

## READINESS OF ADMINISTRATIVE UNITS FOR IMPLEMENTATION OF EUROPEAN UNION DIRECTIVES GOVERNING SOLID WASTE MANAGEMENT

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### **Abstract:**

On 1<sup>st</sup> July 2013 new legal regulations governing solid waste management were enforced to allow Poland to fulfil the requirements set out in the European Union Directives. The first considerable changes referred colloquially to as „waste resolution” were imposed by the legislature under the act on maintenance of cleanliness and order in municipalities that was amended on 1<sup>st</sup> July 2011 (that was subsequently amended on 28<sup>th</sup> November 2014). The above mentioned changes were followed by subsequent enforcement of the new act on solid waste on 14<sup>th</sup> December 2012 (that was subsequently amended on 15<sup>th</sup> January 2015) as well as the new act on packaging and packaging waste management on 13<sup>th</sup> June 2013. This paper aims at defining and interpreting similarities and differences in implementation of the European Union Directives in administrative units in Poland, as exemplified by a selection of issues on solid waste management. The Chief Statistical Office reports that in Poland in 2014 there were 2479 municipalities. For the purpose of the author’s research, the research questionnaire was developed by the author, that was subsequently distributed among short-listed municipalities. The analysis was conducted on the basis of the data obtained due to the return of over 260 questionnaires. The publication includes descriptive statistics inter alia comparison of means, tables of figures, etc. Some of the analyses have been elaborated upon with graphical presentation for data inter alia in the form histograms.

*Keywords: solid waste management, ecology, ecologistics, implementation of the European Union directives*

## 1. INTRODUCTION

New legal regulations governing solid waste management which came into force on 1<sup>st</sup> July 2013 resulted from the implemented European Union Directives. The first considerable changes referred to as „waste revolution” were imposed by means of the amendment of law and related legal regulations under the act on maintenance of cleanliness and order in municipalities on 1<sup>st</sup> July 2011. The Act was subsequently amended on 28<sup>th</sup> November 2014. They were followed by the enforcement of the new act on solid waste (on 14<sup>th</sup> December 2012) as well as the new act on packaging and packaging waste management (on 13<sup>th</sup> June 2013). The act on solid waste was amended on 15<sup>th</sup> January 2015.

Enforcement of those legal acts reflected the implementation of the European Union Directives, among which the following are the most important: Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (OJ EC L 182 of 16.07.1999, p. 1, with subsequent amendments), Directive 94/62/EC of the European Parliament and of the Council of 20 December 1994 on packaging and packaging waste (OJ EC L 365 of 31.12.1994, p. 10, with subsequent amendments), Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste (OJ EC L 332 of 28.12.2000, p. 91, with subsequent amendments) and Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE) (OJ EC L 37 z 13.02.2003, p. 24, with subsequent amendments).

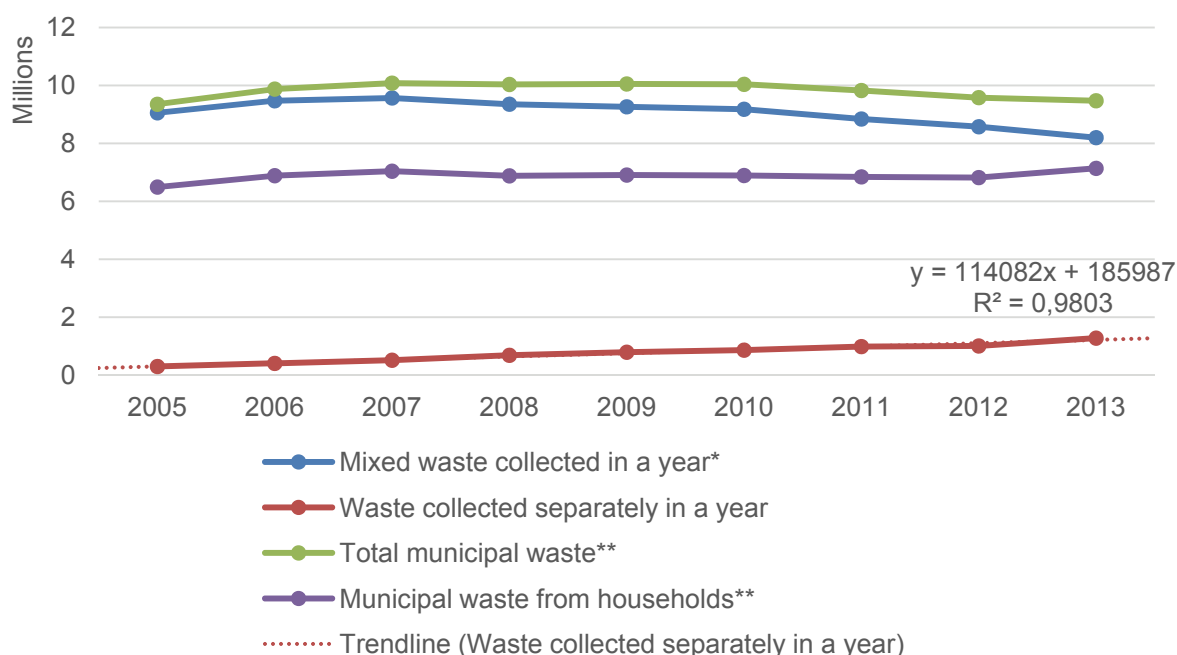
Determining the readiness to implement the European Union Directives at the administrative level to the extent of waste management is essential for effective operations of the whole system. The results presented in the publication are a part of an extensive study of municipalities in Poland.

## 2. MUNICIPAL WASTE IN POLAND

9.47 million tonnes of municipal waste was collected in Poland in 2013, including 8.2 million tonnes (86.54%) of mixed municipal waste and 1.27 million tonnes (13.46%) of waste collected separately. The majority (75.35%) of this waste came from households.

The analysis of data on waste in the period from 2007 until 2013 is indicative if a slight decrease in the total amount of collected waste (as compared to 10 million tonnes in 2007). The volume of waste collected from households in consecutive years remains similar. Attention should be paid to the decrease in the amount of collected mixed municipal waste. The portion of waste collected separately increases each year. The increase estimated on the basis of historical data reaches over 114 000 tonnes a year ( $R^2 = 0,98$ ). The Figure 1 presents the detailed data set (Waste collected separately, Waste collected in a year, Mixed waste, 2015).

**Figure 1:** Waste collected in Poland in the period from 2005 until 2013 (t)



\*Mixed municipal waste is the waste collected in a year, excluding waste collected separately and selected form dry fraction.

\*\* Data on Mixed waste and waste collected separately.

Source: Own elaboration on the basis of data from the Local Data Bank of the Chief Statistical Office.

In conformity with the currently binding regulations municipalities are required to organize collection of municipal waste. The act of 1 July 2011 on the amendment of the act on maintenance of cleanliness and order in municipalities and several other acts (the Act, 1 July 2011) provides for:

- municipalities' tasks and duties of landlords regarding the maintenance of cleanliness and order,
- the pre-conditions for carrying out activities within the scope of municipal waste collection from landlords, and waste management,
- the mandate assignment procedure and related requirements for entities providing services governed by the act of law.

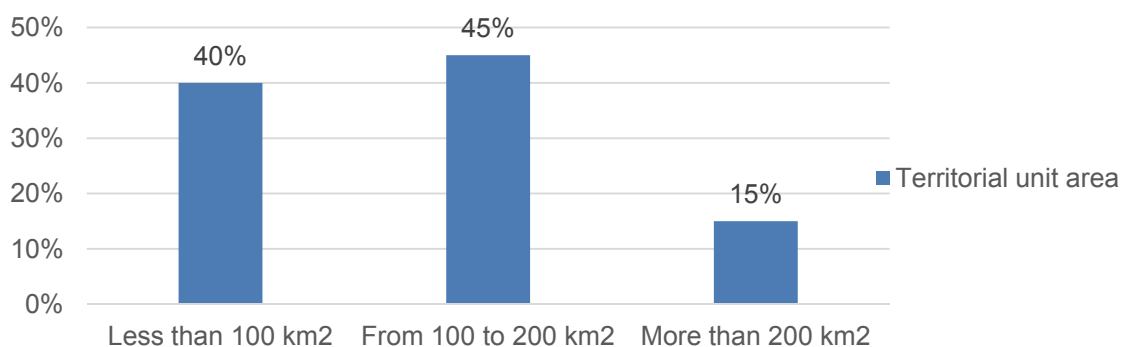
As of 1<sup>st</sup> January 2015 (Municipal Government, 2015) there are 2478 municipalities in Poland, including:

- 304 city municipalities – 12%,
- 611 town and rural municipalities – 25%,
- 1563 rural municipalities – 63%.

### 3. READINESS TO OPERATE MUNICIPAL WASTE MANAGEMENT SYSTEM – TENTATIVE FINDINGS

264 questionnaires were obtained as a result of the survey carried out in municipalities. Among the surveyed (Figure 2) municipalities ( $N = 263$ ) 40% occupied less than 100 km<sup>2</sup> (the smallest; A), 45% occupied an area from 100 to 200 km<sup>2</sup> (medium; B) and 15% occupied more than 200 km<sup>2</sup> (the largest; C).

**Figure 2:** The area occupied by a municipality (%)



Source: Own elaboration on the basis of data collected by PIGO [PI: Polska Izba Gospodarki Odpadami; Eng: Polish Chamber of Waste Management].

A sheet containing the following areas: leadership, management style, competence and technologies, was used for the purpose of evaluation of readiness to operate a municipal waste management system. Attitudes were studied with the use of five-level Likert scale. In this publication the results for leadership (L) and competences (C) have been presented as well as the breakdown according to the size of municipal area. The studied attitude in leadership is presented in the Table 1.

**Table 1:** The study of the attitude in leadership

Variable	Studied attitude
L1	Senior management of TU* is aware of opportunities/risks of the MWMS.
L2	Undertakings currently implemented in TU regarding municipal waste management are integrated with the Voivodeship waste management plan.
L3	In our TU there is a culture of sharing information regarding the MWMS within the whole unit.
L4	Our TU has a clearly specified and approved 3-6-year MWMS development plan.
L5	Our efforts regarding the creation of the modern MWMS aim especially at achieving strategic goals of the system and not at achieving temporary effects.

\*Abbreviations: TU – a territorial unit understood as a municipality, association of municipalities or union of municipalities; MWMS – municipal waste management system.

Source: Own work output on the basis of data from PIGO.

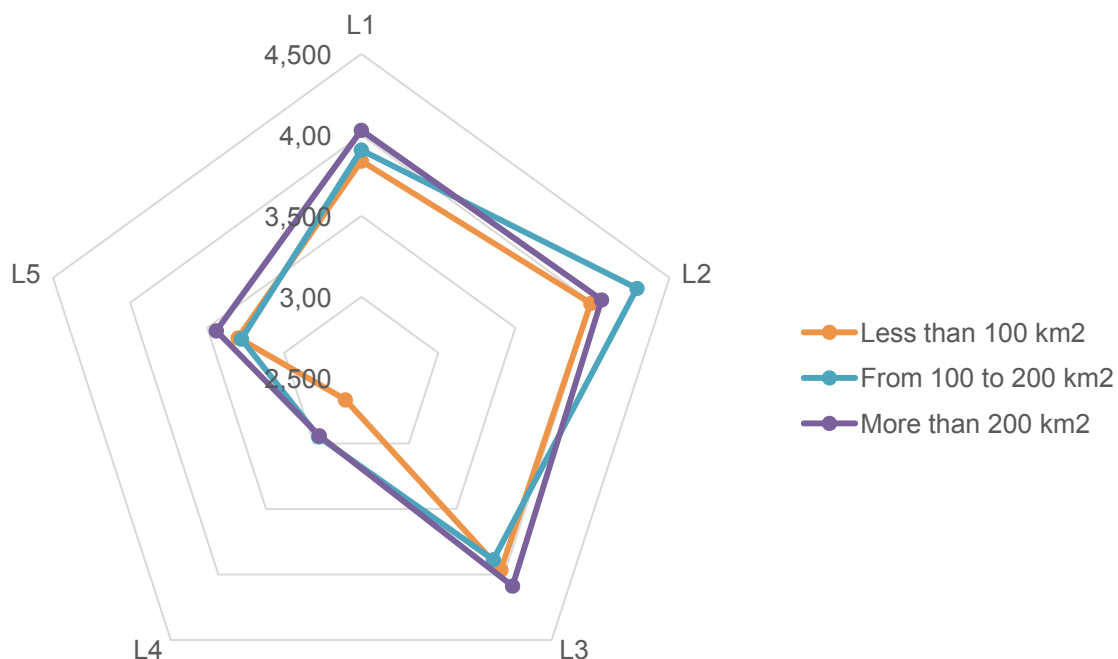
As a result of the determination and comparison of average values ( $N = < 226; 230 >$ ) for respective areas of leadership, the largest indication was achieved for the statement that the currently implemented undertakings in territorial units within the scope of waste management are closely connected with the voivodeship waste management plan (L2; 4.14). It is essential for territorial units to tie in with the comprehensive voivodeship strategy while implementing local undertakings connected with waste management. The surveyed units claim that relevant information policy is essential. They indicate that there is (within the whole unit) an exchange of information concerning the municipal waste management system (L3; 3.96).

The attitude of the management has a significant impact on the operation of the whole territorial unit in its many domains. In the analyzed area of waste management, the surveyed units indicate that senior management takes into consideration both opportunities and threats connected with the waste management system (L1; 3.90).

Slightly lower indications result from the creation of a modern waste management system in territorial units. They indicate that works on this system are slightly more aimed at achieving strategic goals than at temporary effects (L5; 3.33). Units indicate that there may be some shortcomings in the (3-6-year) municipal waste management system development plan (L4; 2.86). This indication achieved the lowest value in all analyzed areas. Therefore the units can be recommended to clearly specify and approve of the development plan.

The average values presented above were determined for the whole sample. In order to identify potential differences in the presented attitudes average values were also in groups of territorial units varied in size, which is presented in the Figure 3.

**Figure 3:** Comparison of average values in the leadership area in municipalities varied in size



Source: Own elaboration on the basis of data collected by PIGO [PI: Polska Izba Gospodarki Odpadami; Eng: Polish Chamber of Waste Management].

Benchmarking of the average values within the respective groups of the territorial units (varying in terms of the size) shows that the indication was, as a rule, higher in larger units. The larger the area, the higher the following indications: having an established and accepted 3-6-year development plan for municipal solid waste management system (L4) and the identification of opportunities and threats connected to the system by the executive officers (L1). It is characteristic that smaller territorial units achieved the lowest indication concerning the SGOK [PI: System Gospodarki Odpadami Komunalnymi; Eng: Municipal Waste Management System] development plan.

Similar indications (insignificant differences in average values) were achieved within the areas of achieving strategic aims to a greater extent than short-term aims (L5) as well as in terms of sharing information connected to the Municipal Waste Management System within the unit (L3). The opinions of the respective units converge in this case.

An interesting feature was noticed in the case of the indication concerning the integration of the enterprises of the units with the voivodeship waste management plan (L2). In this case, the indications of the medium-sized units were the biggest. The detailed comparison of differences in the attitudes of the respective groups of territorial units are presented in the Table 2.

**Table 2:** Average values of attitudes of leadership along with the differences between the specified groups

Leadership	Size of the territorial unit			Differences		
	below 100 km <sup>2</sup> (A)	100 to 200 km <sup>2</sup> (B)	above 200 km <sup>2</sup> (C)	B-A	C-A	C-B
L1	3.839	3.907	4.029	0.068	0.190	0.122
L2	3.989	4.289	4.059	0.300	0.070	-0.230
L3	3.966	3.887	4.088	-0.079	0.122	0.201
L4	2.667	2.948	2.941	0.281	0.274	-0.007
L5	3.299	3.278	3.441	-0.021	0.142	0.163

Source: Own elaboration on the basis of data collected by PIGO [PI: Polska Izba Gospodarki Odpadami; Eng: Polish Chamber of Waste Management].

**Table 3:** The surveyed attitudes within the area of competences

Variable	Surveyed attitude
C1	TU can operate in the environment of rapid and continuous changes.
C2	The Projects connected to the SGOK are implemented efficiently and quickly, i.e. by 1-3 people, within the time limit up to 24 months.
C3	The people responsible for managing the SGOK have technological knowledge, and the people managing the technology have the business knowledge/content-related knowledge, concerning the SGOK.
C4	We have experience in managing many relations concerning both internal SGOK relations, as well as the external relations of the TU.
C5	We can instantly establish or terminate the cooperation with many partners (in connection to construction and managing the SGOK).

Source: Own elaboration on the basis of data collected by PIGO [PI: Polska Izba Gospodarki Odpadami; Eng: Polish Chamber of Waste Management].

Among the analyzed components of the area of competences ( $N = < 224; 227 >$ ), the indication was the biggest in the case of the manner of operations of a territorial unit.

Proper operation in a dynamic environment, in which the changes occur rapidly, proved to be the most important feature (C1; 3.82). The possibility of quick and efficient implementation of projects related to municipal waste management system is its direct consequence (C2; 3.41).

For the construction of a proper waste management system, it is necessary to have adequate intellectual capital. Critical are both the possessed knowledge as well as the gained experience. Those managing such a system in the respective units, have the necessary technological knowledge, and those who manage the technology of such a system, have both the content-related and business knowledge (C3; 3.37). The indications concerning experience are only slightly lower (the difference: 0.05). The surveyed units indicate that they have experience in managing relations (internal and external relations within the given unit) concerning municipal solid waste management (C4; 3.32).

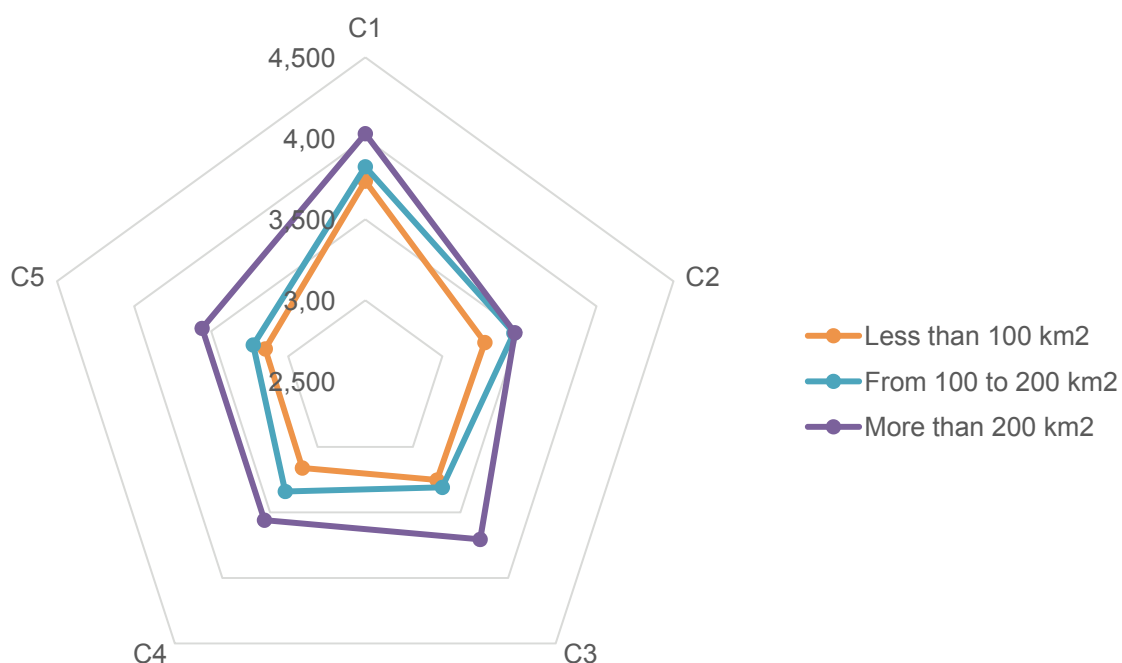
The lowest indication within this group of characteristics is associated with establishing and terminating cooperation with partners within the area of the construction and management of waste management system (C5; 3.26).

It is worth noting that the average values of the obtained indications within the area of competence are very similar (the difference between the highest in the lowest value amounts to 0.56).

The obtained average values of the attitudes specified the group of leadership are in most cases (excluding L4 and L5) larger than within the group of competences.

In order to determine the possible differences, it was attempted to divide the group of competences in relation to the size of the territorial unit and the results are shown in Figure 4.

**Figure 4:** The comparison of the average values within the scope of competences in municipalities varied in size



Source: Own elaboration on the basis of data collected by PIGO [PI: Polska Izba Gospodarki Odpadami; Eng: Polish Chamber of Waste Management].

As a result of sample division and taking into account the declared size of a territorial unit, the average values were obtained, which constitute a characteristic structure. The larger the size of the unit, the better the assessment of the respective attitudes. This was proven by comparing the small territorial units with medium ones, medium-sized units with large ones and, last but not least, the small units with large ones.

The most considerable differences in attitudes of the small and large units were related to: knowledge possessed by the executive officers (C3; 0.45), cooperation (establishment and termination) between the entity and its partners (C5; 0.41) and experience in managing relations (C4; 0.40). The less significant differences in attitudes were related to operations in a dynamic environment (C1; 0.29) and to how to implement projects related to municipal waste management system (C2; 0.20).

The details of the comparisons between the two groups are presented in the Table 4.

**Table 4:** The average values of the attitudes specifying the respective competences, along with the differences between the respective groups

Competences	Size of the territorial unit			Differences		
	below 100 km <sup>2</sup> (A)	100 to 200 km <sup>2</sup> (B)	above 200 km <sup>2</sup> (C)	B-A	C-A	C-B
C1	3,736	3,825	4,029	0,089	0,293	0,204
C2	3,276	3,464	3,471	0,188	0,195	0,007
C3	3,253	3,309	3,706	0,056	0,453	0,397
C4	3,161	3,340	3,559	0,179	0,398	0,219
C5	3,149	3,227	3,559	0,078	0,410	0,332

Own elaboration on the basis of data collected by PIGO [PI: Polska Izba Gospodarki Odpadami; Eng: Polish Chamber of Waste Management].

#### **4. RESEARCH LIMITATIONS**

A comprehensive study of territorial units of the municipal waste management has not yet been completed. The presented results concern merely the surveyed group of units, and constitute a part of a larger whole. The survey is currently being continued in order to ensure more accurate results.

#### **5. CONCLUSIONS**

The environmental issues are a priority on the agenda of the European Union. Creating relevant legislation in the form of directives must be reflected by the activities at the level of the state and its territorial units. In order to develop a system of municipal waste management in a proper way, and to manage it in the future and to obtain certain benefits from it, the territorial units have to be provided with certain resources.

This publication (based on tentative data) presents the analyzed areas of leadership and competences concerning municipal waste management. The surveys were performed both for the entire sample, as well as dividing the samples due to the size of the unit (the declared size).

The attitudes characterizing the leadership received indications of higher values than the ones describing the attitude concerning competences. The analyzed territorial units assess the characteristics associated with leadership in the municipality more favourably than competences. The attitudes (average values) characterizing the powers were so similar. The larger the unit, the better the assessment of its characteristics in terms of leadership and competences. Taking into account the municipalities varied in size, there are shortcomings with regard to both leadership and competences within the surveyed scope of developing a municipal waste management system.

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