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Social aspect of municipal waste management

Społeczny aspekt gospodarowania odpadami komunalnymi

Abstract. The authors of the article assessed the social aspect of the municipal waste management system in Poland. The research covered the period from 2011, i.e. from the validity of legal regulations resulting in the changes commonly known as the 'waste revolution'. The impact on social life of the ways in which municipalities organize waste collection and processing was examined. Also, the reaction of residents to specific solutions of municipal authorities in the field of waste segregation and the costs of its removal were taken into account. For example, the social aspect of the municipal waste management system in the Capital City of Warsaw was examined, also including street cleaning and the removal of rubble from renovated apartments. In the conducted research, the authors took into account the need to manage waste under the conditions of a circular economy specified in the directives of the European Union.

Key words: Municipal waste, waste management, circular economy, ecological education

Synopsis. Autorzy artykułu ocenili system gospodarki odpadami komunalnymi w Polsce w aspekcie społecznym. Badaniami objęto okres od 2011 roku, czyli od obowiązywania regulacji prawnych skutkujących zmianami zwanymi powszechnie jako „rewolucja śmieciowa". Zbadano wpływ sposobów, w jaki gminy organizują odbiór i przetwarzanie odpadów na życie społeczne. Ponadto wzięto pod uwagę reakcję mieszkańców na konkretne rozwiązania władz municypalnych w zakresie zasad segregacji odpadów i kosztów ich wywozu. Przykładowo, zbadano system gospodarowania odpadami komunalnymi w m.st. Warszawie w ujęciu socjalnym, włączając także oczyszczanie ulic i wywóz gruzu z remontowanych mieszkań. W przeprowadzonych badaniach autorzy wzięli

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pod uwagę konieczność gospodarowania odpadami w warunkach gospodarki o obiegu zamkniętym określonego dyrektywami Unii Europejskiej.

Słowa kluczowe: odpady komunalne, gospodarowanie odpadami, gospodarka w obiegu zamkniętym, edukacja ekologiczna

JEL codes: Q53, Q56, Q57

Introduction

The aim of the article was to assess the functioning of the municipal waste management system in Poland, taking into the account the social aspect of this activity. Municipal waste is a unique type of waste, next to industrial waste, hazardous waste, electrical and electronic waste, and medical waste, because a social factor plays a role in its production, collection and subsequent processing [Pichtel 2014]. Municipal waste management serves to improve the quality of life of residents.

The presented research results are a continuation of the multi-aspect research on municipal waste management conducted by the authors of this article in cooperation with various academic centers in Poland, such as the University of Radom, Kielce University of Technology, and Rzeszów University of Technology. The research results of these studies are successively presented at international scientific conferences organized by the Transport Committee of the Polish Academy of Sciences, Kielce University of Technology [Bril and Rydygier 2016b, Bril at al. 2017] and are published in specialized international journals [Bril and Rydygier 2016a, Bril and Rydygier 2017, Bril and Rydygier 2020a, b]. In Poland, since 2012, municipal waste management has been the responsibility of municipalities, which by law are the basic units of local government [Dz.U. 2013 poz. 21 z późn. zm.]. Municipalities became responsible for the entire organization of waste management processes, such as waste collection, storage, disposal, and recycling. In turn, detailed waste management rules under European Union directives were introduced by the Act on maintaining cleanliness and order in municipalities, amended in 2012, known as the 'Waste Act' [Dz.U. 2011 nr 152 poz. 897 z późn. zm.].

For commune residents, the changes in waste management in 2012 meant the need to adapt to new waste segregation rules, as well as an increase in waste disposal fees, because the collection and transport of waste to landfills or processing plants was undertaken by private companies selected in a tender procedure. Waste management in accordance with EU guidelines had to meet the principles of sustainable development, which meant taking into the account reuse and recycling in waste processes in accordance with the hierarchy of recovery values of secondary raw materials. The transition of the economy of European Union countries to closed circulation in 2015 resulted in further changes in the principles of waste management, as well as in the circulation of packaging. In the circular economy model, waste recycling has become a priority, while strictly limiting waste disposal through landfilling and incineration. In the conditions of a closed-loop economy, municipalities should pursue two waste management goals: implement an efficient

waste collection system, and ensure appropriate levels of recycling [Pichel 2014, OECD 2015]. New tasks in the field of municipal waste management constitute a challenge for municipalities, especially for those that have invested funds in waste incineration plants. It should be noted that municipal waste management is a complex undertaking, i.e. it goes beyond local public tasks due to the need for contact with the free market environment, implementation of variable government regulations, and cooperation with various entities operating in the commune [Albin 2018].

Municipal waste management carried out by communes takes place in specific social conditions, including the relations between the municipality board and the local community and between the commune and economic entities operating in its area. Residents constitute by operation of law a unit of local government, which is a commune. The commune–resident relationship should be characterized by a balance based on partnership in cooperation between the commune, property owners and entities conducting business activities in the field of waste management. The social activity of residents is important for the effectiveness of collecting recyclable materials by facilitating selective waste collection and caring for the condition of waste collection containers belonging to the local community [Ziora and Pasko 2018].

The material presented in the article is divided into sections covering the introduction, presentation of research methods, characteristics of municipal waste, description of the circular economy, ecological education of society, social aspect of waste segregation, and costs of its collection. The final summary includes conclusions from the presented research.

Materials and methods

The authors of the article studied legal acts and documents concerning the functioning of the municipal waste management system in Poland, such as parliament acts, government regulations, and resolutions of local government councilors in terms of their impact on social life. Also, source materials available on the Internet were studied, including waste industry expert opinions and opinions of specialists from non-governmental organizations, councilors, and local government experts. In addition, a review of the national, regional and local government press was carried out. Also, an observational method was used to identify places where sorted waste is collected and to observe the behavior of residents in keeping the streets clean, which was documented with the photos included in the article.

The authors of the article based their research on knowledge in the field of return logistics as well as their experience gained in activities in regional self-government authorities and local government administration.

In particular, the period 2017–2023 was taken into consideration because in 2017, the regulation of the Minister of the Environment on the detailed method of selective collection of selected waste fractions from 29 December 2016 came into force [Dz.U. 2017 poz. 19 z późn. zm.]. This ministerial regulation introduced a uniform system of municipal waste segregation throughout the country.

Characteristics of municipal waste

Municipal waste generated in municipalities includes primarily waste from households, but also from public utility and service facilities. Since municipal waste is classified under the 'Waste Act' as waste constituting a potential source of secondary raw materials, its collection requires well-organized selection at many stages. Municipal waste can be divided into several groups [Zygadło 1999]:

– household (domestic) waste related to people staying in a place of residence, such as food leftovers, packaging, used household items,
– bulky waste, i.e. car wrecks, furniture, TVs, washing machines, refrigerators,
– waste from public utility facilities, i.e. educational, cultural, sports, administrative and office facilities,
– green waste, i.e. biological waste from the maintenance of urban green areas and home gardens,
– street waste collected in street bins and sweepings from streets and squares,
– rubble and soil from construction and renovation works,
– snow and ice removed from streets and squares in winter.

The quantitative composition of municipal waste depends on the type of development (urban, rural, low-rise, high-rise), technical and sanitary equipment of the buildings, saturation of the area with service facilities and other non-residential facilities (schools, offices, parks), and on the wealth of the inhabitants, whether they have home gardens, and even on the season [Christian et al. 2003].

Impact of the circular economy on waste management

The circular economy is an economic model based on the closed cycle of product life. Closed loop means that after the maximum potential of a product has been used in its life cycle, the product is reused and thus returns to the life cycle [Einsenrizgler 2020, Kovacic et al. 2020]. In this way, the natural resources of raw materials can be saved, so the amount of waste generated is reduced. EU directives on the development of a circular economy favor the reuse and recycling of waste, with a strict limitation of disposal through landfilling and incineration. Burning waste is prohibited because it requires energy from the processing of other raw materials and is a source of new pollutants. However, after consultations with experts, environmentally harmless incineration of high-calorie waste with heat and electricity recovery was allowed. These activities are part of the search for ways to replace conventional sources with alternative sources, because in terms of energy, 1 ton of coal corresponds to 2–3 tons of municipal waste [Ewijk and Stegemann 2023].

The circular economy affects not only the way waste is managed but also the circulation of packaging, because product packaging becomes waste after unpacking or use. In May 2018, the Council of the European Union adopted new regulations regarding waste packaging. These directives require the recycling of at least 55% of municipal waste by 2025, 60% in 2030, and 65% in 2035. By 2050 , only 10% of municipal waste will be allowed to go to landfills [Rydygier and Bril 2020b].

It should be noted that the processing of secondary raw materials is a less burdensome process for the environment than the processing of primary raw materials, so recycling contributes to climate protection.

Thanks to recycling, waste becomes valuable again and instead of ending up in a landfill, it is transformed into raw materials for the production of materials. Secondary raw materials are processed in the order to limit the exploitation of primary, non-renewable raw materials (e.g. crude oil), the earth's resources of which are rapidly decreasing [Christian et al. 2003]. Waste recycling enables:

– processing and use of secondary raw materials into new materials,
– saving space in landfills,
– limiting the amount of harmful waste to those that are difficult to decompose,
– reducing the consumption of natural resources,
– reducing energy consumption,
– reducing air pollution,
– reducing the overall amount of waste and sewage.

European Union directives provide for the imposition of penalties on municipalities for failure to meet the required levels of waste recycling. The main reason for processing installations is the insufficient quality of waste delivered from municipalities. To recover certain raw materials, the recycler must source very high-quality clean waste. The problem here is that selective waste collection at the source and proper segregation depend on ecological awareness and disciplined residents. The social aspect of raw material recovery and waste recycling also involves promoting new forms of economic activity and creating new jobs, which results in alleviating local social problems.

Social aspect of waste segregation

The principles of waste segregation introduced in 2013 by amending the Act on maintaining cleanliness and order in municipalities corresponded to the EU waste management directives while respecting the principles of sustainable development. Waste segregation is one of the methods of reducing the amount of waste intended for disposal by recovering raw materials that can be reused or used for the production of new materials. Processes leading to the repeated recovery of materials, or the acquisition of raw materials, are referred to as recycling. Pre-separation of waste reduces the amount of waste in landfills and facilitates its recycling in processing plants [Zygadło 1999, Christian et al. 2003, Buclet 2010].

The social aspect of waste segregation includes obligations imposed on residents as waste producers, including the method of segregating waste at the source specified by local authorities. In the case of waste management, residents are not passive recipients of services provided by business entities, and their role and rank are gradually increasing. It is expected that, in the long term, the participation of residents will become the foundation of municipal waste management. Residents' obligations can be enforced in various ways, starting from a system of penalties, through systems of various incentives, to active participation in building the system. The applied system of penalties will encounter resistance and disapproval, therefore it is advisable for the local government authorities and the residents, who should be aware of the common goals in the field of waste management, to cooperate. Municipalities organize the segregation of municipal waste by collecting waste generated by residents into specially marked con-

tainers divided by the type of raw material from which they were produced. The term ‘separation at source’ means the selection of waste carried out on-site in households. In practice, waste segregation in municipalities takes place as bag segregation or container segregation [Sobczyk 2016].

Segregation into bags involves collecting waste into special plastic bags provided by the commune and is carried out mainly in single-family housing estates. Container segregation applies to people living in blocks of flats and tenement houses, where sets of appropriately marked containers are placed. Hazardous waste can only be stored in special landfills or in properly secured parts of municipal landfills, which is why it is delivered by residents to special points called PSZOK (Polish acronym for Selective Collection Point for Municipal Waste) [LaGreda et al. 2010]. Until 2017, municipalities were free to determine the fractions of waste collected; some used a two-fraction system, others three or more. In Warsaw, segregation covered three groups of waste: dry waste (in red containers), glass waste (in green containers) and mixed waste (in black containers). For residents, this meant a serious change in the segregation rules, as they were used to separating paper from metal and glass. From July 1, 2017, the Ministry of the Environment introduced unified waste segregation rules by ordinance [Dz. U. 2017 poz. 19 z późn. zm.]. The unification of the waste segregation rules was necessary due to the adaptation to new EU directives related to the transition of the EU economy to a closed loop. According to unified segregation, waste should be collected in four different colored containers: glass (green), paper, including cardboard (blue), biodegradable waste with a particular emphasis on bio-waste such as kitchen waste (brown) and plastic and metals (yellow), mixed waste is collected in black containers (Fig. 1). The collection of the so-called ‘electrical garbage’ containing electrical waste, light bulbs, batteries, and cells phones is organized by municipal district offices, as well as by selected stores (Fig. 2).

Figure 1. Waste containers for uniform segregation
Rysunek 1. Pojemniki do jednolitej segregacji odpadów

Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

Figure 2. Electrical waste collection at a shop
Rysunek 2. Zbiórka śmieci elektrycznych w sklepie

Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

Areas for collecting bulky waste have been designated around residential houses (Fig. 3). From March to November, the collection of green waste is organized in appropriate bags for leaves, grass clippings and shredded branches (Fig. 4).

Figure 3. Separate place for bulky waste
Rysunek 3. Miejsce na odpady wielkogabarytowe

Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

Figure 4. Bags for green waste
Rysunek 4. Torby na odpady zielone

Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

In terms of waste segregation, local authorities should strive to achieve the highest possible level of segregation, taking into the account the cost factor, but the threshold of acceptance by the local community cannot be exceeded.

Ecological education of society

Educational campaigns implemented by municipalities focus on informing about the principles of waste segregation, but they do not explain why waste should be segregated, nor do they provide instructions on how households can limit the production of waste. Therefore, there are no elements in educational campaigns that shape the ecological awareness of society.

Large cities have greater opportunities to conduct educational campaigns than small municipalities. Since February 2020, the second educational campaign has been carried out in the capital of Warsaw in connection with new segregation rules forced by the introduction of a closed-loop economy. The previous campaign was criticized for the excessive artistic expression of its posters at the expense of their content. Information about proper waste segregation is disseminated on posters at bus and tram stops (Fig. 5), as well as on large billboards placed in visible places (Fig. 6). In the new educational campaign, advertising in metro stations was abandoned.

The educational campaign being implemented is of an instructional nature, but to explain to society how to deal with waste in a circular economy, a broad social educational campaign at the government level is needed, also due to the costs involved. To be

Figure 5 Poster on a bus stop shelter
Rysunek 5. Plakat na wiacie przystanku

Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

Figure 6. Advertising on a large billboard
Rysunek 6. Reklama na dużym bilboardzie

Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

effective, the campaign must include television, and the messages should occupy prime time advertising space. In addition to the transfer of knowledge. It is also necessary to make eco-products made from recovered materials fashionable.

In large cities, non-governmental organizations organize various pro-ecological campaigns with the help of local municipal authorities, rewarding people who segregate waste. As a part of such actions, recycling machines were set up in Warsaw. This recycling machine is very similar to a parcel locker, but instead of dispensing parcels, it accepts PET bottles, glass bottles, and cans. The user must download the appropriate application, create an account in it, and, after receiving their QR code, scan it in the recycling machine. Points are awarded for each item of raw material thrown into the recycling machine, which can later be converted into discounts on coffee or cinema or theater tickets. Coca-Cola and the 'Our Earth' Foundation are jointly responsible for the project. The Coca-Cola company, as a large producer of carbonated drinks that produces tons of waste, wants to encourage people to recycle packaging.

Artists are involved in promoting waste recycling among society by designing furniture and clothing from recycled materials and even creating works of art from waste (Figure 7). Employees of a scrap warehouse in Pruszków city near Warsaw create sculptures from scrap depicting various vehicles and characters from science-fiction films. The local city authorities opened a special pavilion for these sculptures named the Museum of Steel Figures. Schools organize student trips to this museum, which also organizes exhibitions in various Polish cities (Figure 8).

Ecological education of residents is an important element of the entire municipal waste management system. Effective ecological education should be continuous, consistent, and planned in the long term, in such a way that the resident themself sees the effects of their efforts, otherwise they will treat top-down education as an a nuisance. It should be noted that the use of penalties is not the right solution when organizing waste segregation, as it causes resistance and dissatisfaction among residents. Ecological education should

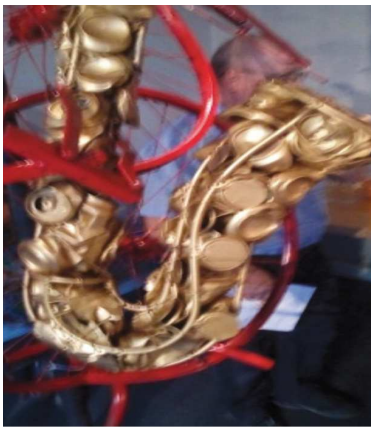

Figure 7. Exhibition at K&K Art Gallery in Warsaw
Rysunek 7. Wystawa w Galerii K&K Art w Warszawie

Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

Figure 8. Exhibition of steel figures in Warsaw
Rysunek 8. Wystawa figur stalowych w Warszawie

Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

reach the recipient directly, then it must be borne in mind that all leaflets, even those delivered directly to homes, are not always read. Posters at bus stops and in the subway as well as advertising on billboards are good solutions for mass information transfer. The role of schools in the ecological education of society is also very important because children educated at school can pass the acquired knowledge on to their parents.

Social aspect of keeping streets clean in urban communes

Municipal waste also includes waste collected from the streets by the relevant city cleaning services. The social aspect of maintaining cleanliness in public space is manifested in the behavior of residents who ignore the individual responsibility of a member of the local community for the cleanliness of their city.

Cleaning waste from the streets

Special waste bins are installed on the streets, especially at public transport stops, in parks, squares and boulevards. These bins are emptied at night by city cleaning crews. In the capital, the organization of garbage collection from street bins involves replacing garbage bags placed in bins and taking them away in small trucks at night. Unfortunately, these organized activities have been found insufficient, because during the day, the bins start overflowing and garbage spills onto the sidewalks, and residents litter the lawns and sidewalks, especially near bus stops and grocery stores (Fig. 9). Drinking alcohol in the vicinity of grocery stores (and throwing away empty bottles or cans) is a social plague, despite the ban on drinking alcohol in public places. City services are unable to overcome such heavy littering of the streets by residents who believe that they bear the costs of cleaning the city and therefore do not show social solidarity in taking care of the city's appearance.

Garbage thrown into street bins should be prepared at least a little in advance so that it takes up as little space as possible: drink cartons should be crushed, just like plastic bottles. It can also be observed that waste from residential premises is thrown into street bins instead of into the previously mentioned trash containers in garbage arbors allocated to blocks of flats. The streets are also littered with posters and advertising leaflets stuck to lamps, road signs, gutters, and shelters at tram and bus stops (Fig. 10). Unfortunately, without observing the culture of social life, it is impossible to keep a big city clean. Work in municipal purification services is low paid and employees, contemptuously called 'garbage collectors', have low social prestige.

Figure 9. Garbage in a street bin
Rysunek 9. Śmieci w ulicznym koszu
Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

Figure 10. Advertisements stuck to a gutter
Rysunek 10. Prywatne reklamy przylepione do rynny
Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

Collecting rubble from renovated apartments

Waste generated in municipalities also includes waste that must be disposed of by its producers. Such waste includes rubble produced during the renovations of apartments. The owner of an apartment in who wants to renovate it themself must order a dumpster from a specialist company and pay for the removal of the waste generated by this renovation, such as rubble, scratched plaster, and paint containers. Depending on the size of the planned renovation, the company provides an open container or a large bag, which is placed on the sidewalk during the renovation (Fig. 11). Unfortunately, it sometimes happens that residents throw the garbage from their apartments into these containers or bags, instead of taking it to the containers in the closed garbage sheds assigned to a spe-

cific building. In the case of large waste bags, they sometimes stay on the sidewalks for a long time, and the garbage spilling out of them makes the street look unpleasant. Such a bag filled with waste lying on the sidewalk is a nuisance for the owners of the property adjacent to the sidewalk. If it is not known which company placed the bag, it seems that the property owner will have to remove it at their own expense due to the mixed contents. Municipal services collect waste from containers in garbage sheds and from street garbage bins. Such an overflowing bag may remain on the sidewalk for a long time unless residents or owners of a neighboring property file a complaint with the City Hall. It sometime happens that such overflowing bags can remain on the street for up to a year, which happened in 2023 near the headquarters of the public television campus in Wierzbno, part of the Mokotów district in Warsaw (Fig. 12).

Figure 11. Container for renovation waste
Rysunek 11. Kontener na odpady po remoncie
Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

Figure 12. Overflowing rubble bag
Rysunek 12. Przepełniona torba na gruz
Source: photo by E. Rydygier
Źródło: zdjęcie E. Rydygiera

Social problem of fees for waste disposal

Inefficient waste management is causing waste collection fees to constantly increase. These increases in garbage disposal fees are inevitable, as waste treatment costs are currently underestimated.

With the introduction of the new waste segregation rules, municipalities began to increase the rates paid by residents, and other solutions for calculating waste disposal fees provided for in the new regulations were introduced. For example, in Warsaw, in February 2020, the City Council adopted new rules for charging fees based on a lump sum [Dz. Urz. Woj. 2019.152]. The fixed monthly fee for collecting separated waste from a single-

family house was PLN 94, and from an apartment in a block of flats or tenement house was PLN 65. In the case of unsorted waste, the fee was charged twice. These rate changes were most harmful to people living in their own apartments, as they faced an increase in fees by up to 600%. Multi-person households were charged the lowest fees.

In December 2019, the City Council wanted to link garbage collection fees to the square footage of apartments. This would mean price increases, especially for single and elderly people who live in large apartments from which children have moved out, so at the last minute before the vote, councilors of the majority club set a lump sum for apartments (PLN 65) and single-family houses (PLN 94).

However, due to the residents' objection to the flat-rate fee, at the meeting on October 15, 2020, the City Council adopted a resolution on new rules for calculating waste management fees, which introduced a solution different to the flat-rate fee provided for in the regulations, i.e. the amount of the fee depended on the quantity of water used. It was agreed that the monthly fee for single-family houses, multi-family apartments and mixed properties will be calculated according to the formula: PLN 12.73/m^3. Unfortunately, this new solution was also criticized by residents and experts, so it was changed.

After attempts to charge fees for garbage collection based on a lump sum and the level of water consumption in the household, the Warsaw City Council adopted a system for charging fees for municipal waste management, which assumes that the rates are charged per household [Dz.Urz. Woj. 2021.10074]. In multi-unit buildings, the monthly fee is PLN 85 per household. Owners of single-family houses pay PLN 107 per month. If the owner decides to compost bio-waste, they receive relief of PLN 9, which brings the fee down to PLN 98.

If the property consists of several parts, one of which is occupied by residents and the other part also generates waste, we calculate the total fee differently. This is, for example, a residential building with commercial premises. The fee is then the sum of the fees calculated for the individual parts of the property:

– for the part where residents live − the product of the number of households and the fee rate of PLN 107 (for a single-family house) or PLN 85 per unit (for a multi-unit development),
– for the part where no residents live and municipal waste is generated (e.g. service premises in the building) – the product of the number of containers, the number of times they are emptied and the fee for a container with a specific capacity (calculated jointly for this part of the property).

The City Council set the fee for the property on which a summer house is located at PLN 181.90 per year for each holiday house on the property. If there is no house on the property that is used for recreational purposes, the payment is PLN 181.90 per year for the property.

Owners of properties where no residents live and municipal waste is generated (e.g. shops, hotels) are obliged to dispose of municipal waste on their own. Owners must conclude a waste collection contract with an entrepreneur entered in the register of regulated activities in the field of municipal waste collection.

It was found that the rates for garbage collection were too high. In 2023, the Regional Chamber of Audit showed in its assessment of the implementation of the 2022 budget by the Warsaw Management Board that the city's income from municipal waste management amounted to PLN 1 billion and 80 million, while the total expenses related to waste collection and management amounted to PLN 895.7 million. Councilors from the opposition party asked the Warsaw authorities to reduce the fees. In response, the Management Board indicated that, in accordance with applicable regulations, funds from the municipal waste management fee can only be used for purposes related to the waste management system, therefore the surplus for 2022 was allocated to financing the municipal waste management system in 2023–2025.

Currently, however, the Mayor of Warsaw is planning to reduce garbage collection fees. The Warsaw City Hall calculated the revenues from fees and the costs of operating the system and it was determined that, for the second year in a row, residents have paid more than the expenses for the service. The Mayor of Warsaw, Rafał Trzaskowski, announced that the planned reductions in fees will result in rates of PLN 91 in single-family buildings and PLN 60 in multi-family buildings. The change in fees is expected to come into force in mid-2024. The mayor's proposal must still be accepted by the City Council.

Conclusions

In delegating waste management to the municipalities, the legislator did not anticipate that, in the conditions of a circular economy, the tasks entrusted to the municipalities would become significantly more complicated and would involve higher costs. Switching the EU economy to a circular economy changes the paradigm of dealing with pollution and environmental protection. Waste management and packaging circulation are areas of the economy that are particularly sensitive to changes caused by the circular economy. Local communities were suddenly burdened with new obligations regarding waste segregation and increased waste collection fees, which sparked resistance from residents. Organized educational campaigns only disseminated waste separation instructions and did not explain the reasons for the changes imposed from above. Meanwhile, if ecological awareness is not developed among the residents, the implemented changes encounter social resistance. Municipalities need cooperation with the local community, therefore introducing penalties is not advisable. In the conditions of a closed-loop economy, municipalities especially expect state support. A comprehensive reform of the entire waste management system is required, especially regarding financial support for municipal investments in recycling, reducing waste collection fees, introducing full producer responsibility for packaging, as well as more effective ecological education of society shaping ecological awareness of the need to exist in a circular economy. Without specific state aid, municipalities will not be able to carry out public tasks related to waste management. There is currently conflict between local government authorities and the government, which, for example, has become more acute in the controversial setting of fees for garbage disposal by municipalities.

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