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GUIDE FOR ESTABLISHING A SYSTEM FOR THE COLLECTION OF GLASS PACKAGING IN LOCAL SELF-GOVERNMENT UNITS

ENABLE A COST-EFFECTIVE GLASS RECYCLING VALUE CHAIN IN WESTERN BALKANS

Implemented by:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

NALED

1756 APATINSKA PIVARA
A Molson Coors Beverage Company

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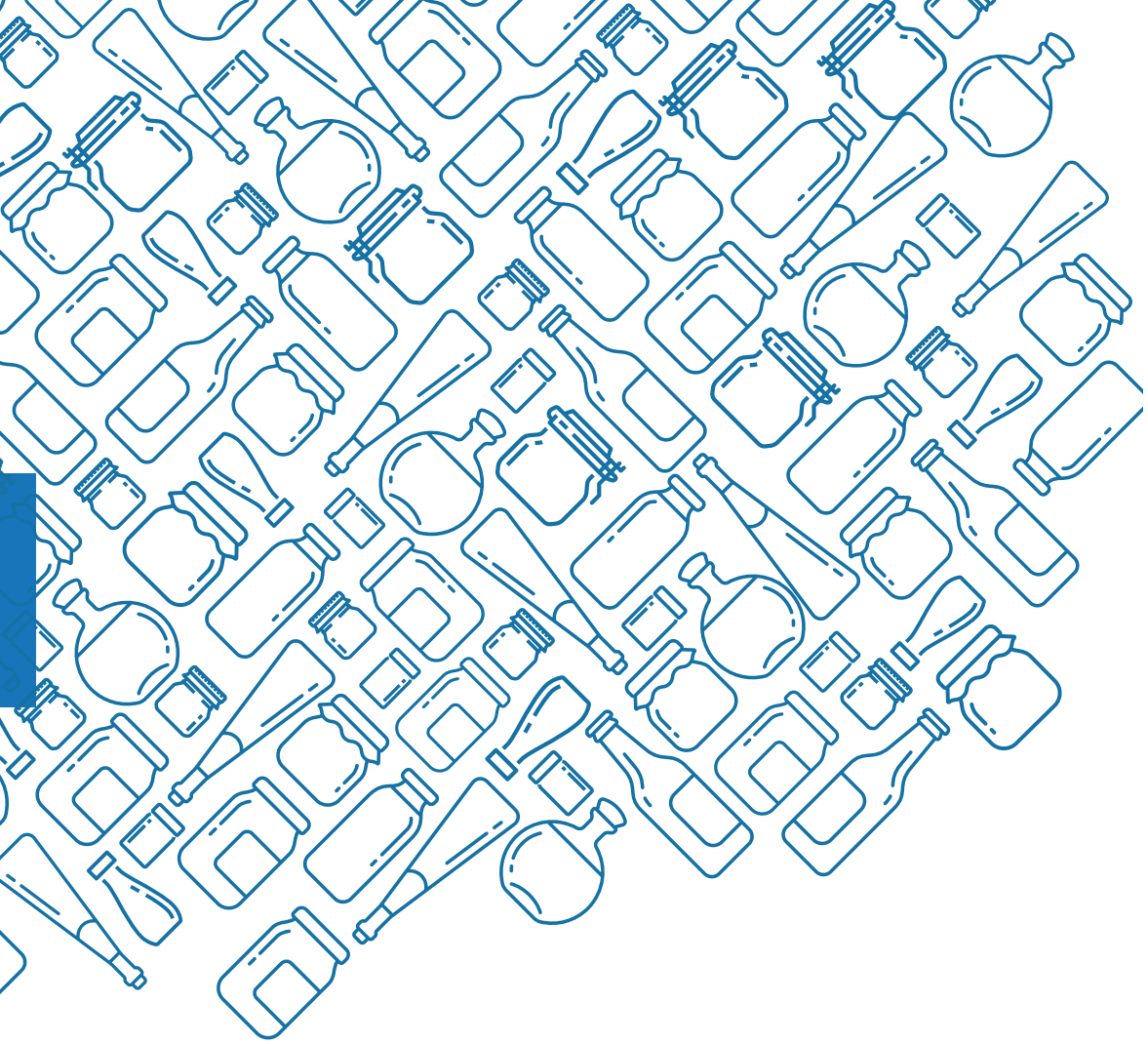

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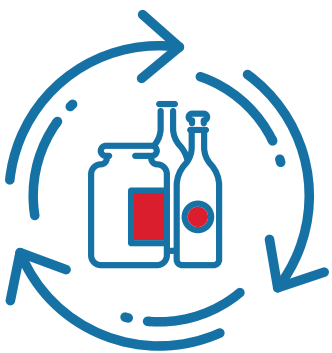

ENABLE A COST-EFFECTIVE GLASS RECYCLING VALUE CHAIN IN WESTERN BALKANS

The project “Enable a cost-effective glass recycling value chain in Western Balkans” was financed by the German Federal Ministry for Economic Cooperation and Development (BMZ), and private partners: Sekopak (Serbia), Ekopak (Bosnia and Herzegovina) and Pakomak (North Macedonia), within the framework of the Program of cooperation with the Private Sector (DeveloPPP). Sekopak, Ekopak and Pakomak are operators of packaging waste management systems developing primary selection in their countries. Together with private companies, the project is implemented by the Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ), in partnership with the National Alliance for Local Economic Development (NALED), the Regional Development Agency of Herzegovina (REDAH) and the Association of Local Government Units of North Macedonia (ZELS).

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INTRODUCTION

This Guide was developed within the regional project "Enabling a Cost-Effective Glass Recycling Value Chain in the Western Balkans", which aims to improve the glass packaging management in cities and municipalities in the Western Balkans countries.

The European Union's Packaging and Packaging Waste Directive stipulated that by 2030, the percentage of glass packaging recycling should be 75%, and thus it is required to develop adequate primary waste selection at the local level and provide citizens with a place to dispose of properly selected waste.

After setting up over 1000 recycling containers for glass packaging, the collection monitoring and model effects assessment methodology was applied in 14 pilot cities and municipalities in Bosnia and Herzegovina, North Macedonia, and Serbia. This included monthly reporting on the collected quantities, according to the preestablished collection routes, with financial costs monitoring that includes human resources and transport costs for each route. The result of the monitoring via this regional project is this Guide presented here. The purpose of the Guide is to serve as a model for all local government units (LGUs) in the region. LGUs can use the instructions and experiences from the Guide in line with the type of their municipality, to establish an efficient and cost-effective glass packaging management system.

The marketing and PR campaign implemented in the project was a continuous activity in all three countries and in all 14 pilot municipalities covered by this Guide.

The project was financed by the German Federal Ministry for Economic Cooperation and Development (BMZ), and private partners: Sekopak (Serbia), Ekopak (Bosnia and Herzegovina) and Pakomak (North Macedonia), within the framework of the Program of Cooperation with the Private Sector (DeveloPPP). Sekopak, Ekopak and Pakomak are operators of packaging waste management systems developing primary selection in their countries. Together with private companies, the project is implemented by the Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ), in partnership with the National Alliance for Local Economic Development (NALED), the Regional Development Agency of Herzegovina (REDAH) and the Association of Local Government Units of North Macedonia (ZELS). The project started in January 2020 and will end in December 2022.


Bosnia and Herzegovina
Serbia
North Macedonia
Serbia:
Niš, Kragujevac, Sombor, Varvarin.
Bosnia and Herzegovina:
Ilidža, Novi Travnik, Konjic, Bihać.
North Macedonia:
Ilinden, Stip, Gevgelija, Tetovo, Bitola, Aerodrom, Gazi Baba.
The collection results in Belgrade and Novi Sad are not included in this Guide statistics.

PARTICIPATING COUNTRIES
SERBIA, NORTH MACEDONIA, BOSNIA AND HERZEGOVINA (BIH)

Bosnia and Herzegovina
- Population: 3,531,159
- Area: 51,197 km2
- Population density: 69 in./km2
- GDP per capita $6,031
- Application for EU candidate country status submitted

North Macedonia
- Population: 1,863,713
- Area: 25,713 km2
- Population density: 72.22 in./km2
- GDP per capita $7,557
- EU candidate country

Serbia
- Population: 6,908,126
- Area: 88,499 km2
- Population density: 90 in./km2
- GDP per capita $7,666
- EU candidate country

WHY GLASS PACKAGING ?

Glass is an inorganic matter, a biologically inactive material, now almost indispensable material in everyday life.

Glass packaging is used for packaging beverages, but also other food or pharmaceutical products. Glass bottles and jars make the biggest share, and in addition to the households, glass packaging is very much used in catering establishments.

The production of glass packaging, especially from primary sources, requires high energy consumption. One way to effectively reduce energy and natural resources consumption is to apply the principles of circular economy in the entire system, i.e. to base the new packaging production on the reuse of waste glass packaging to the greatest possible extent.

A key factor in establishing the circular economy principles in this segment is providing sufficient quantities of collected waste glass packaging

CURRENT STATE OF THE GLASS PACKAGING COLLECTION SYSTEM

• The packaging waste management system includes producers, importers and packers of products and packaging that place products on the market, collection network (companies, utility companies) and recyclers, i.e. producers of new products from waste raw materials. Through the extended producer responsibility system, via the System Operators, the aforementioned industry reports on the packaging placed on the market, the types and quantities of collected, recycled, exported, and disposed of packaging waste to the national Environmental Protection Agency, or the line Ministry. System operators invest the financial charge collected from the economic operators marketing glass packaging in the collection infrastructure (primary selection) development and in covering the operational costs because the market value of glass is significantly lower than the cost of collection.

• No country included in the Project possess a glass recycling plant up to the final product – glass bottles of the required quality for the beverages industry. Thus, the high costs of international transport, mainly to pants in Croatia and Bulgaria, additionally burden the negative economy of glass packaging collection. Serbia is the only one with the plants that grind waste glass (cullet), which is then exported for final processing to Bulgaria. The glass packaging producer, Srpska fabrika stakla, Paraćin, does not possess the required municipal glass treatment technology. International transport of glass waste for processing is a worse option from the environmental point of view due to carbon dioxide (CO2) emissions and fuel consumption.

• The characteristic of all three countries included in the project implementation is that the primary selection of waste glass packaging at the local level has just started.

• There are few utility companies in all three countries that have the infrastructure to collect glass packaging/collect separately.

• Bottles for beverages (wine, spirits, juices, beer) and jars for winter stores are the most common glass packaging waste in households.

NATIONAL GOALS OF GLASS PACKAGING RECYCLING AND REUSE

The European Union stipulated for the Member States the commitment that by 2030 they must reach the target of **75% of recycled glass packaging.**

Bosna i Hercegovina
The goal for glass packaging recycling in Bosnia and Herzegovina is 12% and has not been changed since 2016.
Recycled 2,278t*
Placed on the market 47,512t*

Srbija
Serbia prescribed growth targets for the period from 2020 to 2024 of 1% per year. In 2022, operators will be obliged to ensure the recycling of 46% of packaging waste, and in 2024, 48%.
Recycled 27,743t
Placed on the market 61,980t

Severna Makedonija
In North Macedonia, as of 2021, the goal for packaging glass recycling is 40%, in 2025, it increases to 55%. The target for 2030 is 70%, while for the year 2035 the recycling target is 75%.

*2019 sa s reference year - before the epidemics

BOSNIA AND HERZEGOVINA

In BiH, the target for glass packaging recycling is 12% which has not changed since 2016.

2019

recycled placed on market

SERBIA

Serbia's stipulated via a Regulation the raising of targets for 2020 to 2024 period of !% per year.

In 2022, operators will be obliged to ensure the recycling of 46% of packaging waste, and 48% in 2024.

2019

recycled placed on market

NORTH MACEDONIA

In North Macedonia, from 2021, the target for packaging glass recycling is 40%, in 2025 it will rise to 55%, the target for 2030 is 70%, and 75% for 2035.

2019

recycled placed on market

*2019 sa s reference year - before the epidemics

REGULATORY FRAMEWORK - CHALLENGES

- The EU Packaging and Packaging Waste Directive has been partially transposed into legislation, but the application is subject of poor control
- National packaging targets are not aligned with EU targets in full
- Local governments are not mandated to collect recyclable waste separately, nor have they set targets for recycling and reuse.
- Insufficiently developed control of the implementation and application of the adopted documents and poor inspection capacities.
- Inconsistencies between individual local legal acts leads to misalignment of the municipal packaging waste management system and makes the results achieved at the local level incomparable
- Local planning documents do not include locations for setting up the recycling islands, so in practice, it is extremely complicated to provide locations for separate waste collection containers.
- The lack of systematic control of all participants in the chain by the line authorities.
- Waste disposal/landfilling fees are low or nonexistent which makes the primary selection and recycling expensive and non-profitable compared to landfilling

REGULATORY FRAMEWORK – RECOMMENDATIONS

- Continuous and timely alignment of national legislation with EU regulations in the field of waste management and circular economy.
- Stipulate five-year general and specific targets for the recycling and reuse of packaging waste, which will ensure the development of the system and enable the achievement of EU goals in accordance with national EU accession policies and the negotiation process.
- Stipulate five-year recycling targets for local government units including penalties for targets missed.
- Train market, financial and environmental inspection to control the application of legislation in the field of packaging waste management, ensure compliance with the law and fair conditions for all market participants.
- Define uniform practice of municipal (packaging) waste management in terms of decision-making - prepare a comprehensive legal act that would standardize the process of packaging waste management at the local level, applicable in practice, but also one that facilitates simple regulation of mutual relations with a public or private company at the regional level.
- Ensure that local governments meet their obligations of preparing waste management plans and setting micro-locations for the installation of packaging waste collection equipment in accordance with the subject plans, in agreement with the selected packaging waste collection operator.
- Establish a control body for packaging and packaging waste - Clearing house consisting of representatives of all packaging waste management system operators, including the representatives of the line ministry, whose responsibility is to ensure the control of the packaging quantities that are reported as placed or collected on the market and regulate issues of importance for the establishment of primary selection of packaging waste in local government units.
- Introduce and/or increase the environmental disposal/landfilling fee to discourage disposal/landfilling and, thus, make the waste landfilling the least cost-effective option, which will encourage recycling.

LIST OF STEPS FOR INTRODUCING THE GLASS PACKAGING COLLECTION AT THE LOCAL LEVEL

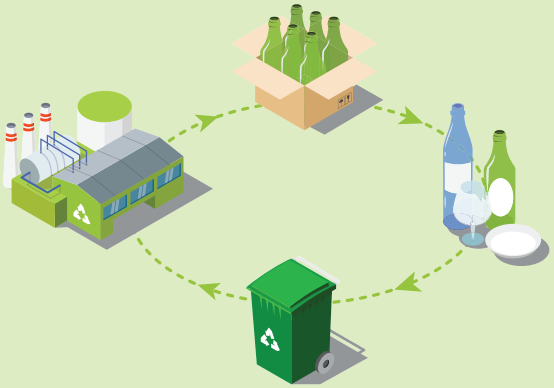
1. PROVIDE LEGAL PREREQUISITES FOR GLASS PACKAGING COLLECTION
High-quality and realistic spatial documents and waste management plans should be your guide.

2. PROVIDE FUNDS FOR EQUIPMENT PROCUREMENT AND SYSTEM OPERATOR SUPPORT
The financial support of the system operator is required to cover operating costs.

3. SET OPTIMAL LOCATIONS FOR GLASS PACKAGING SELECTION CONTAINERS
Create a cadaster of vessel sites according to population density and community needs.

4. IMPLEMENT EQUIPMENT PROCUREMENT - COMPATIBILITY OF CONTAINER AND VEHICLES
Before purchasing containers, make sure that you also have an adequate collection vehicle at your disposal.

5. TRAIN STAFF IN PROPER EQUIPMENT HANDLING
Worker safety comes first, while proper handling also reduces costs.



6. SET THE MOST EFFICIENT COLLECTION ROUTES AND CHANGE AND IMPROVE ON AS NEEDED BASIS
Organize the routing system, track results and match routes to realistic needs.

7. MATCH THE EMPTYING SCHEDULE TO THE REAL NEEDS
The filling of the containers can vary, follow the variations and adjust the schedule accordingly.

8. MONITOR ECONOMIC INDICATORS AND WORK ON COST OPTIMIZATION
Appoint the person who will manage only the costs, do not empty the half-empty containers and optimize the collection routes.

9. INFORM CITIZENS THROUGH AN INTENSIVE AND LONG-LASTING PUBLIC CAMPAIGN
Citizens often do not believe that the waste they separate is actually recycled, so they should be regularly informed about the results achieved.

10. KEEP TRACK OF YOUR RESULTS AND MAKE THEM PUBLIC SO THAT CITIZENS KNOW THAT THE SYSTEM IS WORKING AND THAT THEY TOO ARE CONTRIBUTING TO THE RESULT 10. Your results are also the results citizens have achieved. Publish results on regular basis.

STEP 1: PROVIDE LEGAL PREREQUISITES AND A GLASS PACKAGING COLLECTION PLAN

• **Obtain the appropriate permit for the collection, transport and storage of waste glass packaging** from the line service of the municipal/city administration

• Adopt the **Plan of locations for waste glass packaging containers.**
The plan includes a list of locations/sites where containers are installed and appropriate graphic attachments - maps, sketches, and photographs with the obtained permits of the line services for the management or maintenance of public areas where bells are to be installed – elaborated in step 3

• Obtain the appropriate **location permit** for placing waste glass containers

STEP 2: PROVIDE FUNDS FOR SELECTED EQUIPMENT PROCUREMENT AND SYSTEM OPERATOR SUPPORT

• **Potential financial sources for equipment procurement (container and vehicles) are as follows:**

- Own funds of utility companies or environmental fund of local governments;
- National budget;
- International financial institutions – donations or loans;
- Commercial loans and leasing;
- Leasing/renting;

• **The logic of compliance of container and vehicles in selecting the adequate equipment should serve as the guideline - analyzing the weight of the glass packaging and the handling requirements during emptying.**

• Consider the possibility of upgrading existing vehicles with appropriate equipment for lifting and emptying containers.

• If collection is organized at the level of a region or several local governments, consider the possibility of using one vehicle to optimize costs.

STEP 3: SET OPTIMAL LOCATIONS FOR GLASS PACKAGING SELECTION CONTAINERS

– CRITERIA AND CHALLENGES

Compact type of settlement Urban area	Semi-compact type of settlement Suburban area	Dispersed type of settlement Rural area	HoReCa
• Densely populated downtown areas with intense pedestrian and vehicle traffic; • Administrative, trade and hospitality centers; • Collective and individual housing; • Lack of available space in public areas; • It is extremely problematic to find locations for collection containers; • Difficult vehicle access;	• Medium and less populated areas of the wider surroundings of big cities; • In terms of characteristics, this category include areas of the wider center of smaller cities and settlements with individual housing; predominantly individual housing, industrial and economic areas, less developed hospitality. • Green and agricultural areas on the perimeter of the area to a greater extent. • The occupancy of the bell can vary drastically within a single route. • Easy vehicle access;	• Less populated zones outside urban settlements; • They can be compact rural settlements or dispersed especially in mountainous areas; • Individual housing is dominant; • Less hospitality facilities, except in rural tourist centers; • Less frequent pedestrian and vehicle traffic. • Agricultural areas and economic activities related to agriculture and livestock farming; • Easy vehicle access, but high transport costs due to the distance.	• The HoReCa Canal consists of cafes, restaurants and hotel facilities and is a source of the most significant municipal packaging glass. • HoReCa is the most present in the city central zones, which are mainly the tourism sites. • Packaging glass collection from these sites may be difficult due to poor vehicle accessibility or pedestrian zones. Another problem is the lack of storage space for glass packaging. • Ideally, each HoReCa facility has its own glass container, with a wide opening in the immediate vicinity of the facility, to make it as easy as possible to separate glass packaging and take as little time as possible for this activity.
Recommended bell sites			
•Existing recycling islands, locations with municipal waste vessels; •Sites in front of shops and green markets;	• Existing recycling islands, locations with municipal waste vessels; • Sites in front of shops and green markets; • Corners where the streets in the individual residential zone connect;	• Sites for bells in the center of the village - shops, community centers, cultural centers, schools, taverns, agricultural pharmacies	
Recommended distance between bells			
100 – 500m	300 – 1000m	> 500m	

The key criteria for successful bell installation are as follows:

- Site accessibility for emptying vehicle;
- Possibility of installation at the locations of existing municipal waste containers;
- A greater number of potential users;
- Possibility of obtaining permit for the installation of glass packaging bells on public areas;
- Adequate distance between the installed bells;
- Predefined locations of waste disposal containers in spatial or strategic plans;
- Defined Organized Collection Programs - routing, transport and storage of classified recyclable materials (the Program includes elements from the Site Plan for the installation of containers for waste glass packaging originating from municipal waste as well as the expected quantities, collection frequency, transportation mode and storage);
- Procurement of smaller containers;
- Possibility of abolishing parking sites to provide locations for the installation of waste disposal containers;

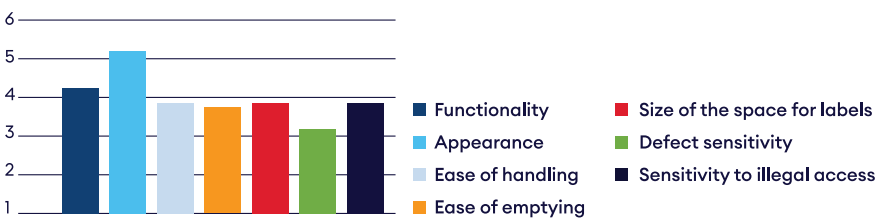
According to the experience gained through the project implementation, the most common challenges in selecting locations for setting the bell were as follows:

- Lack of space at the locations of existing municipal waste containers;
- No possibility to set the glass disposal bells in pedestrian zones;
- Unclear ownership of public areas adequate for the installation of the bell;
- Unclear and demanding procedures for obtaining location permit from the line local government authorities;
- Narrow sidewalks;
- Occupancy of existing public areas with parking spaces;
- Difficult vehicle access for bell emptying;

STEP 4: IMPLEMENT EQUIPMENT PROCUREMENT - COMPATIBILITY OF CONTAINERS AND VEHICLES

Plastic bell (igloo) for glass packaging (1,3m3 and 1,5 m3) with collection holes on two or more sides provide for the storage of larger quantities of glass packaging (from 300 to 500 kg, depending on the size) on public areas. The bells are designed to allow easy emptying, and safe handling by both the emptying workers and the citizens who dispose of the glass packaging. Occupancy measurement windows did not prove necessary.

GLASS BELLS Acquired within the project are highly rated by the users in terms of all characteristics.



The most optimal vehicle for emptying the glass packaging waste bell is a dump truck with emptying arm, which was used by 60% of the companies involved in the project. A box truck with emptying arm is an alternative solution, used by 30% of companies. One Utility Company, lacking an adequate vehicle, used a box truck and a construction vehicle with a claw as an alternative. The truck driver and the auxiliary worker participate in the emptying operation. Only in one company one person performed the emptying job – the truck driver.

Containers with a larger opening are recommended for packaging glass collection from the HoReCa sector that allows the simultaneous disposal of larger glass waste quantities. 120l plastic bins and vans or “pick up” vehicles have proved to be the optimal solution for collecting glass packaging from the hospitality sector.

Abroll containers with stainless steel reinforcements of 8m2 and bigger are the ideal solution for storing glass packaging.

Note: *Glass packaging disposal in classic municipal containers emptied by waste collecting trucks (compactors) is not recommended because this type of containers does not have adequate capacity for the weight of glass, and broken glass damages the hydraulics of the waste truck resulting in higher maintenance costs.*

STEP 5: TRAIN STAFF IN PROPER EQUIPMENT HANDLING

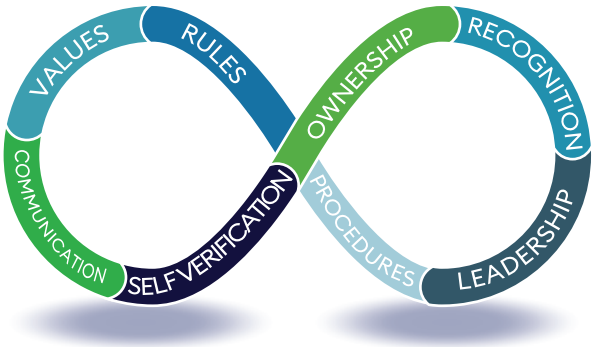
Safety of all participants in operations in the first place

• Packaging waste collection operations include driving a freight vehicle through settlements, frequent stops, operating a vehicle in the start – stop mode, hanging heavy collection equipment with glass and lifting on a truck, which all together makes a high-risk operation for the safety of both workers engaged in collection operations, as well as other participants in traffic, equipment, surrounding assets.

• It is necessary to define and prescribe the safety procedures for all phases of operations depending on the inherent risks and conduct training of workers engaged in the transport, collection and reception of packaging glass.

• Workers should be encouraged to check the effectiveness of procedures and make suggestions for improvements, impose an obligation to report all avoided or experienced accidents in order to adequately prevent their reoccurrence.

• Operational hygiene is required to avoid waste glass spill outside the containers, which can cause damage to vehicles or injury to passers-by.



Checks of compliance with emptying procedures for containers and hygiene of the surrounding area should preferably be carried out periodically, and afterwards, inform all actors about the findings and take appropriate corrective measures if the need arises, but also reward and encourage good results.

STEP 6: SET THE MOST EFFICIENT COLLECTION ROUTES AND CHANGE AND IMPROVE ON AS NEEDED BASIS

•Routing is a challenge. Utilities and collecting companies do not have the appropriate software tools required to master routing so it mainly relies on experiences and long-established practices. Given that dedicated containers for separate glass packaging collection are usually placed next to or near existing containers for mixed municipal waste, companies usually apply the existing routes.

•Route designing requires consideration of several factors – the **location of the container, population density, traffic frequency and the best time for emptying the container**. Routing and route hours should consider optimization, as well as the time of emptying containers so that noise during operations does not disturb the citizens or the intensity of traffic does not slow down operations.

•Routes can be **fixed or variable.** Variable collection routes can be created in small settlements because there is a better filed information about the occupancy of containers, so the route is created accordingly. This type of routing contributes to optimizing costs because containers are emptied at maximum occupancy. However, in large populated areas, variable routes are not possible without modern software tools and technology that provides for the measurement of vessel occupancy and data sharing via the center / person in charge of routing.

•The existing routes are usually used in big settlements as per the preestablished schedule.

•If economic indicators show that collection is not well optimized, review and improve the routes to reduce logistics costs.

Additional container or modifying vessel locations can correct vessel occupancy and raise route efficiency.

STEP 7: MATCH THE EMPTYING SCHEDULE TO THE REAL NEEDS

- Emptying schedule is a significant factor of the cost-effectiveness of collection operations. If it is not adequately coordinated according to real needs, it can lead to high costs due to frequent emptying of poorly filled containers (less than 80% of occupancy) or discourage citizens and poor hygiene of the container location due to waste accumulation in and out of the container.

- The emptying schedule is largely dependent on the population density of the site where the container are located.

- Adequate route schedules in line with vessel occupancy not only contribute to lower operating costs, but also to the reduction of CO2 emissions and consequently pollution in populated areas. Avoiding unnecessary transport, both in terms of the economic and environmental aspects, brings benefits to the company, as well as to the community/citizens who finance operations of glass packaging collection from municipal waste through the utility service price or the packaging fee included in the price of the product.

Compact type of settlement Urban area	Semi-compact type of settlement Suburban area	Dispersed type of settlement Rural area	HoReCa
Emptying schedule:	Emptying schedule:	Emptying schedule:	Emptying schedule:
• 15 to 45 days;	• 30 to 90 days;	• Ideally, on call; • 30 to 180 days;	• Ideally, on call; • Depending on the season, weekly

STEP 8: MONITOR ECONOMIC INDICATORS AND WORK ON COST OPTIMIZATION

Possible business models of successful glass packaging management in local governments:

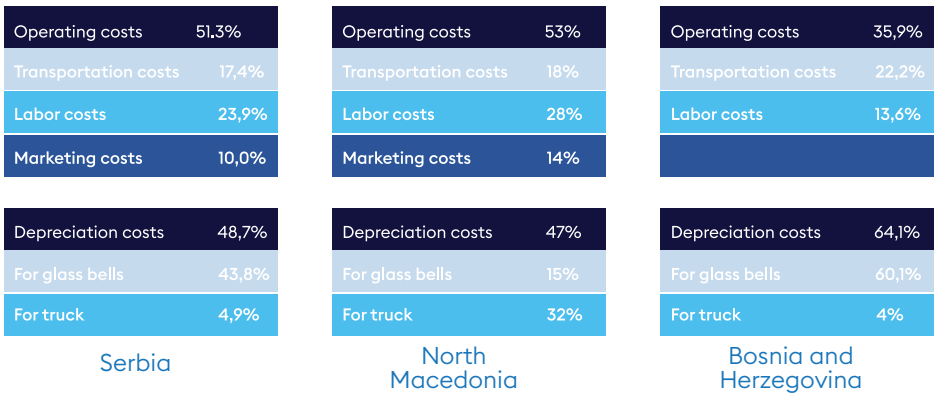
- LG invests in bells – PUC covers collection costs – PUC sells the collected glass -requires financial support from the system operator
- LG invests in bells – System operator covers the collection costs of PUC and owns the collected glass
- LG receives bells as the donation – the System operator covers the collection costs of PUC and owns the collected glass
- The system operator invests in the bells and organizes the collection – The system operator covers the collection costs and owns the collected glass

PROJECTED INVESTMENTS IN COLLECTION EQUIPMENT – BELLS AND VEHICLES

The investment results in financial outflow in the full amount.

From the moment of setting up and using the equipment, it starts to affect the costs through depreciation.

AVERAGE PUC/PRIVATE COLLECTORS COST STRUCTURE WITH ADEQUATE COST OPTIMIZATION



NOTE: *The costs of collecting glass packaging are conditioned by a number of factors (depreciation period, standardized or non-standardized routes, collection schedule, settlement type, number of containers on the route, etc.). The costs by country are calculated via different parameters during the pilot project and are not necessarily standardized.*

The most optimal costs were obtained as follows:

- The rate of container occupancy in the case of an optimal route should not be less than 80%;
- The optimal number of workers for bell emptying job is 2 (two) /driver and auxiliary worker
- An example of a standardized urban route of 55-60 km with 20 containers for Serbia and BiH and 184 km with 55 containers for North Macedonia was used to calculate the cost of the optimal route.

Higher marketing costs mean higher quantities of collected glass, lower unit costs of glass collection (RSD/kg) and change in the ratio of operating costs and depreciation costs.

* In BiH, marketing costs of 22% were not included.

STEP 8: MONITOR ECONOMIC INDICATORS AND WORK ON COST OPTIMIZATION

– CHALLENGES AND RECOMMENDATIONS

Najveći izazov u praćenju finansijskih pokazatelja i optimizaciji troškova predstavlja nedostatak ljudskih resursa angažovanih na ovim poslovima u komunalnim preduzećima. Uočeno je da se komunalna preduzeća ne bave analizom operativnih troškova, da nemaju adekvatna rešenja za rutiranje, niti zaposlene angažovane i obučene za poslove analize operativnih troškova i unapređenja operacija u cilju njihovog smanjenja.

Iskustva komunalnih preduzeća pokazuju da su logistički troškovi viši usled velike udaljenosti između posuda, male popunjenosti zvona, a na sakupljene količine i profitabilnost negativno utiču neformalni sakupljački koji neovlašćeno preuzimaju otpad iz posuda komunalnog preduzeća.

Analizom ekonomskih pokazatelja uočeno je da popunjenost posuda u trenutku pražnjenja ima najveći uticaj na ekonomičnost operacija.

THE AVERAGE PRICE OF COLLECTION OF ONE TONNE OF WASTE GLASS DURING THE PILOT PROJECT PERIOD BY COUNTRIES WAS AS FOLLOWS:

1t

SERBIA – 130-150 EUR/t
NORTH MACEDONIA – 170-200 EUR/t
BOSNIA and HERZEGOVINA - 356 EUR/t

Reducing the cost of collecting municipal glass waste, i.e. raising the efficiency of utility operations, is possible through a flexible approach to routing, as well as by incorporating new technologies via occupancy sensors and routing software, which have not been tested in this project.

STEP 9: INFORM CITIZENS THROUGH AN INTENSIVE AND LONG-LASTING PUBLIC CAMPAIGN

If the goal is to have citizens who make an effort to separate and bring packaging into dedicated containers, their awareness of the benefits of such behavior for them personally and for the local community must be raised. This is the reason why the campaign should be continuous and use all available sources of information.

- Form a PR and communications team from all services involved in waste selection activities.
- Select a marketing agency or share internally the work related to the development of the communication strategy and its subsequent implementation (line institutions and persons in charge of implementation).
- Match the visual identity of the campaign – the message of what is being separated must be clear, visible and illustrated with easily identifiable graphic solutions. Branding containers is an important means of communication.
- Based on the project experience, the pillar of the PR campaign is LGU, while the marketing campaign implementer in the field is PUC.

OBJECTIVE OF THE COMMUNICATION STRATEGY	TARGET GROUPS	PROJECT PROMOTION PHASES	KEY CAMPAIGN DIRECTIONS
EDUCATION – why are we selecting waste?	Line institutions	INITIAL PHASE – before infrastructure set up – local media visits and educational texts.	Dinamika pražnjenja:
MOTIVATION - Incentivizing waste selection	The general public	IMPLEMENTATION PHASE – focus on providing information to citizens at the local level – distribution of leaflets with container locations and the correct method of disposal as an addition to the bills.	DIGITAL – social networks as a means of informing citizens of middle and young age through written, visual, audio and video content.
ACTIVATION – specific actions with citizens	Waste generators	FINAL STAGE – promotion of results.	FIELD CAMPAIGN – contributes to the visibility the infrastructure. Education and workshops for children in schools encourage changes in the habits of the whole family.

It is estimated that min. 10% of the investment value of the container was invested through the project in marketing and PR campaign.

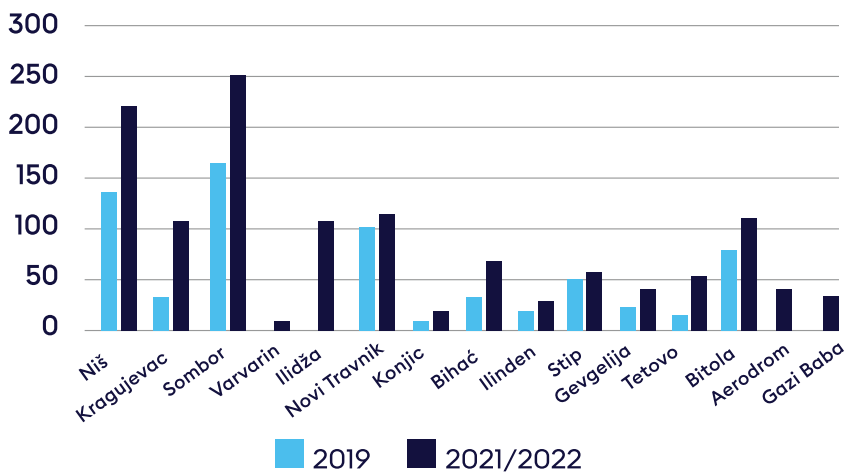
* All promotional materials produced within the project, in the form of drafts and open files are available as an annex to the online version of the Guide and can help other LGUs and PUCs for promotional activities.

STEP 10: KEEP TRACK OF YOUR RESULTS AND MAKE THEM PUBLIC SO THAT CITIZENS KNOW THAT THE SYSTEM IS WORKING AND THAT THEY ARE CONTRIBUTING TO THE RESULT TOO

The citizens must be aware of the results they have achieved if you want them to have confidence that the system really works and permanently build motivation to participate in the system. Inform them at least once a year about the collected and recycled quantities, remind them why this is important and thank them for their cooperation.

THANK YOU FOR JOINING US IN SENDING 1268t OF PACKAGING GLASS
TO RECYCLING INSTEAD OF LANDFILLS DURING THE 12 MONTHS OF THIS PROJECT

WE MANAGED TO INCREASE THE COLLECTION BY 90%



EXPERIENCES FROM SERBIA

The first project implementation challenge was the lack of an adequate vehicle for glass bell emptying. All utility companies in Serbia, except in one municipality, have procured adequate vehicles (box or dump truck with arm/lifter) with the support of the system operator or from their own resources.

According to the assessment of utility companies, the selected equipment proved to be highly functional. Emptying is simple, and the time required to empty one bell is about 3 minutes on average.

One utility company used 2 vehicles, a truck and a construction vehicle with a claw, for bell emptying, which caused a higher collection cost.

In addition to the truck driver, an auxiliary worker was engaged in collection operations in all companies. Handling of the bell and the control of the lifting process - the bell emptying operation can not be performed by only one person, i.e. the truck driver.

Vehicle accessibility was a necessary feature of bell locations. Avoid emptying the bell during periods of heavy traffic in areas of narrow streets and intensive traffic.

Utilities avoided emptying the glass bell in the early morning and late evening due to noise caused by glass spilling into the truck.

Damage to the bells was noticeable only in Nis, where the bells were broken and the glass was taken by informal collectors.

When it comes to choosing locations for glass bells, utility companies have followed key recommendations – to place them next to existing utility containers. At locations where the glass bells were set independently, i.e. there was no other communal container for mixed or separated waste, it was noticed that citizens leave separate and other fractions besides the packaging glass – PET bottles, cans, in bags disposed next to the bells, or insert them into the bells, which affects the purity and quality of the collected material.

In rural areas, bells were placed in the center of the village next to the shops, cultural centers and similar.

The best results of bell occupancy were achieved by companies that did not have fixed emptying schedules. The bells were emptied after the occupancy information were provided by citizens or employees of the utility company. Low bell occupancy during emptying largely affects collection c

EXPERIENCES FROM NORTH MACEDONIA

The biggest barrier in North Macedonia was the mapping, i.e., setting the container locations in all municipalities, because competencies were not aligned, and locations were not included in urban plans.

There is a need for closer cooperation in municipalities where the process of collecting glass packaging is delegated to collective operators - reports of utility services should elaborate the glass packaging waste.

The interest of utility companies and local governments in separate collection and recycling needs to be intensified.

Data on separately collected glass packaging waste are not included in mandatory reports and local strategic documents (municipal/solid waste management plans).

Existing documents hardly mention that a separate glass collection system has been established. There is no database and local reporting procedures are inconsistent with activities in national programs and obligations stemming from legislation.

Capacities for monitoring and analyzing the collected quantities are not satisfactory. Due to changes in management structures and operational staff, organizational memory is missing and knowledge is not transferred. Multi-level trainings are missing, especially at the operational and middle management levels.

Utilities/collective operators avoided emptying the glass bell in the early morning and late evening due to noise caused by glass spilling into the truck.

Only a few bells/containers were damaged.

When it comes to selecting locations for glass bells, utility companies have followed key recommendations – to place them next to existing utility containers, eco-islands or at locations where truck operation was possible without interfering with the normal movement of pedestrians and vehicles.

At locations where the glass bells were set independently, i.e. there was no other communal container for mixed or separated waste, it was noticed that citizens leave separate and other fractions besides the packaging glass – PET bottles, cans, in bags disposed next to the bells, or insert them into the bells, which affects the purity and quality of the collected material.

In rural areas, bells were placed in the center of the village next to shops and schools.

EXPERIENCES FROM BOSNIA AND HERZEGOVINA

There were several challenges during the project implementation phase in all municipalities where the project was implemented.

One of the challenges is obtaining permits for setting the glass packaging waste bells and setting the location of the bell in some of the municipalities.

Sites for glass packaging waste bells were selected in consultation with utility companies and on the basis the needs of individual local communities. Selected locations are most often next to existing utility containers, eco-islands and locations where access for bell emptying trucks is possible. In all municipalities, the bells placed in the rural zone did not have a significant contribution to the total quantity of collected glass packaging waste.

Noticeably, caterers which are the dominant generators of waste glass packaging do not perform separation and disposal of the subject waste in dedicated containers. Also, the openings on the bells are quite small which makes the bell difficult to use.

In one municipality, the utility company refit the bell, thus facilitating the use of the bell for the HoReCa channel. Certain bells do not have a bell occupancy control label, so the occupancy record keeping was difficult for some utility companies.

Legal entities that expressed interest at the beginning of the project have issued consent for the installation of the bell, but during the implementation of the bell, they are not emptied due to insufficient occupancy.

Challenges related to infrastructure in selected utility companies made the implementation of the project difficult. The lack of a suitable vehicle for glass bell emptying and truck weighing equipment were the challenges that were identified at the very start of the project.

Utility companies received support for the project implementation through cooperation with the system operator. At least two workers, a truck driver and an auxiliary worker were hired in all companies for glass packaging waste collecting.

The results of the bell occupancy are different.


COLLECTIVE OPERATORS
FILLING POINTS
UTILITIES AND PRIVATE COLLECTING COMPANIES
LOCAL GOVERNMENT
RECYCLERS
CITIZENS
STATE

INSTEAD OF CONCLUSION

COLLABORATION

key recommendation for the glass packaging management improvement

Without the cooperation of all stakeholders in the chain, it is not possible to establish a long-term sustainable glass packaging management system!

The waste glass packaging collection largely depends on the financial support of the system operator, i.e. the responsible industry, which according to the law bears "extended" responsibility for the packaging they place on the market. It also depends on the human and operational capacities of public utility companies/collectors and the motivation of local governments to provide them with adequate working environment. However, without the willingness of citizens to participate in the primary selection of waste, the results will be non-existent, so it is crucial to ensure the support of the media, citizens' associations, and educational institutions in educating citizens with the aim of raising awareness of the importance of recycling and the use of waste as a resource. In the end, or at the beginning, it is the state that is obliged to provide an encouraging regulatory framework and related application, so that all stakeholder act in the same direction in a stimulating environment.

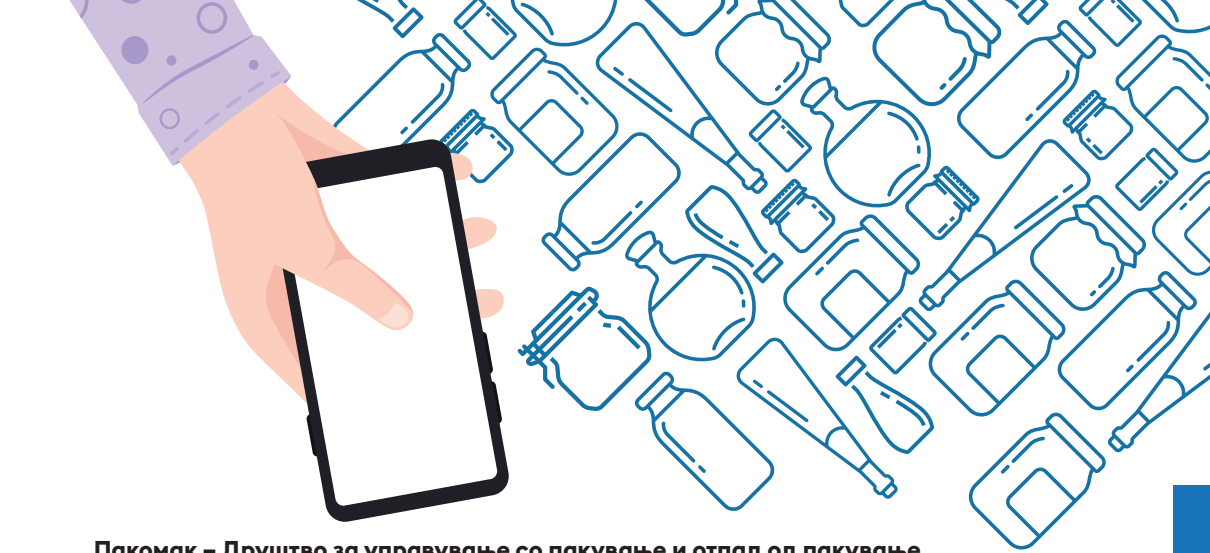
ADDRESS BOOK OF ALL PROJECT PARTNERS:

NALED
Makedonska 30/VII
11103 Beograd, Srbija
Tel: +381 11 337 30 63
E-mail: naled@naled.rs
Web: **www.naled.rs**

Sekopak D.O.O. Beograd
Milutina Milankovica 3v, 1. sprat,
11070 Novi Beograd, Srbija
Tel: +381 11 4350 450
E-mail: o_ce@sekopak.com
Web: **www.sekopak.com**

GIZ Open Regional Fund for South East Europe – Modernisation of Municipal Services Deutsche Gesellscha_ für Internationale Zusammenarbeit (GIZ) GmbH
Bulevar Mihajla Pupina 115D/III,
11000 Beograd
Tel: +381 11 3122-995
E-Mail: zorica.bilic@giz.de

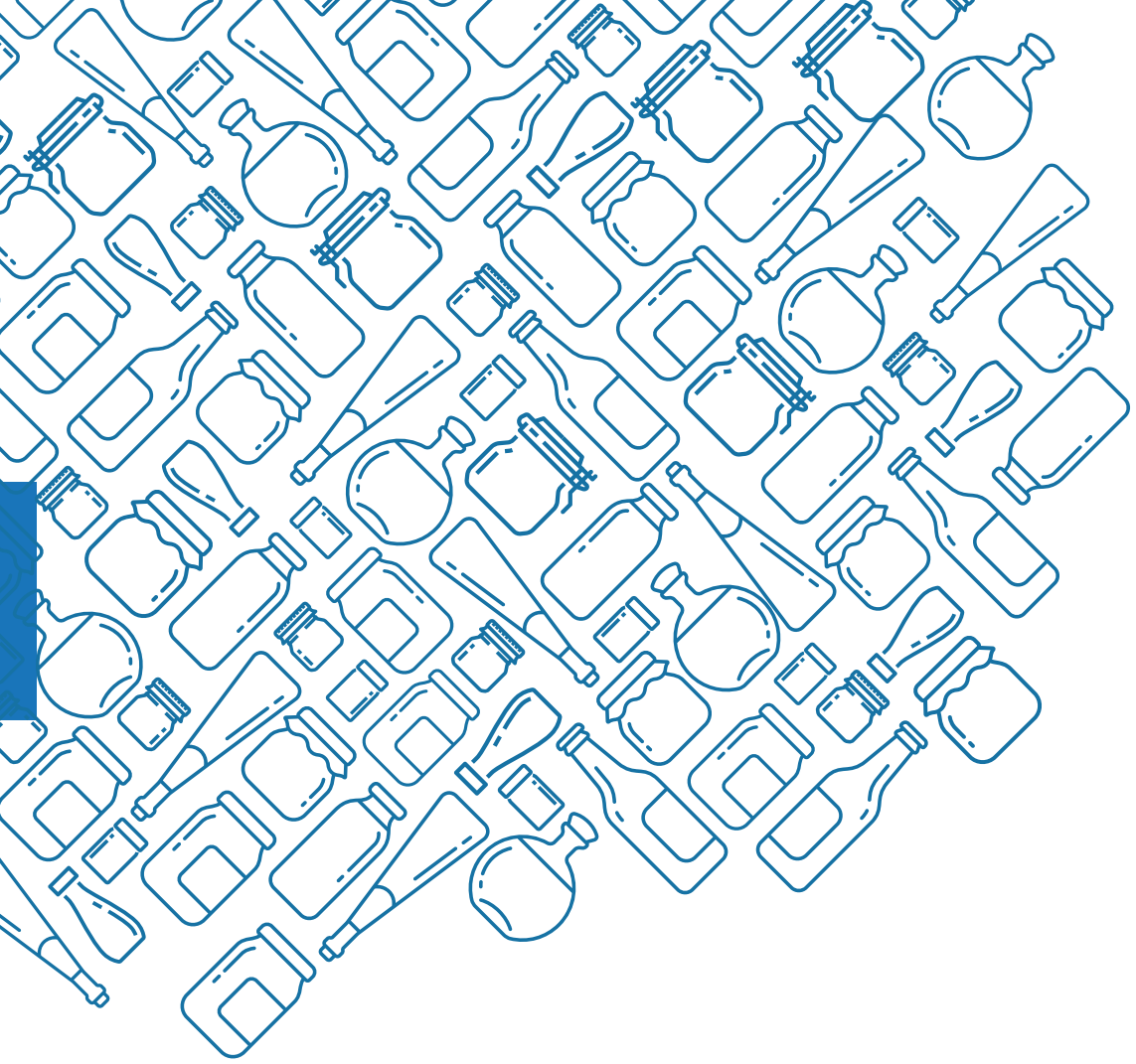
Заедница на единиците на локалната самоуправа на Република Северна Македонија - ЗЕЛС
Копенхагенска 5
п.фах: 32
1000 Скопје
Република Северна Македонија
Tel: +389 (0)2 30 99 033
Fax: +389 (0)2 30 61 994
E-mail: contact@zels.org.mk
Web: **www.zels.org.mk**

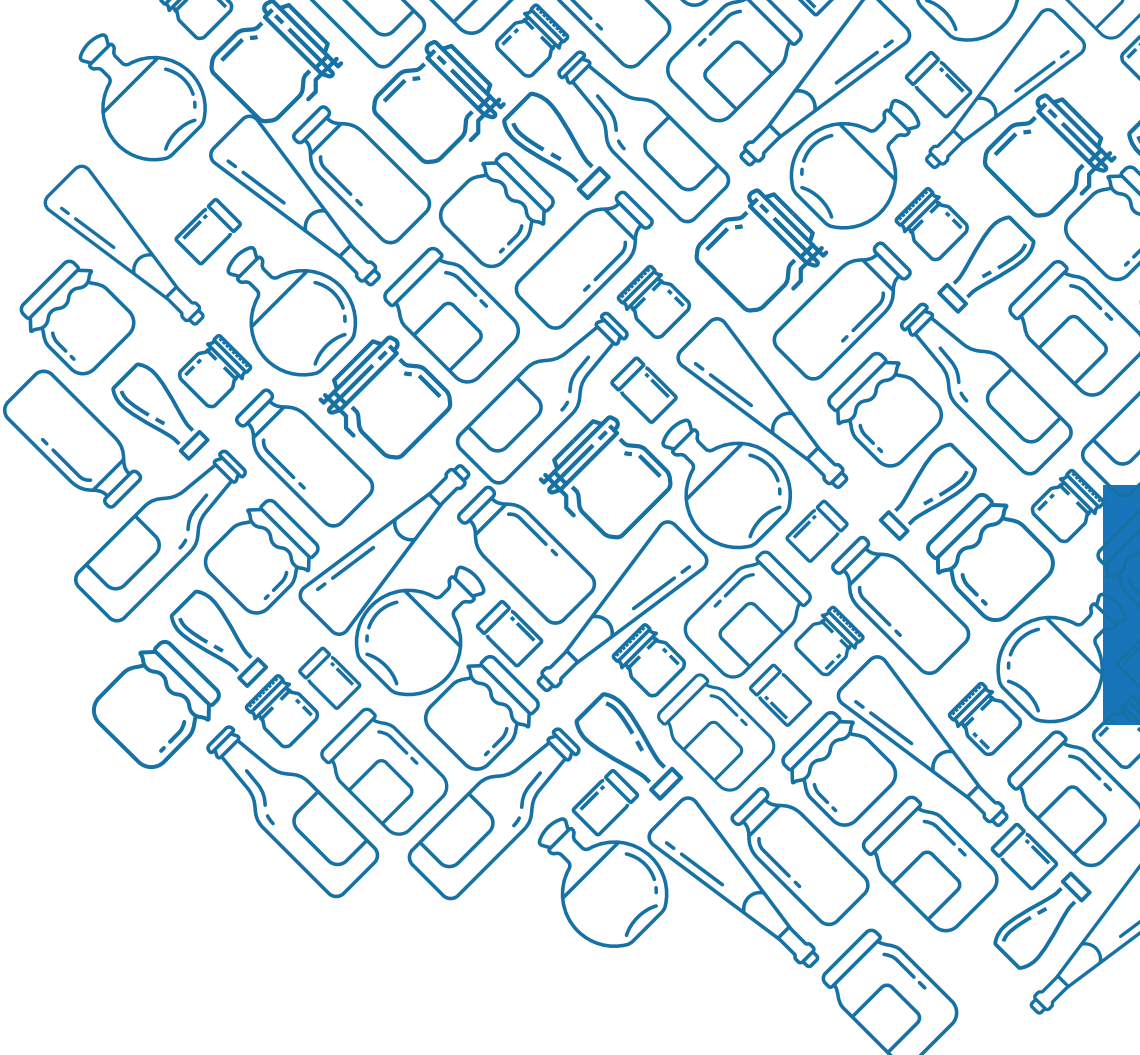


Пакомак – Друштво за управување со пакување и отпад од пакување
Бул. Партизански одреди, Порта Влае блок 4
1000 Скопје
Република Северна Македонија
Tel: +389 (0)2 20 44 567
Web: **www.pakomak.mk**

Asocijacija za ekonomski razvoj REDAH
Bulevar narodne revolucije 15
88000 Mostar
Tel: +387 36 557 210
E-mail: info@redah.ba
Web: **www.redah.ba**

Društvo za postupanje sa ambalažnim otpadom Ekopak d.o.o.
Zmaja od Bosne 7–7a, O3/6
71000 Sarajevo, BiH
Tel: + 387 33 921 934
Fax: + 387 33 921 935
E-mail: info@ekopak.ba
Web: **www.ekopak.ba**





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You can find the documents and analyses this Guide is based on by scanning the QR code below