

# IMPLEMENTATION OF WASTE MANAGEMENT PROGRAM: CASE STUDY OF SELF-GOVERNMENT UNIT OF BAČKI PETROVAC IN SERBIA

## IMPLEMENTÁCIA PROGRAMU ODPADOVÉHO HOSPODÁRSTVA: PRÍPADOVÁ ŠTÚDIA SAMOSPRÁVNEJ JEDNOTKY BAČKI PETROVAC V SRBSKU

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### I. Introduction

Waste Management Program of the Republic of Serbia (hereinafter WMP; Serbia) for the years 2022–2031 has been accepted by the Government of Serbia at a session which took place on 28th of January 2022<sup>(1)</sup>. Forerunner of the WMP was

<sup>(1)</sup> Program upravljanja otpadom u Republici Srbiji za period 2022 – 2031 (2022).

#### Abstract (EN)

As part of the negotiations for EU accession, the Republic of Serbia through Chapter 27 (Poglavlje 27 u Srbiji: Napredak pod ključem<sup>(1)</sup>), has begun the process of establishing a waste management system and adapting it to the goals and *acquis communautaire*<sup>(2)</sup>. The key document in Serbia that aims for environmental awareness is called the Waste Management Program of the Republic of Serbia. Followed by the Waste Management Program of the Republic of Serbia, the Regional Waste Management Plan for 2019–2028 has been created and is addressing waste management and establishing a Regional Centre in the city of Novi Sad for Waste Management. Furthermore, the Local Waste Management Plan for the self-government unit of Bački Petrovac has been adopted in May 2021.

<sup>(1)</sup> Alternativa za bezbednije hemikalije, Beogradska otvorena škola, Centar za unapređenje životne sredine, Društvo za zaštitu i proučavanje ptica Srbije, Inženjeri zaštite životne sredine, Jedan stepen Srbije, Mladi istraživači Srbije, Mreža za klimatske akcije Evrope (CAN Europe) i Svetska organizacija za prirodu Adria – Srbija (WWF Adria – Serbia). 2021. Koalicija 27 Poglavlje 27 u Srbiji: „Napredak pod ključem“.

<sup>(2)</sup> Set of laws and all juridical procedures which constitute the body of European Union Law.

#### Keywords (EN)

waste management program, regional waste management plan, local waste management plan, Serbia, Bački Petrovac

the Waste Management Strategy (hereinafter Strategy) for the years 2010–2019 and was implemented based on the conditions for the establishment and development of an integrated WM system in Serbia<sup>(2)</sup>. If we compare the process of adoption and content of Serbian WMP with the Slovak one, we can state as follows: Slovakia (SR) as an EU member state has enacted not only WMP SR 2021 – 2025, also the Waste Prevention Program SR 2019 – 2025, and the Environmental Strategy until 2030. The overarching goal of these strategic documents is to achieve a higher level of environmental quality and waste recycling.

The reasons why the new document in Serbia was not adopted on time are unknown, as well as why the name was changed from the Strategy to the WMP. Based on the WMP, Waste Management Act (hereinafter WMA): 36 / 2009–115, 88 / 2010–

<sup>(2)</sup> Strategija upravljanja otpadom za period 2010–2019 (2010).

#### Abstrakt (SK)

V rámci rokovaní o vstupe do EÚ, Srbská republika prostredníctvom kapitoly 27 (Poglavlje 27 u Srbiji: Napredak pod ključem) začala proces zriaďovania odpadového hospodárstva, jeho prispôsobenia cieľom a *acquis communautaire*. Kľúčový dokument v Srbsku, ktorý sa zameriava na environmentálne povedomie, sa nazýva Program odpadového hospodárstva Srbskej republiky. V nadväznosti na Program odpadového hospodárstva Srbskej republiky bol vytvorený Regionálny plán odpadového hospodárstva na roky 2019 – 2028, ktorý rieši odpadové hospodárstvo a zriaďuje Regionálne centrum odpadového hospodárstva v meste Nový Sad. Okrem toho bol v máji 2021 prijatý Miestny plán odpadového hospodárstva pre samosprávný celok Bački Petrovac.

#### Kľúčové slová (SK)

program odpadového hospodárstva, regionálny plán odpadového hospodárstva, miestny plán odpadového hospodárstva, Srbsko, Báčsky Petrovec

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170, 14 / 2016–17, 95 / 2018–267 has been implemented in the practice. Following WMA, regional waste management plan of city of Novi Sad and local waste management plan for the self-government unit of Bački Petrovac (hereinafter BP) has been executed.

## II. Objective and Methodology

The paper's theoretical foundation is based mostly on an interpretation of Serbia's amended WMP legislation and strategic documents.

The research study includes information on Serbia's WMP, the city of Novi Sad's regional waste management plan, and the self-government unit of BP's local waste management plan. The local waste management strategy for the BP public utility business Komunalac and Gloakvalis self-government unit has been discussed. Data from Eurostat (assessed period 2011–2019) were utilized in the study paper, including data on municipal waste by waste management operations and the recycling rate of municipal garbage in Serbia, as well as data for Komunalac and Gloakvalis for the year 2021. Only data up to 2019 was available from Eurostat for Serbia, based on the most recent local document for 2021. The goal of this research study is to provide a critical assessment of the Serbian Waste Management Program's adoption process and content.

## III. Results and Discussion

### 3.1 Waste Management Program of Republic of Serbia

As stated in WMP, progress in the previous period has been made in harmonizing waste management (hereinafter WM) regulations with European Union (hereinafter EU) regulations, in institutional strengthening and reaching regional agreements for the establishment of joint waste management, as well as in the construction of a number of sanitary landfills. In the EU, legislation and waste recovery strategies aim to reduce landfill waste by separating its components in the recycling process<sup>(3)</sup>. However, differences in terms of waste handling among the EU member states are immense. Slovakia belongs to the lowest quartile of EU states in terms of waste volumes disposed of by landfilling<sup>(4)</sup>.

The goals set by the Serbian Strategy have not been fully achieved, particularly in the scope of organized waste collection, the degree of primary waste separation and recycling, infrastructure construction of waste disposal at unsanitary landfills and dumps, application of economic instruments and establishment of sustainable WM financing system. Accordingly, the Ministry of Environmental Protection (hereinafter: The Ministry) coordinated the development of the WMP in order to achieve continuity in the implementation of WM policy and its harmonization with EU regulations and standards. Despite the fact that the Serbia has a primary separation law that requires the separation of plastic, paper, glass, and

metal in specially marked containers, separate collection does not work in practice (with the exception of some local governments). One of the principles that will be applied in order to ensure a financially sustainable WM activity is the “polluter pays” (Zagađivač plaća – Plati koliko zagađuješ) principle. Polluters must bear the full cost of their activities' consequences, and waste collection, treatment, and disposal costs must be included in the product's price. The full cost recovery principle should be applied to waste collection and disposal services, as well as the introduction of financial incentives for waste reuse and recycling. Another innovation is the “Pay as much as you throw away” (Plati koliko baciš) principle, which allows households and legal entities to have a say in how much they pay for municipal waste collection services. They may require a lower amount of waste fees if they separate waste at the point of origin, or those who compost.

As it can be seen in Fig. 1, generated, treated and disposed waste by incineration and other (D1–D7, D12) has been used. However, disposal – incineration (D10) and energy recovery (R1) it is not implemented yet.

In Fig. 2, recycling rate of municipal waste in Serbia is described. Based on the figure, recycling rate is decreasing because awareness of the benefits of recycling exists, but the conditions for this process are not fully implemented. No data is available after the year 2018.

Further as it is written in the WMP, a component of “home composting” will be included in a package of support for local governments and citizens dealing with biodegradable waste at home. This measure focuses on rural areas, where home composting space is more readily available and where the benefits of reducing separate collection and transportation costs are greatest. In rural areas, all households will be given home composters and will make their own compost.

### 3.2 Regional Waste Management Plan of city of Novi Sad

In accordance with the WMP, the self-government unit (municipality) of BP agrees that it needs to be part of the Regional Waste Management Centre for the City of Novi Sad and the municipalities of Bačka Palanka, Bački Petrovac, Beočin, Žabalj, Srbobran, Temerin and Vrbas for the period 2019–2028<sup>(5)</sup> (Fig. 3).

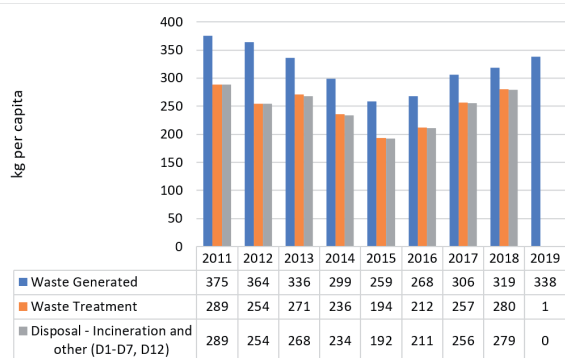
Currently, underground containers have been installed in the City of Novi Sad, and a system of primary separation of waste into two streams (mixed recyclable and residual waste) has been introduced. The Regional Waste Management Plan for the Waste Management Region proposes the construction of two transfer stations (in Bačka Palanka and Vrbas), while waste collected from other municipalities in the Region would be transported directly to the Regional Centre in Novi Sad. Calculations show that the construction of the transfer station in Bačka Palanka is economically justified, while the transfer of the station in Vrbas is economically viable if waste collected from the neighbouring municipality – Srbobran – is transported to Vrbas.

<sup>(3)</sup> Marišová, Valenčíková (2021).

<sup>(4)</sup> Mariš–Marišová (2021).

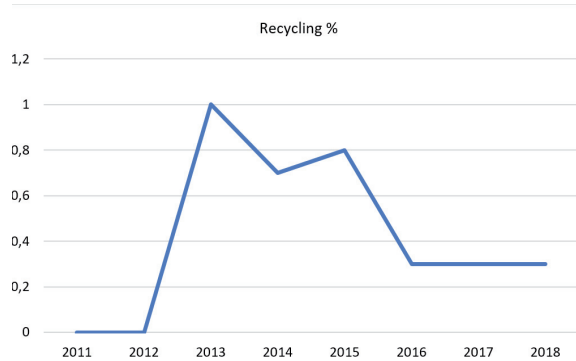
<sup>(5)</sup> Grad Novi Sad (2020).

**Figure 1: Municipal waste by WM operations**



Source: own processing based on Eurostat, 2022

**Figure 2: Recycling rate of municipal waste in Serbia**



Source: own processing based on Eurostat, 2022

### 3.3. Local Waste Management Plan of municipality of Bački Petrovac

The local WM plan is a document that organizes the WM process at the municipal / city level. The local plan is adopted for a period of 10 years, and is reviewed every five years.<sup>(6)</sup> The Law on Waste Management “ No. 36/09, 88/10, 14/16 and 95/18 – other law) defines the obligation to develop local and regional WM plans that should be mutually harmonized with the WMP of Serbia<sup>(7)</sup>.

The municipality of BP a municipality located in AP Vojvodina and belongs to the South Bačka district. In 2020, according to the Statistical Office of the Republic of Serbia, 12 605 inhabitants lived in municipality of BP<sup>(8)</sup>. In Fig. 4, location of self-government unit has been located.

In the Tab. 1., competences of Serbia, Autonomous Province (hereinafter AP) of Vojvodina as well as local self-government unit of BP has been identified.

Only a company that is constantly working to improve its procedures and processes and participates in developing new products and services that can bring innovations to custom-

<sup>(6)</sup> Lokalni plan upravljanja otpadom za opštinu Bački Petrovac (2011).

<sup>(7)</sup> Zakon o upravljanju otpadom: 36/2009-115, 88/2010-170, 14/2016-17, 95/2018-267.

<sup>(8)</sup> Statistical Office of the Republic of Serbia (2021).

**Figure 3: Regional Spatial Plan of City of Novi Sad**

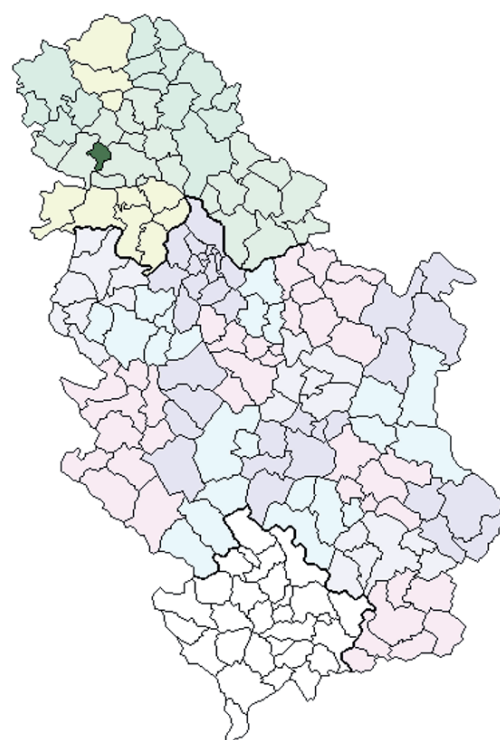


Source: Official gazette of the city Novi Sad<sup>(1), (2)</sup>

<sup>(1)</sup> Službeni list grada Novog Sada (2012).

<sup>(2)</sup> Službeni list opštine Beočin (2020).

**Figure 4: Self-government unit of BP in Serbia**



Source: Self-government unit (municipality) of BP, 2022<sup>(1)</sup>

<sup>(1)</sup> Opština Bački Petrovac (2022).

ers can be successful on the market<sup>(9)</sup>. Communal activities in the municipality of BP, for the settlements of Bački Petrovac, Kulpin and Maglič are performed by the public communal company “Komunalac” from Maglič, while Gloakvalis l.l.c collects waste in Gložan. In “Komunalac”, 7 workers are employed for an indefinite period, while 1 worker is employed under a contract. Komunalac is responsible of waste collection

<sup>(9)</sup> Mura (2021).

Table 1 Competences of state, AP and local self-government unit

| Ministry                                                                                                                                                                                                                                              | AP of Vojvodina                                                                                                                                                                                                              | Local self-government unit – BP                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| develops national policy and national WMP                                                                                                                                                                                                             | participates in the development of the Strategy and individual national WM plans                                                                                                                                             | adopts a local WM plan, provides conditions and takes care of its implementation; defines local policy                                                                                                                                           |
| prepares draft legislation harmonized with EU legislation                                                                                                                                                                                             | adopts the WMP of protection and development of the environment on the territory of the AP and determines the measures for its implementation in accordance with the basic goals determined at the republic level            | regulates, provides, organizes and implements the management of municipal, ie inert and non-hazardous waste on its territory                                                                                                                     |
| coordinates WM activities of importance to the Republic and monitors the situation                                                                                                                                                                    | coordinates WM activities of importance for the AP and monitors all environmental factors and authorizes professional organizations to perform these activities in the territory of AP Vojvodina                             | determines the prices of communal services                                                                                                                                                                                                       |
| adopts regional WM plans other than those in the territory of the AP                                                                                                                                                                                  | adopts regional WM plans on its territory                                                                                                                                                                                    | performs communal inspection supervision and supervision in the field of environmental protection                                                                                                                                                |
| performs functions in accordance with international treaties and agreements                                                                                                                                                                           | issues permit, consents, certificates and other acts in accordance with the Law on WM as well as other laws, keeps records and submits data to the Ministry                                                                  | establishes fees and penalties                                                                                                                                                                                                                   |
| issues permit for import, export and transit of waste, i.e. manages chemicals, hazardous and noxious substances and waste, including the production and trade of poisons and transboundary movements of waste in accordance with the Basel Convention | forms an information subsystem on environmental protection and improvement and on waste, as part of a single information system of the Serbia                                                                                | provides financing for the performance of activities within its competence, determines the collection procedure and collects local utility fees, including the collection of services in the field of municipal, i.e. inert and non-hazardous WM |
| manages or coordinates the implementation of large investment projects in the field of waste financed from international or domestic sources                                                                                                          | performs administrative supervision in all areas of environmental protection and WM, except in the areas of hazardous substances and biodiversity conservation, and takes measures for effective elimination of illegalities | issues permits for the collection and treatment of municipal and construction waste, approvals and other acts in accordance with the Law on WM as well as other laws, keeps records and submits data to the Ministry                             |
| determines authorized organizations regarding WM                                                                                                                                                                                                      |                                                                                                                                                                                                                              | controls the activities of the company with which it has contracted the services of collection, transport and disposal of municipal waste                                                                                                        |
| establishes and develops information system on waste on the territory of the Republic                                                                                                                                                                 |                                                                                                                                                                                                                              | supervises and controls WM measures                                                                                                                                                                                                              |
| performs inspection supervision and control of the application of WM measures                                                                                                                                                                         |                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                  |

Source: local WM plan, 2021 (not yet published publicly)

of 4193 households. “Gloakvalis” deals with the management of municipal waste from the territory of the village as well as arranging and maintaining green areas and the environment. Gloakvalis has 10 employees. Waste collection is done 1 working day, according to the plan and WMP. Gloakvalis collects waste from 747 households in Gložan. Based on that, in Tab. 2, and Tab. 3, data from the public utility company of Komunalac and Gloakvalis has been described. When it comes to data, there are no records for separated municipal, green, construction, or separated waste from the Komunalac public utility company, making it difficult to track the recycling process. These data have been provided by Gloakvalis, making the recycling process in the BP area more transparent.

The following Tables 4 and 5 show the monthly prices of

municipal waste cooperated by public utility companies such as Komunalac and Gloakvalis.

As for 2021 year, 35 inhabitants of municipality of BP received composters from Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) donation and remaining 65 composters were supported by municipality of BP<sup>(10)</sup>. The only form of composting in the municipality of BP is home composting. This type of treatment of biodegradable waste is mainly represented in households, mostly from rural areas, using the most basic techniques of biodegradation of waste. As part of the future Regional Waste Management Concept, a green waste composting plant will be built within the JKP “Gradsko

<sup>(10)</sup> Opština Bački Petrovac (2021).

**Table 2:** Data from the public utility company “Komunalac” on the amount of waste

| Type of waste collected                                        | Quantity (t / year) |
|----------------------------------------------------------------|---------------------|
| <b>Mixed municipal waste - total</b>                           | 1300                |
| From households (* estimate)                                   | 800                 |
| From enterprises and public sector (institutions) (* estimate) | 500                 |
| <b>Separated municipal waste</b>                               | no records          |
| <b>Green waste (garden and waste from green areas)</b>         | no records          |
| <b>Construction waste</b>                                      | no records          |

Source: data from local WM plan, 2021

**Table 3:** Data from the public utility company “Gloakvalis” on the amount of waste

| Type (stream) of waste collected                               | Quantity (t / year)       |
|----------------------------------------------------------------|---------------------------|
| Mixed municipal waste - total                                  | 636                       |
| From households (* estimate)                                   | 476                       |
| From enterprises and public sector (institutions) (* estimate) | 160                       |
| Separated municipal waste                                      |                           |
| Plastic                                                        | 5t- PET 4t-plastics       |
| Paper and cardboard                                            | 3                         |
| Glass                                                          | 2.1                       |
| Green waste (garden and waste from green areas)                | 600                       |
| Construction waste                                             | 490                       |
| Other                                                          | septic tanks sludges 1220 |

Source: data from local WM plan, 2021

**Table 4:** Current monthly price of waste disposal on the territory of the municipality (“Komunalac”, Maglič)<sup>(1)</sup>

| Users                   | Unit of measure      | Waste disposal (RSD)<br>Without delivery for added value |
|-------------------------|----------------------|----------------------------------------------------------|
| Population - households | per household member | 79,20 RSD                                                |
| Business sector         |                      | 457,87 RSD                                               |

Source: data from local WM plan, 2021

**Table 5:** Current monthly price of waste disposal on the territory of the municipality (“Gloakvalis”, Gložan)

| Users                   | Unit of measure | Waste disposal (RSD)<br>Without delivery for added value |
|-------------------------|-----------------|----------------------------------------------------------|
| Population - households | per household   | 232,35 RSD                                               |

Source: data from local WM plan, 2021

<sup>(1)</sup> RSD - Serbian dinar (official currency of Serbia); Medium exchange of dinars 1€ = 1117.5781 RSD. Available at: <https://www.kursna-lista.com/konvertor-valuta-EUR-RSD>.

zelenilo” in the City of Novi Sad. Green waste from the municipality of BP will also be treated at this plant. The capacity of the composting plant of JKP “Gradsko zelenilo” will be about 5,000 tons of green biomass annually, which is about 17 tons of compost material per day. Incineration and anaerobic digestion are not present in the municipality of BP.

## IV. Conclusion

Legislation and WMP in Serbia aims to reduce landfill waste by separating its components during the recycling process. Separation of bio-waste is essential, especially because it makes up a large portion of communal waste. However, a vital issue

for Serbia is that there is a lack of staff (experts in the WM sector, public utility companies and local governments) and equipment such as bins for separating communal waste. This study is unusual in that it is the first to compare the WMP of the Republic of Serbia, the Regional WM Plan of the city of Novi Sad, and the Local WM Plan of the municipality of BP. There is awareness about the benefits of recycling, but not about the conditions for it to be completely implemented. Additionally, no recycling rate goal has been set in the WMP of the Republic of Serbia. Although, there are waste management strategies accessible, no universal waste management system for all countries has yet been devised. This may be evident in policymakers’ decisions, as the national WMP follows the ideas

and norms of the regional and local WM plans; self-reflection might be seen in the areas of data collection, which is clearly lacking, more transparent and efficient communication between policymakers and stakeholders, and obtaining feedback from waste management research. To summarize, the future of waste management in Serbia should begin with data gathering, effective communication between policymakers and stakeholders, and establishing defined objectives.

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