

The story of Partizánske

October 2024



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Introduction

The story of Partizánske is one of how a relatively small municipality can take innovative steps to tackle bio-waste, one of the most common challenges municipalities still face today in regards to waste management.

In Partizánske, the story is one of how a municipality can work together with its community to develop a tailored bio-waste collection and management programme. It highlights the importance of tackling kitchen (food) and garden waste separately, as well as the need for different strategies to capture kitchen waste from individual households and multi-apartment buildings. It provides an inspiring case of how municipalities can bring waste management back into the hands of public ownership to deliver better results, for the community and local environment.

This case study looks at how the municipality adopted an approach of prioritising home composting for individual households, whilst complementing this with a different strategy for people living in multi-apartment buildings, which was based on small and regular collection rounds.

As a result of the Home Composting Development Programme, **95% of households** living in single-family houses compost independently at home. **The amount of mixed waste produced in participating households has been reduced by 118 kg per inhabitant - 36% - over the last 8 years.** Also interesting are the results of the kitchen waste collection system introduced in apartment buildings.

Further impressive results can be seen with the complementary system of kitchen waste collection in apartment buildings. Already after 2 years of implementation, on average more than 49 kg of kitchen waste has been collected per inhabitant involved, with an incredible **contamination rate of just 0.07%.** **As a result of these 2 activities, the mixed waste in Partizánske for all its participants has been reduced by 18% in 8 years.**

These results have been achieved whilst also delivering cost savings for the municipality. 2023 analysis shows that the savings made through a reduction in mixed waste and a more optimised collection system were actually higher than the total costs invested in the kitchen waste collection programme. Therefore the story of Partizánske is not only one of meaningful community engagement to deliver environmental benefits through the implementation of zero waste solutions, but also to help deliver economic benefits for the city.

Figure 1: Waste truck city of Partizánske.



1. Basic information about the city of Partizánske



Partizánske is the 32nd biggest city in Slovakia, it has almost 21,000 inhabitants. It is located in the southern part of the Trenčín region, at the intersection of the Nitra and the Nitrica rivers.

State: Slovak Republic

Region: The region of Trenčín

Area: 22.31 km² (2,231 ha)

Population: 20,388 (data from 1st January 2024)

Population density: 935.5 inhabitants/km²

Average annual temperature: 8.6C°

Altitude: 195 metres above sea level



Figure 2: Slovak landscape.



The city is divided into 9 districts, and the table below shows the population and household data for each district:

Table 1: Number of inhabitants and households per district.

District	Population (data from 1st January 2024)	Number of households AMOUNT		Average number of inhabitants per household
		In individual houses	In blocks of flats	
Velké Bielice	2,180	618	64	3.20
Šimonovany	1,668	518	16	3.12
Centrum - Bařovany	4,108	411	1,343	2.34
Štrkovec	1,588	355	329	2.32
Malé Bielice	492	159	0	3.09
Návojevč	438	136	10	3.00
Šípok	4,329	20	1,983	2.16
Luhv I	3,159	0	1,642	1.92
Luhv II	2,426	0	1,218	1.99
TOTAL	20,388	2,217	6,605	2.31

2. Waste management & municipal waste production in Partizánske

In 2023, the average production of municipal waste reached **408 kg per capita in Partizánske**, that is 1.12 kg of waste per citizen per day. The national average in Slovakia (for the year 2022) is 478 kg, higher than the Partizánske average by 70 kg.

On average, an inhabitant of Partizánske produces 202 kg of mixed (residual) waste per year (162 kg for households and 40 kg for legal entities), which is just above the national average - although if you look only at household waste then Partizánske citizens generate 21 kg of mixed waste less per year than the average Slovak.

In 2023, 41.9 % of municipal waste was sorted in Partizánske, which is 0.4 percentage point higher than the national average (41.5 %). Whilst this may not be the most ambitious or best performance result for separate collection, the story of Partizánske stands out for its unique and tailored approach to improving kitchen waste collection & management

2.1. Current waste management system

Collection, transport and disposal/recovery of municipal waste is mainly provided by the Technical Services of the City of Partizánske, whilst selected types of waste are handled by other companies. The city collects mixed municipal waste, bulky waste, and sorted components of municipal waste (see the table below for a thorough overview).

In addition to the municipal waste collection system, citizens can make use of the municipal collection yard. In the yard, the employees collect certain components of municipal waste as well as temporarily store and further sort the sorted waste from Partizánske and from the villages in the vicinity. The yard is open 6 days a week and inhabitants can bring a wide range of materials.

Table 2: Methods of collection of sorted municipal waste from household's description of containers, bins, bags used for collection, and frequency of collection.

Type of waste	Type of household	Collection method and associated containers, bins, or bags	Collection system (frequency of collection)
Paper	Houses	Blue plastic bags	Door-to-door (once a month)
	Blocks of flats	Blue containers, 1,100 litres	Curbside (once a week)
Plastic Metals Composite packaging	Houses	Yellow containers, 1,100 litres (shared collection)	Door-to-door (one a month)
	Blocks of flats	Yellow containers, 1,100 litres (shard collection)	Curbside (1-2 times a week)
Glass	Houses	Green plastic bags	Door-to-door (once every 2 months)
	Blocks of flats	Green containers, 1,100 litre	Curbside (once per 14 days)
Biodegradable kitchen and canteen waste	Houses	Home composting	N/A
	Blocks of flats	10-litre baskets and compostable bags	Door-to-door (twice every 7 days)
Biodegradable garden waste	Houses	<ul style="list-style-type: none"> - Home composting - Seasonal collection of branches (without containers) 	<ul style="list-style-type: none"> - N/A - Door-to-door (twice a year)
	Blocks of flats	Home and community composting	N/A
E-waste from households (waste from electrical and	Houses	<ul style="list-style-type: none"> - Collection announced in advance (without containers) - Containers for small e-waste 	<ul style="list-style-type: none"> - Door-to-door (twice a year) - Curbside (as needed)

electronic equipment)	Blocks of flats	<ul style="list-style-type: none"> - Collection announced in advance (without containers) - Containers for small e-waste 	<ul style="list-style-type: none"> - Door-to-door (collection twice a year) - Curbside (as needed)
Batteries and accumulators	Houses	Collection announced in advance (without containers)	Door-to-door (twice a year)
	Blocks of flats	Collection announced in advance (without containers)	Curbside (twice a year)
Clothes and textiles	Joint for houses and blocks of flats	<ul style="list-style-type: none"> - Specially adapted containers - Collection announced in advance (inhabitants use their own packaging) - Collection yard 	<ul style="list-style-type: none"> - Curbside (as needed) - Curbside (twice a year) - Curbside (year-round collection) *
Bulky waste	Houses	Collection announced in advance (without containers)	Door-to-door (twice a year)
	Blocks of flats	Collection announced in advance (in big containers)	Curbside (twice a year)
Mixed municipal waste	Houses	110-litre containers	Door-to-door (once a week)
	Blocks of flats	110- and 1,100-litre containers	Curbside (twice a week)

*Inhabitants can bring sorted waste to the municipal collection yard all year-round, Monday through Saturday, during opening hours.

** Inhabitants can bring specific types of waste to the secondary raw materials redemption point or take-back point throughout the year during opening hours.

Disposal and recovery of collected waste is done by subcontractors. Mixed waste and bulky waste is disposed of at the landfill by the company Borina Ekos s.r.o. Sorted municipal waste is handed over to several external companies and intended for recycling.

The cost of waste management, which is not covered by extended producer responsibility (EPR), is covered by a fee paid by inhabitants. When it comes to households, the yearly fee is 46.33 EUR per inhabitant. The

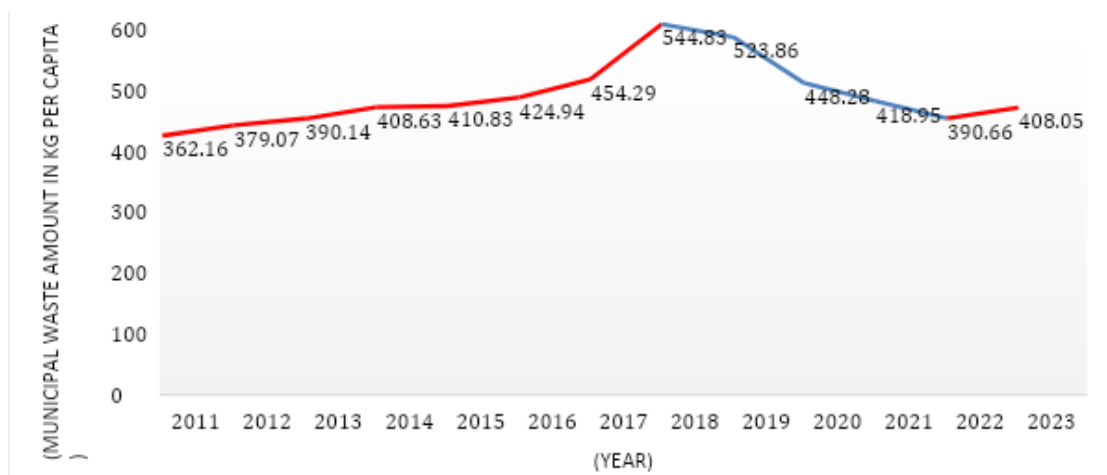
costs included in the EPR scheme (packaging and non-packaging products made of paper, plastic and glass, composite cardboard-based packaging, metal packaging, electrical and electronic equipment, batteries and accumulators) are covered by the producers through so-called "Organisations of Producer Responsibility". In the case of Partizánske, and for packaging and non-packaging products, it is a company called SEWA a. s.

2.2. Production and management of municipal waste

In 2023, **8,441.8 tonnes of municipal waste** were produced in Partizánske, which is almost 408 kg per inhabitant per year, which accounts to 1.118 kg of waste per day.

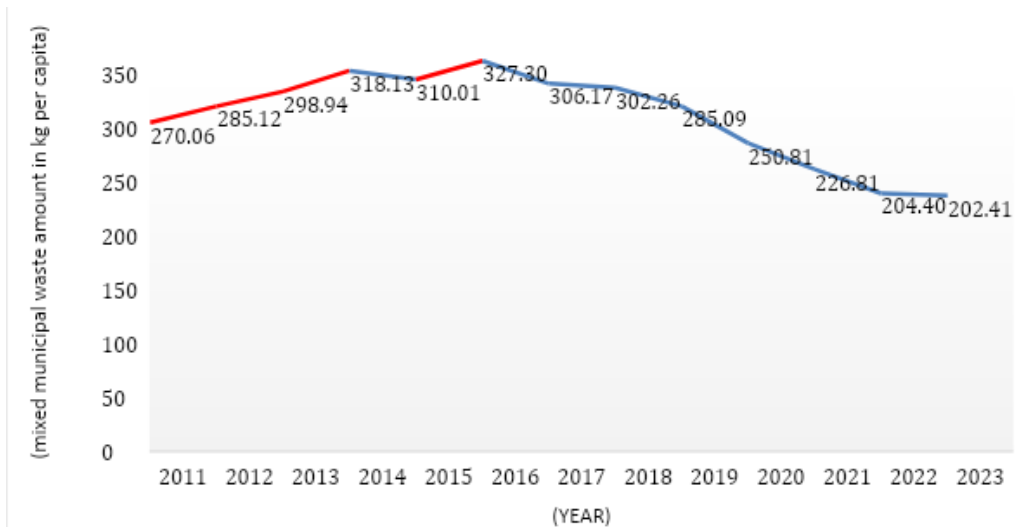
An interesting tendency can be observed when looking at the production of waste in Partizánske over the last 13 years (between 2011 and 2023). Between 2011 and 2018, there was an increase in the production of mixed waste per capita from 362 kg (2011) to 545 kg (2018). This is a staggering increase of over 50%. Since 2019, the amount of mixed waste has started to decrease year by year. In 2022, the amount of municipal waste per capita was 391 kg. This represents a decrease of over 28% compared to 2018. In 2023, although the amount of mixed waste increased again by 17.4 kg per capita, this was mainly due to 3 factors - an increase in the amount of mixed waste from businesses (9.44 kg/capita), green bio-waste from public green spaces (5.76 kg/capita) and the amount of metal waste bought by secondary raw material buyers (5.31 kg/capita).

Chart 1: Municipal waste produced in Partizánske per capita, from 2011 to 2023.



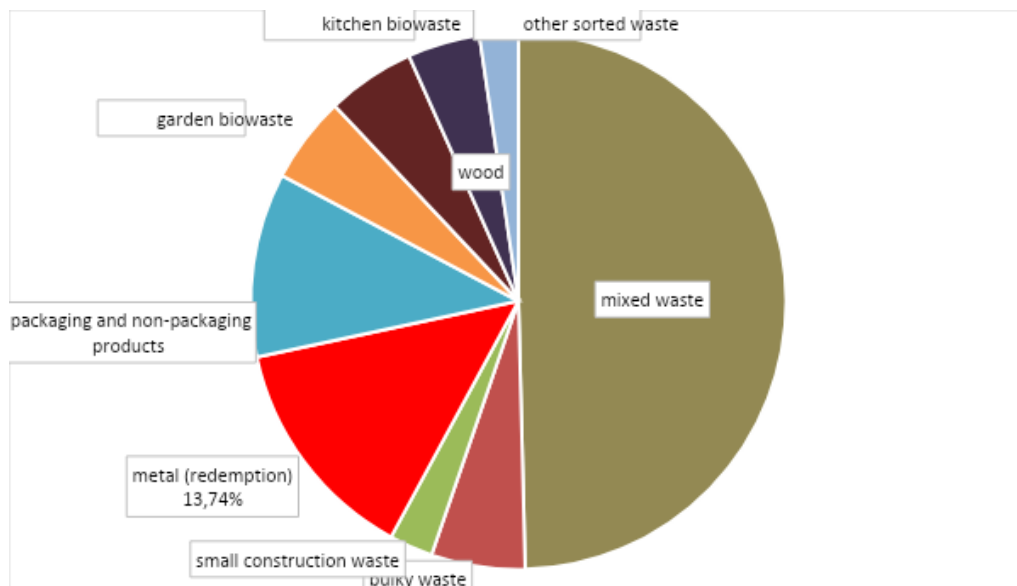
The evolution of the quantities of mixed waste - the non recyclable part often commonly referred to as residual waste - over the period under review also appears interesting. Its amount per capita increased from 270 kg (in 2011) to 327 kg (in 2016). This is an increase of 21 %. However, from 2017 onwards, the amount of mixed municipal waste started to decrease year by year, reaching a 202 kg per capita in 2023. This is a decrease of almost 125 kg (over 38 %) compared to 2016.

Chart 2: Development of the quantities of mixed waste in Partizánske from 2011 to 2023 per capita.



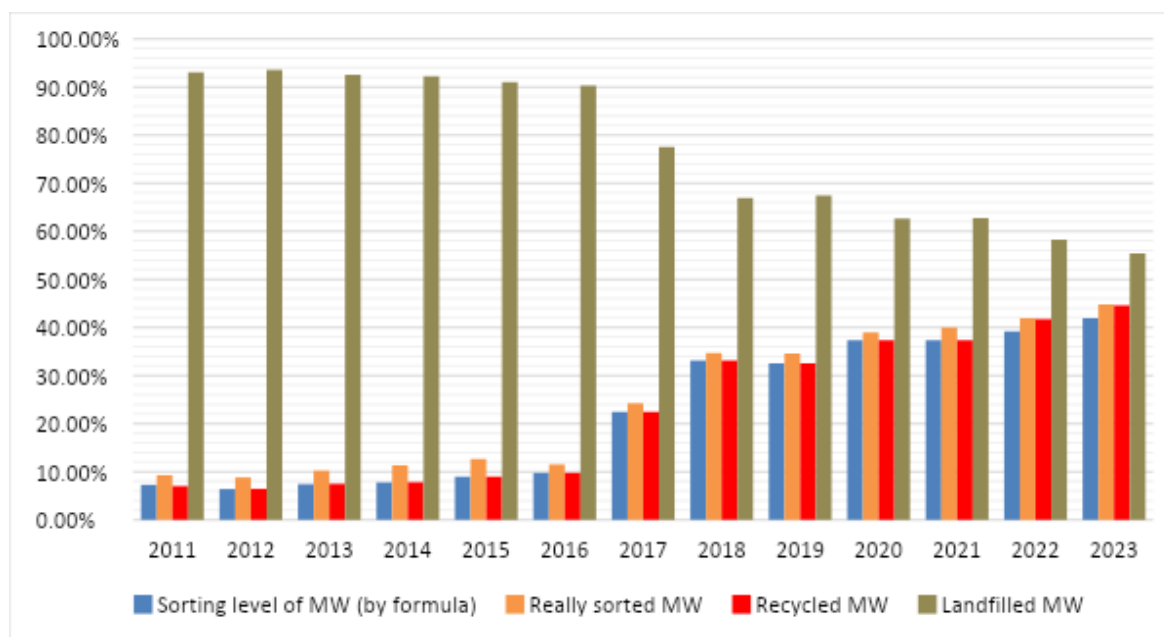
Mixed waste was the most common part of municipal waste in 2023. It accounted for nearly 50 % of all municipal waste generated. The second most common part were metals (14 %), which the inhabitants handed over to secondary raw material collectors. Packaging and non-packaging items - paper, plastics, glass, metal packaging and composite cardboard-based packaging - came third (11 %).

Chart 3: Percentage composition of municipal waste in Partizánske in 2023.



The predominant method of municipal waste management throughout the period under review was landfilling. However, landfilling has been decreasing since 2012. It decreased to 55.4% in 2023, from 93.6 % in 2012. Landfilling is gradually being replaced by separate collection and recycling. In 2023, 44.7 % of municipal waste was sorted. This is an increase of 35.6 percentage points in sorting and 37.6 percentage points in recycling compared to 2011.

Chart 4: Comparison of municipal waste management in Partizánske between 2011 and 2023.



Another important parameter monitored is the ratio of municipal waste that has been sorted. In the Slovak Republic, this parameter is calculated on the basis of a formula set by legislation. It is then used to determine the amount of the fee for landfilling - the more waste is sorted in a municipality, the lower the fee. However, this formula does not include small construction waste or certain hazardous waste components that had been sorted. Therefore, this figure is different from the total sorted municipal waste, hence the different categories in Chart no.4 above.

Figure 3: Collected bio-waste.



3. Overview of relevant legislation for the management of bio-waste in Slovakia

According to the Slovak Waste Law (No. 79/2015), it is the municipality that bears the responsibility for the management of municipal waste generated on its territory. In general, the municipality is the ultimate decision maker. It is the municipality that decides what waste management looks like on its territory - what collection containers are used, how often waste is collected, when and how it is collected, whether there is a collection yard or a composting plant, or which companies will manage municipal waste and more.

There are a number of requirements on Slovak municipalities due to national legislation now regarding the separate collection of kitchen and garden waste. For garden waste (EU waste code 20 02 01), municipalities are obliged to ensure that every individual household (not multi-apartment buildings) has a composting bin¹ or collection container. Collection must happen at least from March to November, and the minimum size of the container is 120 litres for those having 20 collections each year. For those living in apartment buildings, the municipality is obliged to ensure that each block of flats with a plot, associated green area or a garden has a composting bin or a collection container. The distance to the collection container must be the same as it is for mixed waste.

Looking at food waste (EU waste code 20 01 08) specifically, it's important to note that the obligation to introduce and ensure the separate collection of biodegradable kitchen waste does not apply to that part of the municipality that demonstrates that 100% of households compost their waste. For those who cannot provide this, the same rules apply to both individual households and multi-apartment buildings. There is a year-round collection offered with the provision of a brown labelled container, and size of this being a minimum of 250 litres/inhabitant/year. The minimum frequency of collection depends on the container used and the period in question (see table 3).

Slovak law also establishes some minimum requirements relative to the frequency and type of containers used for collection of biodegradable municipal waste. This is based upon whether the municipality uses a container that has been adapted for food waste collection, for example with ventilation holes on the body of the container or in the lid, or with a grid on the bottom part of the container separating the liquid part from the solid part. Evidence shows these adapted containers provide much better infrastructure for food waste collection, giving more oxygen to the food scraps so they do not liquidise or ferment too quickly. Separate requirements are established for collection during warmer months (March–November) when food waste can pose more challenges and when garden waste grows quicker.

For food waste separate collection:

- For municipalities using containers without any or some adaptation, minimum twice a week during the warmer months and once a week during the colder months (Dec–Feb).
- For municipalities using containers with the adaptation, minimum collection of once a week during the warmer months and once every 2 weeks during the colder months.

¹ The composting bin must be located above the ground, it must be adapted to ensure sufficient air supply and it must allow for an easy handling of the composted material (§ 14, paragraph 13 of Decree No. 371/2015).

For garden waste separate collection:

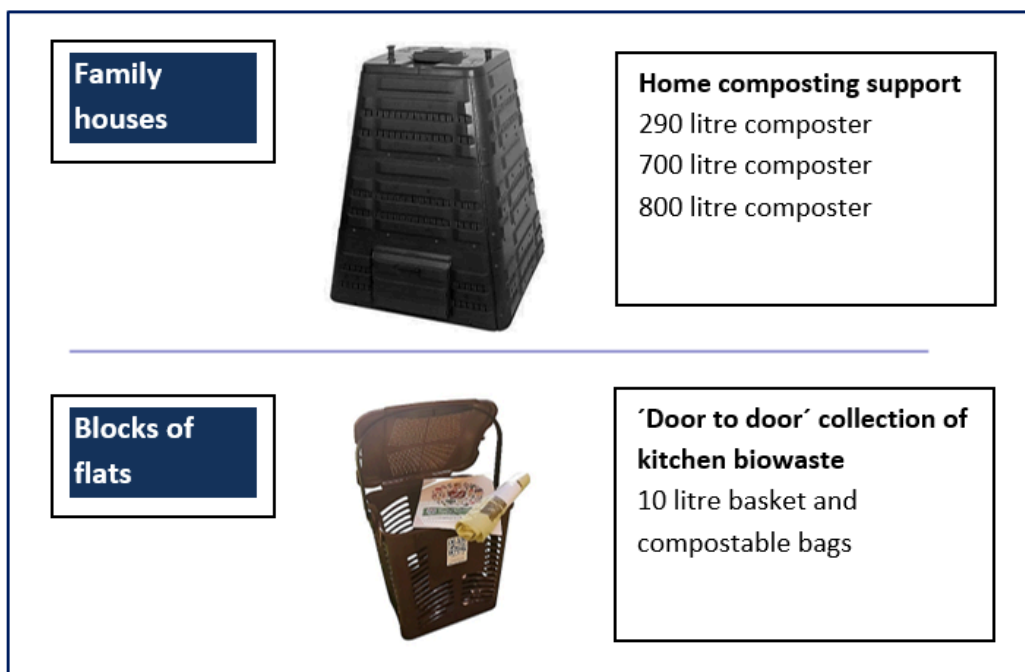
- For municipalities using containers without any or some adaptation, minimum collection of once a week during the warmer months and no collection during the winter.
- For municipalities using containers with the adaptation, collection is just once every two weeks during the summer and is not collected during the winter.

4. System of collection of biodegradable municipal waste (BMW) in Partizánske

This case study looks only at households' biodegradable waste, which is the responsibility of the Partizánske municipality. Kitchen and garden waste generated by private establishments (e.g. catering companies or private gardeners) is their own responsibility to manage and pay for the collection and treatment of the waste they generate.

In the city of Partizánske there is a different approach to the management of BMW in the development of family houses and blocks of flats. Simplistically, we could say that in the family houses, the city promotes home composting as a priority, and in the blocks of flats, it has introduced door-to-door collection of kitchen bio-waste. This split approach is one of the main reasons behind the city's successful system start-up.

Figure 4: Breakdown of bio-waste collection by type of housing in Partizánske



4.1. Family houses

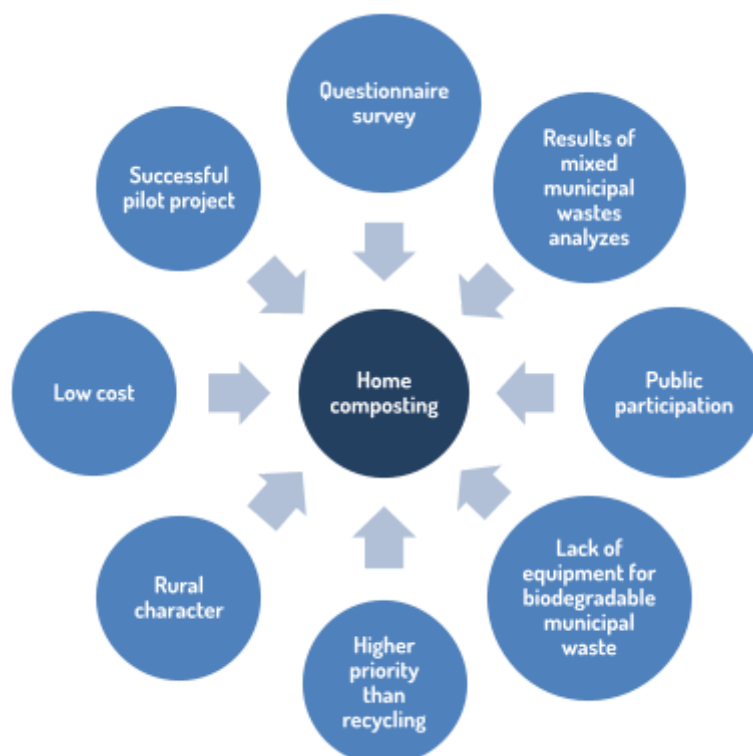
The city has decided in the case of family houses, it shall promote home composting, which is complemented by seasonal collection of branches from tree and bush trimming (in spring and autumn). Households can also bring unlimited quantities of garden bio-waste to the municipal collection yard, which is open 6 days a week.

The city started promoting home composting in 2014 with a pilot project in the Nájovce district. It actively tries to encourage households living in family houses to compost their own biological waste generated in the kitchen (K-BRO), as well as in the garden (Z-BRO). The city has provided each interested household with a free plastic composting bin, a series of informational materials on proper composting methods and compost use, and a public lecture on composting. Attendance of at least one member of the household at the lecture is a condition for receiving a composter.

4.1.1. Introducing the chosen system

The system described above was introduced for a number of reasons that more or less motivated the city to introduce the Home Composting Development Programme.

*Diagram 1: Reasons for the introduction of **the Programme for the development of home composting in family houses in the city Partizánske.***



To begin with, a questionnaire survey was prepared prior to the start of the project for those living in single-family households. The feedback gained demonstrated that:

- Almost 30% of households did not compost any bio-waste.
- Only a small proportion of households used good composting practices, composted all suitable bio-waste and used appropriate composting bins for doing so.
- Almost 68% of households would prefer home composting over collection of BMW (assuming support from the municipality).

An important next step was to conduct an analysis of the residual waste to better understand the problem. Analyses done showed that up to 53% of the weight of mixed waste from family houses was compostable waste, therefore a significant chunk and validation for prioritising this home composting project.

There are also a number of other key motivating factors as to why the home composting project was initiated by the municipality:

- The city wanted to actively involve inhabitants in waste issues and thus raise their broader environmental awareness, which they felt could be done via home composting.
- During the period when the pilot project to promote home composting was under way, no facilities for the recovery of BMW were available to the city.
- Home composting is considered to be waste prevention and this has the highest priority in the waste hierarchy.
- Around 81% of the houses in the city are rural in character and therefore prime for home composting.

Furthermore, the municipality had identified that activities to promote home composting required far lower investment and operating costs compared to intensive collection of BMW from households and its central recovery.

Lastly, a pilot project in the selected urban district of Nájovce (in 2014) demonstrated the viability of home composting within Partizánske. All monitored indicators were improved within one year. For example, the share of BMW in mixed waste was reduced to 28 % (it was 53 % before the project) and the amount of mixed waste per capita was reduced by 57 kg.

Other impressive results from this initial pilot project include a look the number of households that:

- Did not compost bio-waste at all decreased to less than 8% (in the pre-project survey it was 30%).
- Used suitable composting bins increased to 93% (27% before the project).
- Did not dispose of any BMW in the mixed waste stream reached 75% (pre-project 4%).
- Did not burn any BMW at all, reaching 85% (before the project 20%).
- Declared a significant reduction in the amount of waste thrown away reached 74%.

4.1.2. Information and promotional activities

In order to raise more awareness within the community about the possibilities and benefits of home composting, several activities have been carried out during the programme's duration to this current date:

- a. 2x house-to-house **questionnaire surveys** on households' management of BMW. The first survey was carried out in all family houses in the city, the second one after the end of the pilot project in the city district of Nájovce.
- b. 41 free **lectures on home composting**. Participants learned important information on composting, the correct procedures and how to make the best use of it. Attendance of a household representative at the lecture is a condition for obtaining a composter. Residents of the city can also attend the lecture repeatedly.
- c. **Personal visits** to over 800 households. During the visits, trained officials verified the composting process was being followed correctly and further advice was given on how to improve composting if needed.
- d. **A 'bio-waste free bin' competition** was also held in the pilot city district of Nájovce in 2014. All households in the city district were entered into the competition with the aim of reducing the amount of bio-waste found in the mixed waste, through increasing home composting. During the competition, 13 inspections of the mixed waste bins were carried out. Whoever was found 7 or more times with compostable bio-waste in the container was excluded from the competition. A winner was drawn from the remaining participants, receiving a garden waste shredder.
- e. **Distribution of information leaflets** has been ongoing since the beginning of the programme. At the beginning, each household that received a composter from the municipality received the brochure 'Composting in home composters'. In the following years, information leaflets have been distributed on the following topics:
 - Composting
 - Compost and its use
 - Three false myths about composting
 - Don't burn waste
 - 10 tips on how not to waste food
 - Using bio-waste in the garden
- f. **8 analyses of mixed waste** that was in randomly selected bins for mixed waste on the day they were exported. The analyses are used to monitor residents' behaviour, e.g. food wastage, effectiveness of waste sorting, involvement in composting, extent of composting use. The results of the analyses were reported to households in local newspapers and on television.
- g. **A series of articles and programmes in local newspapers**, television and the city website on the home composting development programme, the different activities and their results, good composting practices and compost use, the importance of compost locally and more.

4.1.3. Results of the home composting development programme

Further action was needed however in order to ensure that the promotion of home composting in the city does not end up as a simple tick box exercise, fulfilling the legislative obligation but not focusing on impact – for example the law requires homes to compost but sets no performance targets. It was therefore necessary to continuously monitor and evaluate the success of the established programme. On the basis of the results, further activities have subsequently been adapted and supplemented in the years since it started. The indicators monitored in Partizánske include:

a. Number of composters distributed

As of 14 June 2024, 2010 composters with a capacity of 290, 700 and 800 litres (households choose according to the size of their garden) have been distributed. This means that 90.66 % of all households living in family houses have received composters from the city. Some households already had access to composting equipment.

b. Number of lectures & attendance

As of 14 June 2024, 41 lectures on home composting have been given. These have been held successively in all the city districts. The lectures were attended by 2 110 residents of the city.

c. Number of households practising home composting

As of June 14, 2024, 95 % of households living in single-family homes were self-composting.

d. Reduction in mixed waste generated

Compared to 2016, the amount of mixed waste produced by households in 2023 decreased by 36 kg per capita in total – 17% of the previous mixed waste total. But looking specifically at the target audience, those living in a family house, **the amount of mixed waste generated reduced 118 kg per capita as a result of home composting – a staggering 58% of the previous mixed waste total per capita.**

e. Remaining amount of bio-waste in mixed waste bins

The analyses of mixed waste in 2023 showed us that on average there is still the following in the mixed waste bins of households living in detached houses:

- 35 kg of kitchen bio-waste per capita per year, which represents about 40% of its total potential which was calculated as 86 kg per capita.
- 50 kg of garden bio-waste per capita per year, which represents about 39 % of its total potential.

Activities and results of the home composting development programme in the city Partizánske



Number of people involved

- 2 010 composters distributed
- 95 % composting households



Lectures and personal visits

- 41 free lectures/2 110 residents trained
- 813 households visited



Reduction of mixed waste

- 30 kg per capita or
- 118 kg per capita living in family houses



Mixed waste containers still contain

- 35 kg of kitchen biowaste per capita per year (40 % of the total potential)
- 50 kg of garden biowaste per capita per year (39 % of the total potential)



Collected quantities of biowaste from additional collection

- 24 to 32 tonnes of branches from seasonal collections
- 200 to 230 tonnes of garden biowaste delivered to the collection yard

4.2. Blocks of flats / apartments

For families and individuals living in apartment buildings, the city of Partizánske decided to introduce an intensive door-to-door collection of kitchen bio-waste, rather than promote home composting. This model is not the standard collection system in Slovak conditions, where normally collection containers placed on container stands in the street are the chosen methodology. Instead, in Partizánske, separate collection of bio-waste is carried out directly from the front door of individual households, or from the common areas of blocks of flats.

The door-to-door collection system is complemented further by electronic individualised collection records, allowing the city to have an overview of the frequency of collection and total waste generated by households. This system is based upon each basket having a unique QR code on it, which is scanned by the collecting personnel each time. The combination of door-to-door collection and individualised record-keeping has proven to be an effective way of collecting kitchen waste in Partizánske, ensuring high quantities of sorted kitchen waste and low contamination rates.

4.2.1. System description

Every household living in a block of flats is entitled to a 10 litre basket with 25 compostable bags from the city (as a starter pack), which are tailored for the collection of kitchen waste in households. When households require more compostable bags, they can either leave a message for the collection service on the paper taped to the basket, so that next time they deliver more bags with them, or individuals can come and collect them from the municipal town hall.

The collection takes place all year round, happening twice a week - Mondays and Fridays.

Figure 5: Household starter pack: a 10 l basket, 25 compostable bags and a leaflet for the public.



Depending on the type of block of flats where the collection is carried out (with or without lift), the household shall leave the basket with the tied bag of food waste inside by 7:00 a.m. on the designated day. For buildings with a lift, it can be left just outside each apartment's front door. Whilst for buildings with no lift, it must be left on the ground floor by the main entry point.

Figure 6: Baskets for door-to-door bio-waste collection.





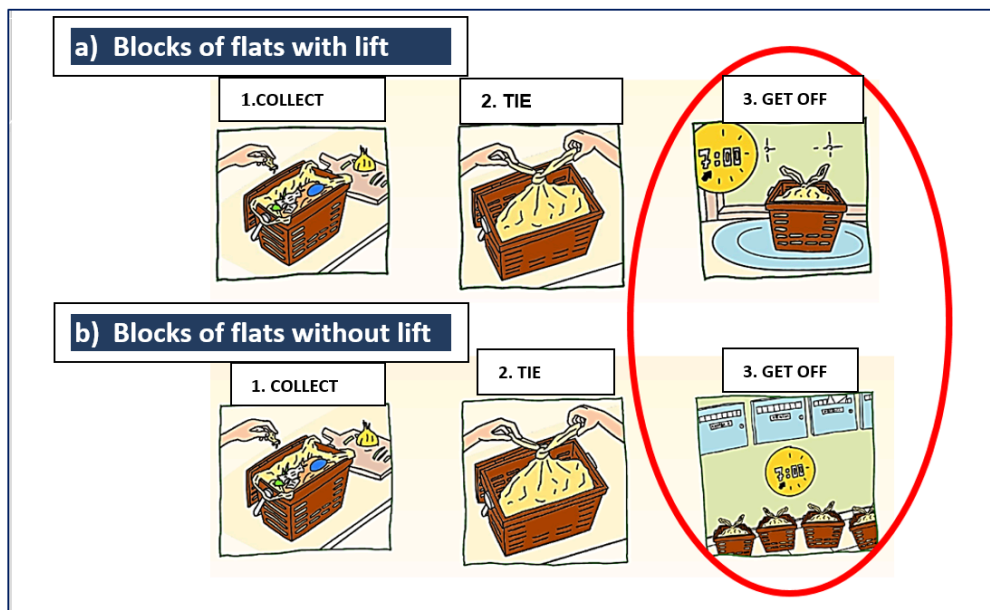
Figure 7: Collection personnel scan a QR code placed on the basket, which is placed by the household in front of the door of the apartment.



Figure 8: Residents of apartment buildings without a lift place the baskets ready for collection behind the front door of the building in the common hallway.

These bags of sorted kitchen waste are then collected by a special service called ‘runners’. Before emptying the basket, the collection service checks the contents of the bag and takes a picture of the QR identification code which is placed on each basket. Contaminated kitchen waste is not accepted as part of the service to encourage good practices of sorting. Once the basket is emptied, an empty basket with a new bag will be left on site (by the door or under the mailboxes) for the household to take back to their home.

Figure 9: Difference in collection of kitchen bio-waste by type of dwelling house.



The runners, as part of the collection service, then place the collected kitchen waste in a designated location just in front of the block of flats. The small tied bags each go into a larger 120 L container or bag, from where they are taken by truck from the collection company to a central composting facility.

Until the end of September 2023, this collection was carried out by an external company, but from October 2023 onwards, the collection is carried out by the public waste company using its own collection vehicle.



Figure 10: Collected kitchen bio-waste in compostable bags placed on the roadside in front of blocks of flats.



Figure 11 and 12: There are 2 containers on the collection vehicle. The collection service puts kitchen bio-waste in one and bags in the other. The blue bags are washed and used repeatedly.

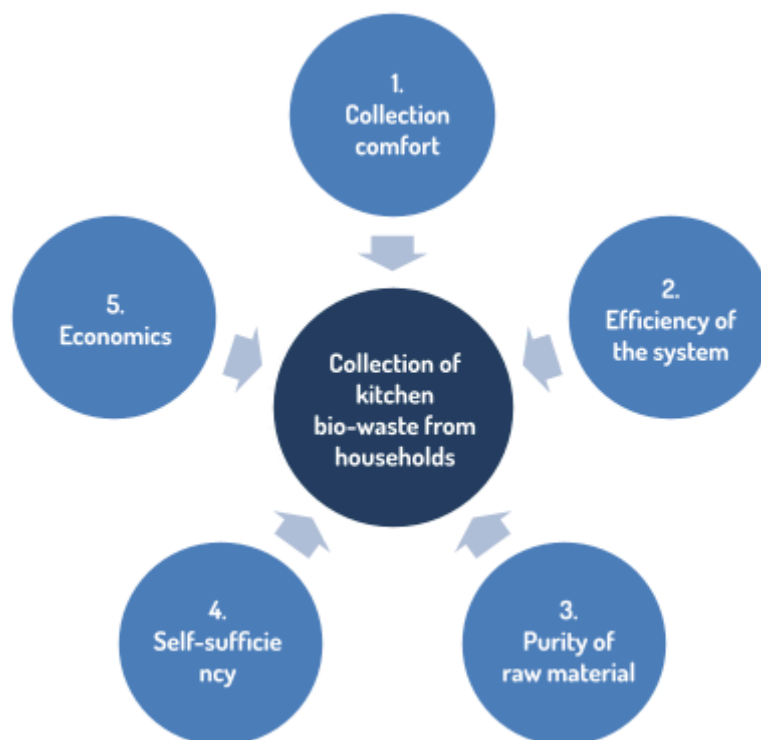
Reflections from the pilot for apartment buildings in Partizánske shows that the system implemented opens up a number of key benefits for the city, including:

- Oversight of the participation of households in the collection system, which then allows for more targeted information campaigns.
- Quality control of the cleanliness of kitchen waste during collection.
- Greater information flows mean an easier introduction of a future reward system or Pay-As-You-Throw model (e.g. reduction of the fee for those households that sort kitchen waste or charges for the exact amount of waste produced).
- Better management of compostable bags that are distributed to individual households according to their participation in the collection.

4.2.2. Reasons for implementing the selected system

When selecting the collection system that would be the most suitable for the conditions of the city of Partizánske, 5 basic but interrelated parameters were taken into account: comfort for the residents, efficiency of the system, cleanliness of the collected raw material, self-sufficiency (independence for the city) and the economics of collection.

Diagram. 2: Main parameters used in the selection of the kitchen WEEE collection system in Partizánske.



1. We assessed **the comfort of collection** mainly on the basis of experiences from other European cities (including Slovak cities) that have been collecting kitchen waste for a long time, as well as conducting field surveys with residents concerning their willingness to participate in improved waste sorting practices. These surveys clearly demonstrated that individuals were not willing to go too far out of their household to leave their sorted food waste. Many other influences also were noted as major factors within the design of the collection system, such as the cleanliness of containers containing old food waste, the potential for bad odours, insects and mould occurring. This is why the system with compostable bags and small baskets was chosen, to make it as accessible as possible and with compostable bags with ventilated baskets, odours and mould risks decrease significantly.
2. **The efficiency of the collection system** was assessed alongside the comfort & accessibility of it for citizens. On the basis of information gained from studies of other European examples and the analysis of mixed waste during the pilot project, a calculation was done on the mass potential of kitchen waste and the expected efficiency of the individual collection systems (what percentage of

the total potential we can collect). For the city of Partizánske, the collection system was chosen that was projected to deliver the highest efficiency in terms of kitchen waste collected and mixed waste reduced.

3. **The purity of the collected raw material** is a quality parameter that influences the possibilities of treatment and often also the price of this – for example, kitchen waste with high percentages of plastic will require more filtering and therefore higher costs. As the city will have its own composting plant in full operation by the end of 2024, where it wants to produce high quality compost, it was necessary to choose a collection system that will create a prerequisite for high purity of the collected kitchen waste. Again, mainly foreign experience was used to make this decision, which we supplemented with the results of the monthly pilot collection of kitchen bio-waste in Partizánske.
4. **Self-sufficiency and independent decision-making for Partizánske**, together with the application of the proximity principle (localism), is of particular social and economic importance. It is generally acknowledged that when selecting a collection system, it is essential to take into account the economic possibilities and the specific characteristics of the chosen location. However, in Partizánske we also focused on the availability of human potential and the technical possibilities of the city. We saw this as another opportunity to employ local people and thus support the local green economy. Therefore a system was chosen that allowed for long-term economic stability and also independence – not reliant on external companies for delivering the service.
5. Partizánske calculated **the economics of the collection model** based on detailed analysis from the pilot project conducted in the Šípok housing estate during 2021. The calculation was made by a combination of understanding the costs for collection & treatment across the whole municipality, as well as the savings for reduced waste going to landfill and revenue gained from the national Environmental Fund. Further savings were made in Partizánske as a result of this initiative, due to less collection rounds being needed for mixed waste in housing developments. Before the introduction of the collection of kitchen waste, mixed waste was collected 3 times a week. After its introduction the frequency was reduced to 2 times a week, which saved additional funds for the residents.

The future economics of waste management in Slovakia are being affected by the ongoing increase in municipal waste sorting. A statutory fee for landfilling of municipal waste is determined based on the rate of separate collection in each municipality. As a rule of thumb, the more waste is sorted in a municipality, the lower the fee, but there are complexities within the Slovak system. Each municipality has to report their sorting rate for the previous year to the Ministry of Environment and afterwards, the statutory landfill charge is calculated accordingly and added to the price from the landfill operator.

For the city of Partizánske, the system was chosen that had the lowest economic burden on the city and its inhabitants.

4.2.3. Pilot project in 2021

To test the functionality of the chosen system for collecting kitchen waste, Partizánske and Friends of the Earth Slovakia together started on a joint pilot project. This includes selecting 8 blocks of flats with 12 entrances in the Šípok housing estate in Partizánske, introducing a pilot project of door-to-door collection. These were a representative sample of the most common types of blocks of flats in the city (by number of floors - 3, 5, 7, 8 and 12, by number of flats - 8 to 60 flats, with or without lifts, etc.).

The pilot project lasted for 1 month - from 19 April to 13 May 2021. The collection took place twice a week, on Monday and Thursday mornings from 7:00 a.m. onwards. Household participation in the collection was voluntary. Each participating household was given a detailed explanation of the entire collection system and was provided with a free collection kit:

- A 10 litre plastic basket.
- 10x 10 litre compostable bags.

A total of 8 collections were carried out, during which:

- Records were kept of households' participation in each collection.
- The quantities collected were weighed by individual entrances.
- The duration of the collection was measured by individual entrances.
- The cleanliness of the sorted kitchen waste was monitored.
- The impact of collection on the incidence of odour, insects and pollution in the corridors was monitored.

The collected kitchen waste was taken to a nearby biogas plant for recovery, which was the case for all sorted bio-waste in the municipality until July 2024 and the composting plant was in operation.

Figure 13: Analysis of collected kitchen waste.



Results of the pilot project:

a. Participation:

Participation in the pilot project was voluntary. Out of a total of 302 households living in the apartment buildings, 215 households took up the kitchen waste collection baskets. This was over 71% of the total number of households.

b. Number of baskets unloaded. During the pilot project, the following were unloaded:

- 867 baskets.
- An average of 108 baskets per 1 collection.

c. Quantity of kitchen waste collected:

- 1121 kg of kitchen waste.
- A rate of 21.94 kg/year/capita.
- A rate of 30.82 kg/year per inhabitant involved in the collection.

d. Cleanliness of collected kitchen waste:

Checks after each collection proved that there was no contamination (plastic or paper material found) in the sorted kitchen waste, a hugely impressive achievement.

The pilot project confirmed the viability of the proposed system and provided important information that was subsequently used to design a city-wide collection system. Based on the findings from this initial pilot, more accurate estimates were able to be made on a city-wide system regarding:

- Households' willingness to participate in the system.
- The expected quantity and quality of kitchen waste collected.
- The duration (time) of the collection rounds.
- The number of 'runners' needed for the collection.
- Projected costs of collection.

The pilot project also showed the need for a slight correction in the collection system (e.g. changing the collection day from Thursday to Friday), to optimise the system further.

4.2.4. Information activities and distribution of collection tools

As this was the introduction of a new component of municipal waste collection, it was necessary to adapt the information and awareness-raising activities accordingly. Also based on the experience with the pilot project, it was decided to combine the information campaign with the distribution of baskets and compostable bags (collection tools). Our experiences have shown that in order to have high engagement with a new system, citizens need regular information and education, intensely at the start but also continually to ensure high engagement and performance.

In Partizánske, these activities were carried out successively in the different districts of the city. Gradually, food waste collections in blocks of flats all over the city were introduced, district by district, rather than all at once.

Households could access the information and collection tools in 4 ways:

1. During **direct distribution**, which took place at individual entrances to blocks of flats. Residents were informed in advance of the time at which the distribution would take place at their entrance. They could also collect the collection tools at any other distribution point.
2. **At specific distribution centres**, which were temporarily set up (for 2-3 hours) at predetermined publicly accessible locations in the individual housing estates. These centres were set up only after the 'direct distribution' had taken place to add a further opportunity to gain knowledge for those who missed the first meeting. Residents were informed in advance of the place and time of distribution.
3. **At the municipal office**, where household representatives can pick up collection tools (starter kit or just refill compostable bags) all year round - 5 days a week.

Figure 14: Friends of the Earth Slovakia staff explaining the kitchen waste collection system to residents at a meeting in front of the entrance of the block of flats



4. During **the additional distribution**, which takes place on an ongoing basis when a newly constructed block of flats opens in the city. The distribution takes place at the entrances of new apartment buildings.

The distribution group was composed of three workers for all 4 distribution methods:

- **An informant**, whose role was to explain the whole collection system and its benefits to the household representatives.
- **Registrar**, whose task was to register households in the registration system (find the household representative in the list and match him/her with the unique QR code stuck on the basket).
- **Technical support**, whose task was to prepare the distribution packages (assemble the basket, put the bags and leaflet in it) and move them to the different sites.

Figure 15 and 16: Registration of a household-specific kitchen bio-waste collection basket into the electronic record-keeping system by QR code.



At the beginning of the meeting, there was always a short lecture on the collection system complemented by a practical demonstration of the use of the collection tools by the informant. After the lecture, the individual household representatives moved to the registrar, who did the necessary registration steps for each household and their respective QR code. Household representatives signed to accept the distribution package and participate in the collection.

In the information campaign itself, in addition to explaining the environmental benefits of collecting kitchen waste, extra focus was given to highlight:

- a. **Specific 'behaviour' of kitchen waste** - highlighting that this is mainly wet waste that decomposes rapidly. Therefore, they need to be taken for collection on a regular basis (ideally twice every 7 days). Otherwise, there is a risk of odour, mould, leachate and insects getting inside of the waste bin.
- b. **How to store and use compostable bags** - these bags must be stored in a dry and dark place, for example. When used in baskets, they must be emptied at least once every 7 days, as there is a risk that they will start to decompose and tear in the basket.
- c. **How to use the basket and compostable bags** (with practical demonstration) - the basket is designed to be used with compostable bags. For this purpose, it has 'ears' just below the lid on which the bags are tied to. The bags are also adapted for this purpose, as they are shaped like a 'shirt' (with handles) so they are easier to tie. The basket also has a locking mechanism on the lid which prevents the contents from spilling out if the basket is tipped over. The bags must be knotted in the basket before being unloaded for collection - which helps speed the collection process up and increases the cleanliness of the collection.
- d. **How sorted kitchen waste must be collected** - it must always be collected and emptied by a runner with a tied compostable bag inside the basket. There is a QR code on the basket which is recorded at collection to identify the household that has unloaded it.
- e. **How & when to present the baskets for collection** - baskets that are distributed to households are indoor containers, designed to be placed directly in the kitchen. They shall only be placed outside the dwelling just before the collection happens (at the earliest the evening before the collection date and at the latest by 7:00 a.m. on the day of collection). Empty baskets shall be put back into the flat by the household after emptying. The baskets must be placed in the corridor in such a way that they are accessible to the collection service but do not obstruct passing residents.

In addition to the personal campaign for the distribution of the collection tools, complementary educational activities were also carried out to help increase engagement:

- The city issued an **information leaflet** with a brief description of the whole collection system, which was included in the distribution package.
- The city issued **posters** for the collection of kitchen waste, indicating when the collection starts and in which locality. These posters were pasted in the entrances of each block of flats.
- **A series of articles** about the pilot project on the city district Šípok, [the introduction of the collection](#), [the city's achievements in waste management](#), etc. were published in the local weekly magazine TEMPO.
- Municipal Television Partizánske (MTP) prepared and broadcasted **a series of reports and interviews** concerning the collection of kitchen waste, experiences with collection and results achieved.
- **A series of lectures** for primary school pupils and summer day camp participants were held.
- A sub-page on [the city's website](#) has been created to address the issue of collection of kitchen waste from households.

Figure 17: Partizánske's information leaflet.

DO VYTRIEDENÉHO KUCHYNSKÉHO BRO:

PATRÍ ✓

- zvyšky z ovocia a zeleniny,
- znehodnotené potraviny rastlinného pôvodu bez obalu napr. po dátume spotreby,
- nepotrebovaný chlieb a pečivo,
- kávové a čajové zvyšky (aj naplnené vrecúško bez šnorky),
- zvyšky varenej stravy rastlinného pôvodu (bez tekutých zvyškov, napr. polievky treba predtým precediť cez sitko),
- vaječné škrupiny,
- mliečne výrobky – nie tekuté,
- odrezky izbových rastlín,
- použité papierové kuchynské utierky

NEPATRÍ ✗

- akékoľvek tekuté zvyšky (polievky a omáčky),
- nerozložiteľné odpady a obaly – plasty, sklo, kov, kombinované obaly (VKM)...
- použité jedlé oleje a tuky,
- hygienická potreby – plienky a hygienické vložky,
- kozmetické potreby – odličovacie tampóny, vata, vlhčené a parfumované utierky a vreckovky,
- kávové kapsuly,
- mäso, kosti, ryby, uhynuté zvieratá,
- exkrementy a podstielka z chovu zvierat,
- ohořky z cigariet

DŮLEŽITÉ

- Pri zbere kuchynských BRO bude mesto viesť evidenciu zapojenosti domácnosti do zberu. Prednostne preto používajte košíky distribuované mestom s QR kódmi.
- Ak sa vám minú vrecká, napíšte listoček a nechajte ho na košíku. Zberová služba vám ho bezplatne poskytne.
- V prípade, že vyprodukuje viac kuchynského BRO, ako sa zmestí do košíka, použite ďalšiu vlastnú nádobu (napr. misku, vedierko) s ďalším kompostovateľným vreckom.
- Pravidelne si čistíte košík, predídete tým vzniku zápachu a plesní.

KONTAKT

Ak ste ešte nedostali košík a kompostovateľné vrecká na zber kuchynských BRO alebo máte akékoľvek otázky, kontaktujte nás e-mailom alebo telefonicky:
 Ing. Andrea Bencelová, e-mail: andrea.bencelova@partizanske.sk, telefón: 038/536 30 39
 Beáta Katulincová, e-mail: beata.katulincova@partizanske.sk, telefón: 038/536 30 37

ĎAKUJEME VÁM, ŽE TRIEDITE ODPADY A CHRÁNITE TÝM ŽIVOTNÉ PROSTREDIE

Zber biologicky rozložiteľného kuchynského odpadu z domácností v Partizánskom

Mesto Partizánske od 1. júla 2021 zavádza pre domácnosti v bytových domoch triedený zber biologicky rozložiteľných kuchynských odpadov (kuchynské BRO).

4.2.5. Results of kitchen bio-waste collection

Similar to the promotion of home composting, the city of Partizánske has recognised the importance of continuously monitoring and evaluating the success of the system for kitchen waste collection. Only on the basis of having this data can the system be optimised and further outreach activities be added. Otherwise, the introduction of the collection of kitchen waste may end up as an economic burden for the city and its inhabitants.

The indicators monitored in Partizánske include:

a. **Number of baskets distributed:**

As of 31 December 2023, 4,303 baskets for the collection of kitchen waste have been distributed. This means that 65% of all households living in residential buildings have received the baskets, but of course that a remaining 35% have not and do not sort their bio-waste. Work is being done now to understand the reasons behind this decision by households and to motivate them to change.

b. **Number of baskets collected:**

In 2023, a total of 213,679 baskets of kitchen waste were collected and emptied, an average of 2,075 baskets per one collection across the city. Analysis is being done now to understand this figure and why some households might not be using the basket or are not requiring weekly collection.

c. **Quantity of kitchen waste collected:**

In 2023, 450.56 tonnes of kitchen waste were collected. This is:

- An average of 22.10 kg per capita across the whole city.
- An average of 32.03 kg per capita living in apartment buildings.
- An average of 49.17 kg per capita involved in the collection.

d. **Cleanliness of collected kitchen bio-waste:**

Analyses of the cleanliness of the collected kitchen waste in 2022 showed us that the contamination rate was an impressive 0.07% on average.

e. **Remaining amount of kitchen bio-waste in mixed waste containers:**

Analyses done of the city's mixed waste in 2023 have shown that on average there is still 43 kg of kitchen waste per capita per year in the mixed waste bins of households living in blocks of flats, which represents about 53% of its total potential, with an estimated 81 kg of kitchen waste generated per capita.

Sorted collection results of kitchen bio-waste in the city of Partizánske



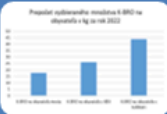
Number of households connected to the system

- 4 303 pieces of baskets distributed
- 65 % of households from blocks of flats



Number of baskets unloaded

- 213 679 pieces per year 2023
- average 2 075 pieces per 1 collection



Quantity of kitchen bio-waste collected

- 450.56 tons per year 2023
- average 49.17 kg per capita involved in the collection



There is still waste in the mixed waste bins

- 43 kg of kitchen bio-waste per capita per year
- this is 53 % of the total potential of kitchen bio-waste in municipal waste



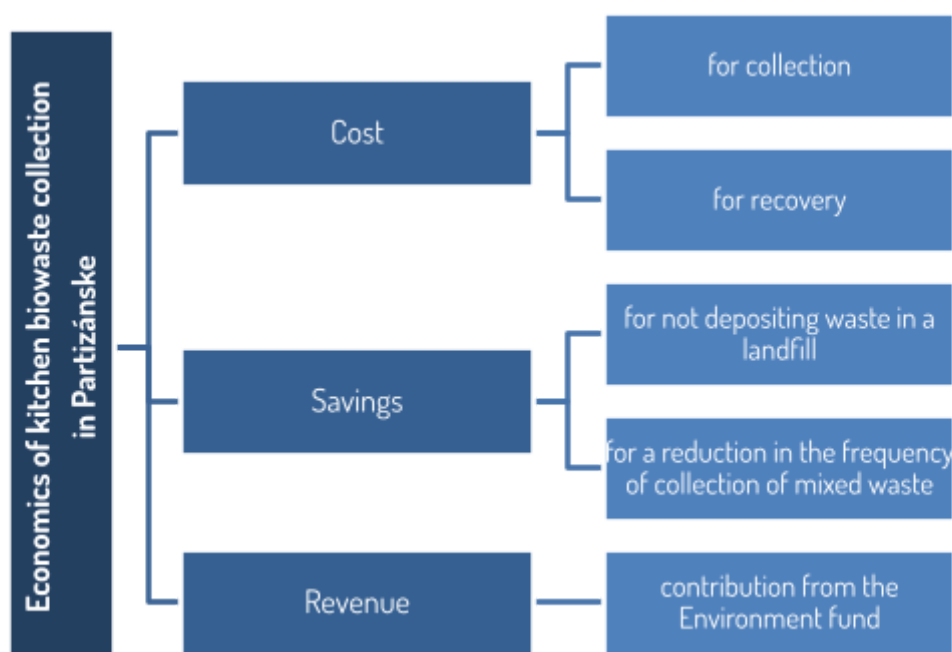
Purity of collection

- average pollution of sorted kitchen bio-waste is 0.07 %

4.2.6. Economics of kitchen bio-waste management

The economics of kitchen waste collection and management in Slovakia are influenced by many factors and therefore cannot be viewed only in terms of costs and revenues. For example, the total amount of waste separately collected also can affect the amount of the statutory landfill tax and the frequency of mixed waste exports, etc. Within the case of Partizánske, an economic calculation was done by looking at the entire costs, savings and revenues all affected by the collection of kitchen waste.

Diagram 3: Overview of the items used in the calculation of the economics of kitchen bio-waste collection in Partizánske.



This calculation was done using figures from 2022. A description of the individual items we have used in the calculation is as follows:

- Collection costs (operational)** - including staff costs for the collection service (runners), the cost of providing compostable bags and the cost of the electronic record keeping system.
- Recovery costs** - including the other costs associated with the collection service (vehicles) and its treatment at an external biogas plant.
- Landfill savings** - including the costs saved on landfill disposal due to the reduction of mixed waste by sorted kitchen waste.
- Savings for reducing the frequency of mixed waste collection** - including the saved cost of 1 mixed waste collection per week (52 collections per year).

- e. **Environmental Fund contribution** - included a claimable contribution from the State to reduce the economic burden of collecting kitchen bio-waste from households. The contribution is calculated on the basis of the amount of sorted household kitchen waste. For example, in 2022, the city received a contribution for the amount of waste sorted in 2021 (120 tonnes) and likewise in 2023, the city received a contribution for kitchen waste sorted in 2022 (371 tonnes).

Table 3: Simplified calculation of the economics of kitchen bio-waste management in Partizánske.

Collection and recovery costs	Amount 2023 (EUR)	Amount 2022 (EUR)	Savings and revenue	Amount 2023 (EUR)	Amount 2022 (EUR)
Collection and recovery	47,734 €	49,325 €	Savings for not landfilling mixed waste	33,432 €	30,456 €
“Runners”	39,239 €	39,239 €	Reducing the frequency of mixed waste collection	79,500 €	79,500 €
Compostable bags	20,228 €	23,244 €	Contributing from the Environment Fund	35,431 €	11,500 €
Evidence system	720 €	1,440 €			
Total costs	103,921 €	113,248 € /year	Total revenue	148,363 €	121,238 €
			<i>Total revenue (excluding the Environmental fund contribution)</i>	<i>112,932 €</i>	<i>109,956 €</i>
Calculation per tonne	231 €/tonne	305 €/tonne	Calculation per tonne	329 €/tonne	326 €/tonne
			<i>Calculation per tonne (excluding Environmental fund contribution)</i>	<i>251 €/tonne</i>	<i>296 €/tonne</i>

Looking at this economic calculation, the new kitchen waste collection system has not only brought improved environmental performance for the municipality but, even without the contribution from the environment fund, it has resulted in greater savings rather than the costs spent. **A net 9,000 euros gain was made in the public budget of Partizánske due to the savings made compared to the investment made.** Therefore the system has not only brought environmental benefits, through a reduction in landfill and increase in biogas and compost generated, but it has also saved crucial costs for the municipality to reinvest elsewhere in public services.

Conclusion

The story of Partizánske is one of how a municipality can work together with its community to develop a tailored bio-waste collection and management programme. It highlights the importance of tackling kitchen and garden waste separately, as well as the need for different strategies to capture kitchen waste from individual households and multi-apartment buildings. The results of this are clearly impressive.

For example, **95% of households living in single-family homes are home composting, resulting in a decrease of 118 kg - 36% - of mixed (non-recyclable) waste per capita in these households since 2018. Whilst the municipality has reduced mixed waste across the whole city by 18% since 2018. What is even more impressive is that these results are being achieved whilst bringing a net positive gain to the public budget - with savings made higher than costs invested.**

The story of Partizánske also showcases the benefits of implementing an extra focus on community education and engagement, investing significantly in this before and during the implementation of a new collection system.

The collaboration between the municipality and local groups, such as ZWE member Priatel'ia Zeme - SPZ / Friends of the Earth - SPZ is a role model for others to follow, utilising the expertise of zero waste experts to help in the design and implementation of local solutions to the issues of waste today. Whilst there are still many areas for improvement within Partizánske, the impressive results they have achieved and the means by which they have achieved them is a story for inspiration for the rest of Europe.

Figure 18: Workshop about home composting in Partizánske.



Contact



Friends of the Earth – SPZ, Slovakia, have been working in Slovakia since 1996 as a non-profit organisation protecting the environment and nature both in Slovakia and Europe. The organisation concentrates on minimisation of pollution caused by waste and toxic substances. Friends of the Earth – SPZ, Slovakia does not depend on any government, political party or group interests. www.priateliazeme.sk



Zero Waste Europe (ZWE) is the European network of communities, local leaders, experts, and change agents working towards a better use of resources and the elimination of waste in our society. We advocate for sustainable systems; for the redesign of our relationship with resources; and for a global shift towards environmental justice, accelerating a just transition towards zero waste for the benefit of people and the planet. www.zerowasteurope.eu



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