



Waste management benchmarking: A case study of Serbia



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ABSTRACT

Republic of Serbia expects to open Chapter 27 for negotiation in the coming year. Comparative analysis in this paper shows current situation in waste management which should meet EU standards. The purpose of this paper is to operationalize current knowledge of waste management practices in order to provide a guideline for implementation of future projects and hereby make this knowledge applicable in every municipality. The results were compared with a municipality of similar characteristics from Ireland, in order to compare average situation in waste management in Serbia with one EU country. This paper presents the findings of the waste management benchmarking, and it sets out the policy priorities from development perspective that need to be addressed to ensure that Serbia meets own waste management needs. The results obtained in the study showed the obstacles, real costs and time requirements for establishment of an efficient institutional system able to generate strategic decisions and ensure adequate capacities for infrastructure project development and implementation in the waste management sector.

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1. Introduction

Waste management presents one of the challenges that any urban area in the world facing with. Although the quantity of solid waste generated in urban areas developing countries is low compared to industrialized countries, the municipal solid waste management still remains inadequate (Prokić, & Mihajlov, 2012). The main reason is that municipal authorities lack the resources and trained staff to provide their rapidly growing populations with the necessary facilities and services for solid waste management. Thus, the problem of upgrading practices for the disposal of solid wastes is far more difficult than in developed countries (GamzeTuran, Çoruh, Akdemir, & Osman Nuri Ergun, 2009). Serbia is in the process of upgrading its MSW management, but generally it can be characterized as undeveloped, as waste management consists of waste collection and land disposal only (Nemanja Stanisavljevic, Ubavin, Batinic, Fellner, & Vujic, 2012). Many cities in Serbia are facing serious problems in managing solid wastes due to the existing solid waste management system that is found to be

highly inefficient. Although strict regulations on the management of solid waste are in place, primitive disposal methods such as open dumping and discharge into surface water have been used in various parts. For dealing with generated waste in an environmentally and economically sustainable way, landfilling must be replaced by other, more sustainable, more efficient and modern processes (Karagiannidis, Kontogianni, & Logothetis, 2013).

Serbian approach to waste management is based on the EU standards and adopted waste hierarchy principle prescribed in the Law on Waste Management ("Official Gazette RS", No. 36/09, 88/10), as well as in the [National Waste Management Strategy, 2010–2019](#) ("Official Gazette RS", No. 29/10). This hierarchy states that the most preferred option for waste management is prevention, followed by re-use and recycling, energy recovery and, least favoured of all, disposal. Serbia is in the process to establish national targets for waste recycling, diversion of biodegradable waste from landfills etc.

In order to ensure compliance with future EU targets, Ireland has adopted new policies for continuing improvements in waste management after the mid 2000s (EEA, 2013). The last decade has seen significant changes in waste management in Ireland. According to [Environmental Protection Agency \(2013a, 2013b, 2013c\)](#), ten years ago recovery and recycling of household waste was 9% while now it reaches 47%. In addition, 98% of construction and demolition waste and 79% of packaging waste is recovered (EPA, 2013). The Irish strategy is to divert over 90% of waste from the landfilling to a

Abbreviations: EU, European Union; LWM, Law on Waste Management; MoUD, Ministry of Urban Development; MSW, Municipal Solid Waste; PET, polyethylene terephthalate; SLB, Service Level Benchmarking; SWM, Solid Waste Management; TQM, total quality management; US, United States; WEEE, waste from electric and electronic equipment.

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significant recovery of recyclable materials through the implementation of 10 regional waste management plans and inclusion of stakeholders involvement programmes. Regional waste management plans were prepared according to principal drivers from the EU Waste Framework Directive, the EU Packaging waste Directive and the EU Landfill Directive (Rudden, 2007).

Benchmarking method described below enables to make a comparative identification of those key elements, that will help to identify cities' strengths and weaknesses. Furthermore, municipal benchmarking leads to more efficient municipal resources management and contributes significantly to expenditure cuts, mainly through a process of development and learning. Subsequently, this analytical tool will serve as the basis for evaluating the results.

1.1. MSWM legislation: at a Glance

The Republic of Ireland is an EU member since 1973. Legal basis of Ireland's waste policy is influenced by a range of EU Directives. Waste Framework Directive sets out the management system applicable to the municipality and it is an inseparable part of Irish Waste Management Act 1996. Waste Management Act is covering non hazardous and hazardous waste in Ireland. This legislation contains a number of key legal obligations, including disposal and recovery activities that require a waste licence (EPA). Waste management policy at the national level was set down in several documents issued by the Department of the Environment, Community and Local Government. Government policy document 'Changing Our Ways', published in 1998, was based on the "integrated waste management" approach, and internationally adopted hierarchy as the cornerstone of European waste policies and legislation. Preventing and Recycling Waste – Delivering Change was published in 2002, built on Changing Our Ways moving to concrete proposals to give authorities more power undertake the problem of waste, while Waste Management – Taking Stock and Moving Forward was published in 2004, Last one, A Resource Opportunity – Waste Management Policy in Ireland was published in 2012. The revised Waste Framework Directive (2008) was transposed into national law providing the legal basis for Irish national waste management policy (ARO, 2012). In summary, the national policy framework for modernising Irish approach to waste management was coordinated and put in place in the form of 10 Regional waste management plans (EPA).

The Republic of Serbia is a developing country in Europe (Nemanja Stanisavljevic, Ubavin, Batinic, Fellner, & Vujic, 2012). Although Serbia is bordering with EU countries, the state of waste management in Serbia is far below EU targets. Since the strategic goal of Serbia is to join the European Union, Serbia goes through an ongoing process to harmonise local laws with EU legislation. Legislation may be considered to be one of the most appropriate means of addressing environmental issues. Serbia adopted the *Law on Waste Management* (Official Gazette of RS, no. 36/09 and 88/2010) in 2009, which sets the framework for waste management in Serbia in compliance with the EU. The Law prescribes all relevant aspects of waste management. Waste management consists of a set of activities of joint interest which comprise implementation of prescribed action plans to be carried out within waste collection, transport, storing, treatment and disposal, including responsibility for waste management facilities upon discontinuation of their operations. In 2009 Serbia also adopted a *Law on Packaging and Packaging Waste Management*. This law sets forth environmental requirements which packaging must meet in order to be marketed, and it is in compliance with the EU regulation ("The Official Gazette of the RS", no. 36/09). According to the LWM each municipality have to develop a municipal waste management plan; subsequently, municipalities must then organize themselves into regions

and prepare regional waste management plans based on the local plans (Prokić, & Mihajlov, 2012). The strategic and planning documents that came from primary legislation and from a series of by-laws adopted in the last three to four years are the Waste Management Strategy of the Republic of Serbia 2010–2019, Spatial Plan of the Republic of Serbia 2010–2020, National Strategy for Sustainable Development and National Programme of Environmental Protection. *National Waste Management Strategy (2010–2019)* adopted in 2010, provide national targets for sustainable waste management. It establishes system for the management of specific waste streams. Therefore, main challenge in waste management in Serbia is to ensure good coverage and capacity for collection, transport and disposal of waste on compliance landfills (Filipović & Obradović Arsić, 2012).

1.2. Benchmarking

The late 1970s and early 1980s were a time when benchmarking was used in the management of industrial firms in the US (Luque-Martinez & Munoz-Leiva, 2005). Benchmarking has been a popular in recent years as a practical method in developing critical areas of business (Anand & Kodali, 2008). Benchmarking can be seen as an important management tool of total quality management (TQM), also for achieving or surpass the performance goals by learning from best practices and understanding the processes by which they are achieved (Ananad & Kodali, 2008), and as a continuous process of identifying, understanding and adapting practice and processes that will lead to better performance (Auluck, 2002; Kouzmin, Loëffler, Klages, & Korac-Kakabadse, 1999). The term benchmark was originally used by land surveyors, and by definition is a reference or measurement standard used for comparison (Auluck, 2002; Ungureanu, 2011). Anand and Kodali (2008) compare 35 different benchmarking models and note that most of them share several key themes including measurement, comparison, identification of best practices, implementation, and improvement. In fact, importance of benchmarking results from its applicability in a variety of fields such as: Manufacturing Total quality (Concurrent engineering, Lean production, Innovation and product, development, Manufacturing and engineering systems, Logistics, Company organization and culture, Environment, health and safety), Finance, Marketing - Customer satisfaction, Plus many others (Kelessidis, 2000).

The main purpose of solid waste benchmarking is to compare common elements in solid waste systems and to follow waste handling from generation to disposal. Waste benchmarking becomes a valuable and powerful tool for representing the solid waste system (NSWB, 2011). The Ministry of Urban Development (MoUD), Government of India recognising its importance, has launched the Service Level Benchmarking (SLB) initiative covering water supply, wastewater, solid waste management (SWM) and storm water drainage (The Ministry of Urban Development, 2010). Benchmarking has been widely applied to any part of waste management system. For example, Folz (2004) use the benchmarking process to achieve efficient recycling measuring service quality for municipal solid waste recycling programs, and shows information from a service-quality framework can be used in a benchmarking project. Similarly, Lavee and Khatib (2010) use the benchmarking process to investigate which underlying characteristics of municipalities predict the potential for economically efficient recycling. The basic concept of benchmarking is the recognition that certain municipalities are able to achieve better results in a certain field than others, reviewing progress towards targets it can eventually lead to the establishment of best practices within a municipality or across municipalities (Folz, 2004). Furthermore, municipal benchmarking leads to more efficient municipal resources management and

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