfunctions.

One of the most serious institutional burdens, faced by most of the projects in implementation in Romania, is the integration into the planned waste systems of the already existing facilities, most of them financed within PHARE CES projects. Several situations can be pointed out in this direction: projects initiated, but not finalized; projects finalized from the technical point of view, but with deficiencies in operation due to lacks in operational and financial management, operational projects that need but a capacity boosting and increasing of the area they cover. In order to better integrate these projects, a careful analysis is required in order to fulfill the objectives of both financing programs (PHARE CES and POS Environment). In case the companies operating in PHARE CES projects are kept within the new Integrated Waste Management Systems at county level, various changes in the administrative documents that set the waste management operation are required. All these changes are to be approved by the local administrative bodies, a very difficult and time-consuming process due to increased bureaucracy.

As regarding the technical burdens, the integrated waste management systems were planned for municipal wastes, as only this category of wastes falls into the responsibility of local administration. In many cases, the planning of this integrated waste management systems covered too long periods of time, thus from the incipient planning stage to the real implementation, important changes in waste management could be reported (legislative changes, progresses in waste selective collection etc.), changes that were not taken into consideration in an appropriate manner when preparing the projects that, thus, require serious improvements before implementation. This is another issue that induces delays in implementing the projects.

As related to the special waste streams within the municipal wastes, in many projects, their management is not planned in detail from the projection phase and becoming a task in the responsibility of the future waste operators and local administration. Due to the lack of national experience in managing special waste streams (hazardous municipal waste, electrical and electronic equipments waste, debris waste etc.), their management might not be solved totally by the implementation of the integrated waste management systems.

As the implementation of integrated waste management systems represents a stringent need in Romania in order to fulfill EU objectives in the field and comply with EU legislation, it is extremely important that their implementation is achieved successfully and at bearable costs for local population.

In order to achieve this main objective, a tight collaboration is required among relevant stakeholders as local administration, local population or waste management operators. Thus, raising public awareness campaigns in the field of waste management hold a key position towards a successful implementation.

A functional waste management system means also to find solutions for the special waste streams, too. In this respect, in case hazardous municipal waste management is transferred to the system operator, then the administrative bodies should set for them very clear responsibilities and targets. As related to the packaging and electric and electronic equipments waste, local administrative bodies should set specific management roles also for the collecting organizations that have taken over the responsibility of achieving the collection targets from producers. As related to the debris wastes, an integrated management is needed at county level that does not depend on the generation source (private households, industry, roads construction etc.), but focus on finding viable recovery solutions or safe elimination.

Within the context of sustainable development, it is assumed that there is a need to consider waste as a resource and where waste is generated, more value should be recovered from it. The fundamental aim of any waste strategy should than be the maximization of resource efficiency by promoting sustainable and integrated waste management that will lead to reduced environmental impacts in a socially and economically bearable manner (Nordone, A. et al, 2010). The balance that needs to be achieved is to mitigate the associated environmental impacts of waste, but keep within acceptable level of cost. Deciding the point of balance between environmental impact and cost will always generate debate. Better decisions will be made if data on impacts and costs are available (Nordone, A. et al, 2010). There is always place for further improvements.

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