

Advancing sustainable municipal waste management in Ukraine: Lviv agglomeration case study

(summary of research paper)

Inclusive recycling of municipal waste in Lviv. Photo by Bohdan Yemets for [Zero Waste Lviv's](#) "Zbyrachi" project.



Contact information:

Yanina Basysta, Ecosmart, yanina.basysta@gmail.com

Author: Yanina Basysta (Ecosmart)

Reviewers: Olga Melen-Zabramna (Environment-People-Law), Evgenia Tasheva, Vladlena Martynkevych, Fidanka Bacheva-McGrath (CEE Bankwatch Network)

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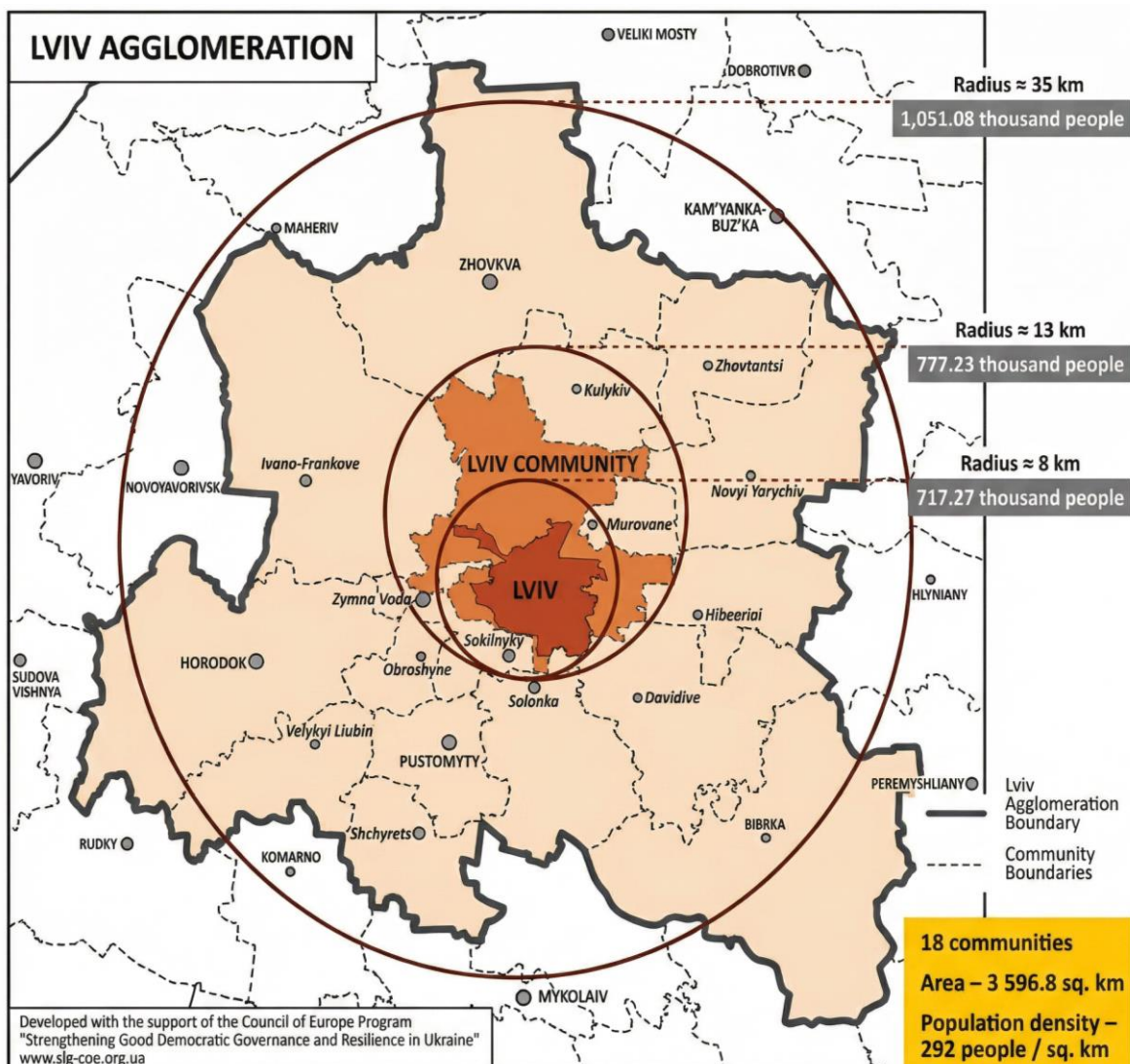
Executive summary

The Lviv agglomeration is one of the most important territorial and economic areas in western Ukraine and has the potential to become a national showcase for EU-aligned municipal waste management reform. At the same time, it still faces the legacy of outdated disposal practices, fragmented local efforts, uneven service coverage, weak cost recovery, and delays in developing modern treatment infrastructure. The current transition is therefore not only a technical challenge, but also a governance, financing and coordination challenge.

The state of municipal waste management is mixed. The city of Lviv has advanced further than most Ukrainian municipalities through biowaste separation at source, a municipal composting station, hazardous household waste collection, and the near-completion of a mechanical-biological treatment plant. Yet the wider agglomeration remains uneven: many communities still have limited or no separate collection, formal household contracts are often incomplete, and most waste is still sent to disposal sites that do not comply with EU standards.

Figure 1. Boundaries of the Lviv agglomeration.

Source: adopted from Council of Europe, *Стратегія розвитку Львівської агломерації до 2027 року*, 6, 2023.



The policy priority is clear: the Lviv agglomeration and the wider region should move from fragmented collection-and-disposal practices towards an integrated system based on the waste prevention & management hierarchy, inter-municipal cooperation, economically rational tariffs, modern sorting and biowaste treatment, and guaranteed access to compliant residual disposal capacity. This requires national enabling legislation, regional coordination, local implementation, and donor support for bankable investment packages.

State of play

The Lviv agglomeration encompasses the city of Lviv and 17 surrounding territorial communities within a 30-kilometre radius of the city's outer boundary. With a population of around 1.05 million people, it accounts for 42% of the region's population and concentrates a very large share of its economic activity, innovation capacity and investment potential. Within the agglomeration's communities, 72% of the region's active enterprises are registered, generating 64% of the total sales revenue in the Lviv region. The agglomeration accounts for approximately two-thirds of the region's capital and foreign direct investment, as well as more than 90% of its innovation potential.

This makes the agglomeration the logical focal point for a multi-level municipal waste management reform implementation.

Municipal waste management in the agglomeration remains constrained by infrastructure gaps and uneven service coverage. In 2022 and 2023, communities in the agglomeration generated more than 1.8 million tonnes of waste across hazard classes I-IV on average, accounting for 66 to 75% of the total waste generated in the region. At the same time, only 4 of the 18 territorial communities were fully covered by centralised municipal waste collection services, while the remaining communities had varying levels of service gaps, contributing to illegal dumping and weak contractual discipline.

The composition of municipal waste in Lviv clearly points to the importance of organics and dry recyclables. Over 40% of a typical Lviv household's mixed waste bin is organic matter by weight. Recyclables such as paper, cardboard, plastics, glass and metal make up another sizeable fraction. This morphology strongly supports source separation, composting and recycling, rather than continued dependence on mixed waste collection and landfilling.

The city of Lviv has already introduced a separate collection scheme that effectively covers four municipal waste streams: four containers are used for biowaste, plastic, glass and mixed municipal waste. For schools and preschools, the system also provides for separate collection of paper and cardboard in blue containers or bags. Biowaste is collected in brown containers or bags and transported to the municipal composting facility. Hazardous household waste is collected separately through container-based systems, municipal collection points, mobile units and on-request services.

Figure 2. Municipal waste separate collection scheme in the city of Lviv.

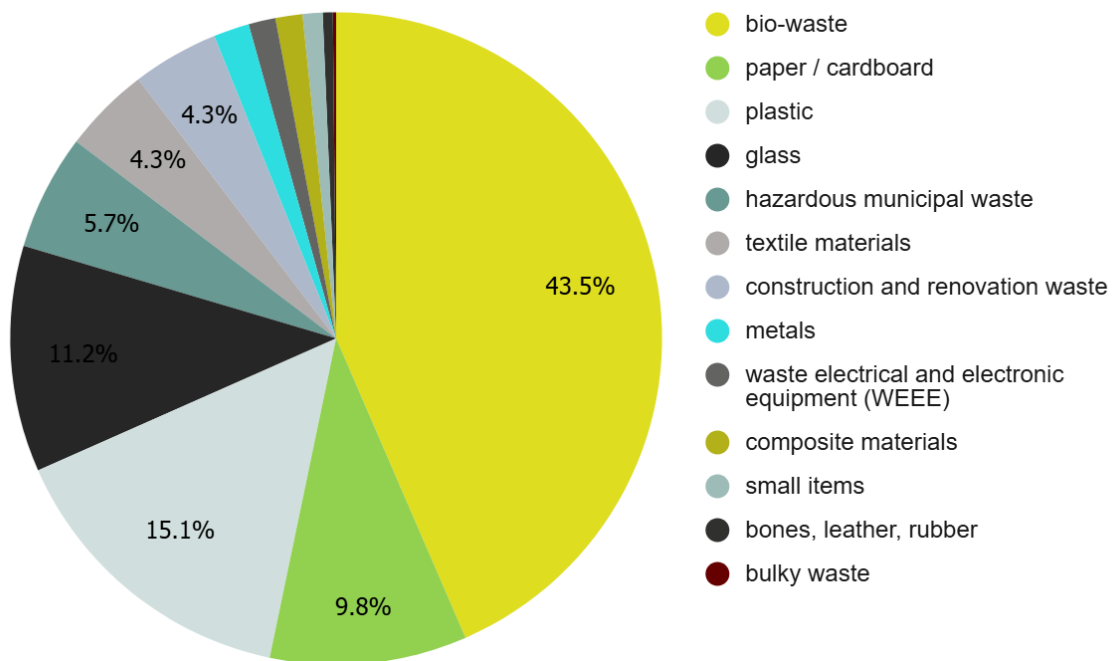
Source: Lviv city council, Presentation, [Створюємо нову муніципальну систему управління відходами разом!](#), November 2024.



This progress is important, but it remains highly uneven across the agglomeration. Some communities report zero population coverage for separate collection, while others have achieved substantial coverage. Infrastructure also varies sharply, with some places relying mainly on PET bottle nets and glass containers. The Lviv Region Waste Management Plan indicates that the agglomeration is expected to be equipped mainly for only two streams - mixed waste/recyclables and PET - which is insufficient for a system genuinely aligned with the EU waste hierarchy.

Figure 3. Composition of municipal waste in the Lviv city territorial community, average indicators for 2023–2024, % by weight (tonnes).

Source: adapted from Lviv region state administration, *Регіональний план управління відходами у Львівській*



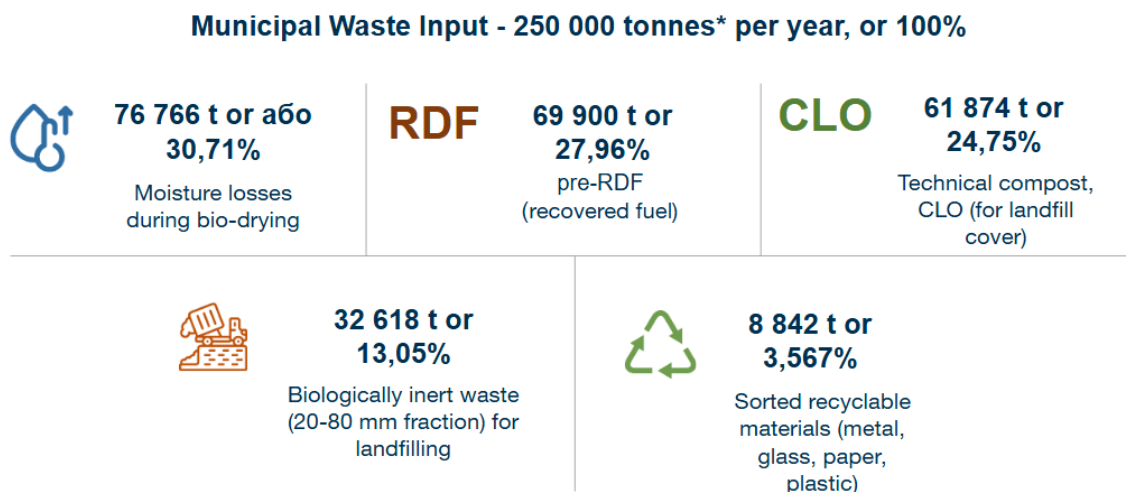
A major shift is now underway through the construction of the Lviv mechanical-biological treatment (MBT) plant. Once operational, the plant will mechanically sort mixed municipal waste, recover recyclable materials, and biologically treat the organic fraction through biological stabilisation and biodrying. Only the residual 15 to 35% of material should then require landfilling. Importantly, the plant will also produce refuse-derived fuel (RDF) from high-calorific waste for co-processing in cement kilns as a substitute for coal. This facility can become a catalyst for wider regional cooperation, but only if upstream separate collection and downstream residual disposal are planned coherently.

At the same time, the wider regional system remains underdeveloped. Twenty-two municipal landfills and two dumpsites continue to operate in the Lviv region, most of them without liners, proper gas systems or leachate treatment. The draft Lviv Region Waste Management Plan therefore proposes a network of seven modern waste treatment facilities, including six landfills and above mentioned MBT plant, alongside closure and rehabilitation of non-compliant disposal sites. The central policy challenge is to turn this planning logic into realistic implementation.

Figure 4. Planned outputs of the Lviv mechanical-biological treatment plant.

Source: adopted from materials provided by LKP "Zelene misto".

WHAT WILL WE GET AFTER RECYCLING MUNICIPAL WASTE?



* Annual municipal solid waste (MSW) quantity in Lviv, according to EGIS calculations



Affordability and economically rational fees

No municipal waste management system consistent with the EU waste hierarchy can function on unrealistically low user fees. Tariffs and fees must support collection, transport, separate collection, sorting, composting, unrecyclable residual treatment, environmentally sound disposal, landfill closure and long-term aftercare. If disposal remains artificially cheap, recycling and recovery will continue to lose economically.

At present, municipal waste management fees for residents of the Lviv territorial community amount to approximately UAH 36 to 45, or EUR 0.76 to 0.95 per capita per month. International practice often treats 1 to 1.5% of average household spendable income as an affordability benchmark for municipal waste collection, separation, recycling and final disposal. Based on the proxy estimate used in the paper, the current fee level in Lviv represents only around 0.25 to 0.32% of income, well below the commonly referenced affordability benchmark.

'Waste management is not an economic activity for generating income but a public service requiring financing for cost recovery.'

World Bank Group, [Municipal Solid Waste Management. A roadmap for reform for policy makers](#), 28, April 2018.

This does not mean fees should be raised abruptly or without safeguards. It does mean that gradual fee adjustment is unavoidable if the agglomeration is serious about financing separate collection, biowaste treatment, MBT operation, compliant residual disposal, and closure or rehabilitation of old dumps. Targeted social support for low-income households should accompany such changes. A transparent, economically rational fee system is not a burden on reform; it is one of its fundamental preconditions.

Table 1. Average municipal waste management fee per household in selected countries (2015-2016).

Source: adopted from World Bank Group, *Municipal Solid Waste Management. A roadmap for reform for policy makers*, 29, April 2018.

	Average household fee/year (Euro)	Average household income/year (Euro)*	Percentage of spendable income
EU			
South	225	22,540	1
North	350	37,095	0.95
East	70	8,620	0.8
Japan	353	24,830	1.42
Bulgaria	58	6,476	0.9
Romania	55	6,120	0.9
Bosnia	55	10,000	0.55
Belarus	14	8,160	0.2

*Eurostat: one earner/household with two children

Recommendations

For national authorities

- Move from partial legislative alignment to practical implementation. The Waste Management Law and the National Waste Management Plan until 2033 have established the strategic direction, but local implementation still lacks a sufficiently strong enabling framework. National authorities should provide clear methodological guidance for regional and local waste management plans, standardise basic planning assumptions for project concept development, and support realistic sequencing of infrastructure investments.
- Accelerate the adoption and operationalisation of extended producer responsibility schemes for packaging, electronics, batteries, textiles and other key streams. Until this gap is closed, municipalities will continue to bear the cost of collecting recyclable streams that in EU systems are financed by producers.
- Enable inter-municipal cooperation through legislation, incentives and co-financing. Agglomeration-based and cluster-based systems should be rewarded, not administratively burdened. A dedicated funding window for waste clusters and agglomerations could help overcome the fragmentation that has historically delayed infrastructure development in the Lviv region.

- Support financial reform in the sector by introducing fully transparent tariff-setting methodologies and reliable mechanisms for the collection of basic service fees, in line with the polluter-pays principle and the need to ensure stable cost recovery. The Polish model of a municipal waste management tax may offer a useful reference for adaptation to Ukraine's context.

Figure 5. Options for municipal waste tax calculation in Poland.

Source: Eurocities, *Sustainable rebuilding of Ukrainian cities*, 42, 2024.



For regional authorities

- Implement the Lviv Region Waste Management Plan until 2034 and translate it into a phased pipeline of feasibility studies, permitting, financing applications and procurement packages.
- Coordinate cluster development actively and meaningfully. Site selection, inter-municipal agreements, waste treatment facility host-community compensation and infrastructure sequencing all require regional leadership, especially for landfill development and long-term residual disposal arrangements.
- Use the Lviv agglomeration as a pilot and learning hub. The overlap between the future regional plan, local waste management plans and the agglomeration's Strategic Solid Waste Management Plan creates a strong opportunity to test how inter-municipal cooperation can work in practice and then replicate the model elsewhere in Ukraine.
- Build a stronger waste-data and analytics function covering service coverage, contracts, contamination rates, fee collection, treatment outputs and residual disposal, so that planning and donor engagement are based on comparable evidence.

For local authorities and the Lviv agglomeration

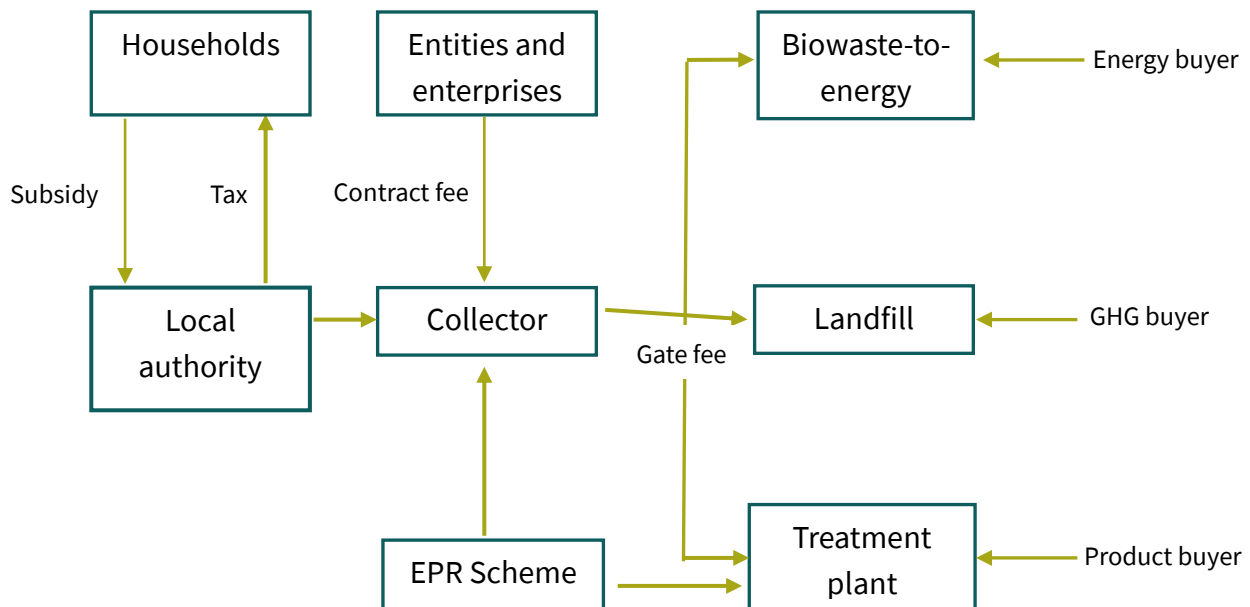
- Prioritise practical expansion of separate collection for biowaste and hazardous household waste. The system should become simpler, more consistent and easier for residents to use, but it must also be matched by actual logistics, treatment capacity, communication and enforcement for public engagement.
- Develop and approve local waste management plans as early as possible and align them with the regional plan and the agglomeration strategy. These plans should define service coverage targets,

contamination reduction measures, responsibilities for infrastructure, and phased enforcement once adequate service is in place.

- Deepen the agglomeration's role as an implementation platform, not only a discussion forum. Shared procurement, joint service operators, common communication campaigns, harmonised service standards and common financing packages should all be considered.
- Engage communities and vulnerable groups throughout the transition. Informal recyclers should not simply be displaced by modernisation. Consultation, safer collection-point design, formalisation pathways, and opportunities for employment in sorting, composting and other facilities should form part of the reform.

Figure 6. Recommended payment flow scheme for municipal waste management in Ukraine.

Source: adopted from World Bank Group, *Municipal Solid Waste Management. A roadmap for reform for policy makers*, 105, April 2018.



For international financial institutions and donors

- Support Lviv agglomeration as one of the most advanced municipal waste reform cases in Ukraine through programmatic, well-coordinated assistance rather than isolated infrastructure financing alone.
- Focus on feasibility studies, meaningful environmental impact assessment, project preparation, and blended financing for cluster infrastructure, including sorting, transfer and composting stations, compliant landfill development and digital monitoring systems.
- Use financing conditionalities to encourage inter-municipal cooperation, data transparency and social inclusion measures, so that project delivery is institutionally stronger as well as technically sound.
- Create or support a coordination platform for the waste sector so that the Council of Europe's inter-municipal work, EU support, and IFI project preparation reinforce one another instead of producing parallel planning tracks.

Alternative project development pathway for the Lviv region

The research paper indicates that the region should not lock itself into only one technical pathway. Instead, alternative project development should be assessed pragmatically and in line with the waste hierarchy.

1. Core cluster-based scenario

Complete the Lviv MBT plant, scale up biowaste and hazardous household waste separate collection across the Lviv region, expand sorting and composting capacity, secure compliant residual disposal through regional arrangements aligned with cluster specialisation, and close non-compliant dumpsites. This is the backbone scenario and should remain the priority.

2. Organics-focused scenario

The municipal composting station in Lviv is significantly underloaded compared with its planned capacity, while biowaste remains the largest fraction in municipal waste. The region should therefore assess whether the most sustainable approach is to use Lviv's existing composting capacity more intensively, to create additional cluster-level composting sites for green waste, or to develop anaerobic digestion for selected biodegradable streams. The choice should be based on logistics, climate performance and economic feasibility.

3. Regional circular materials scenario

Instead of concentrating almost exclusively on downstream mixed-waste treatment, the region could package projects around sorting, reuse, recycling parks, buy-back systems, and construction-and-demolition waste processing. This would better support circular economy development and reduce pressure on landfills and MBT outputs.

4. Refuse-derived fuel and waste-to-energy option - with caution

In the near term, refuse-derived fuel (RDF) co-processing in cement kilns is the more prudent outlet. Any dedicated waste-to-energy investment should be considered only after rigorous feasibility assessment and only for genuinely non-recyclable residues, given capital cost, environmental concerns and growing EU regulatory and carbon-cost risks.

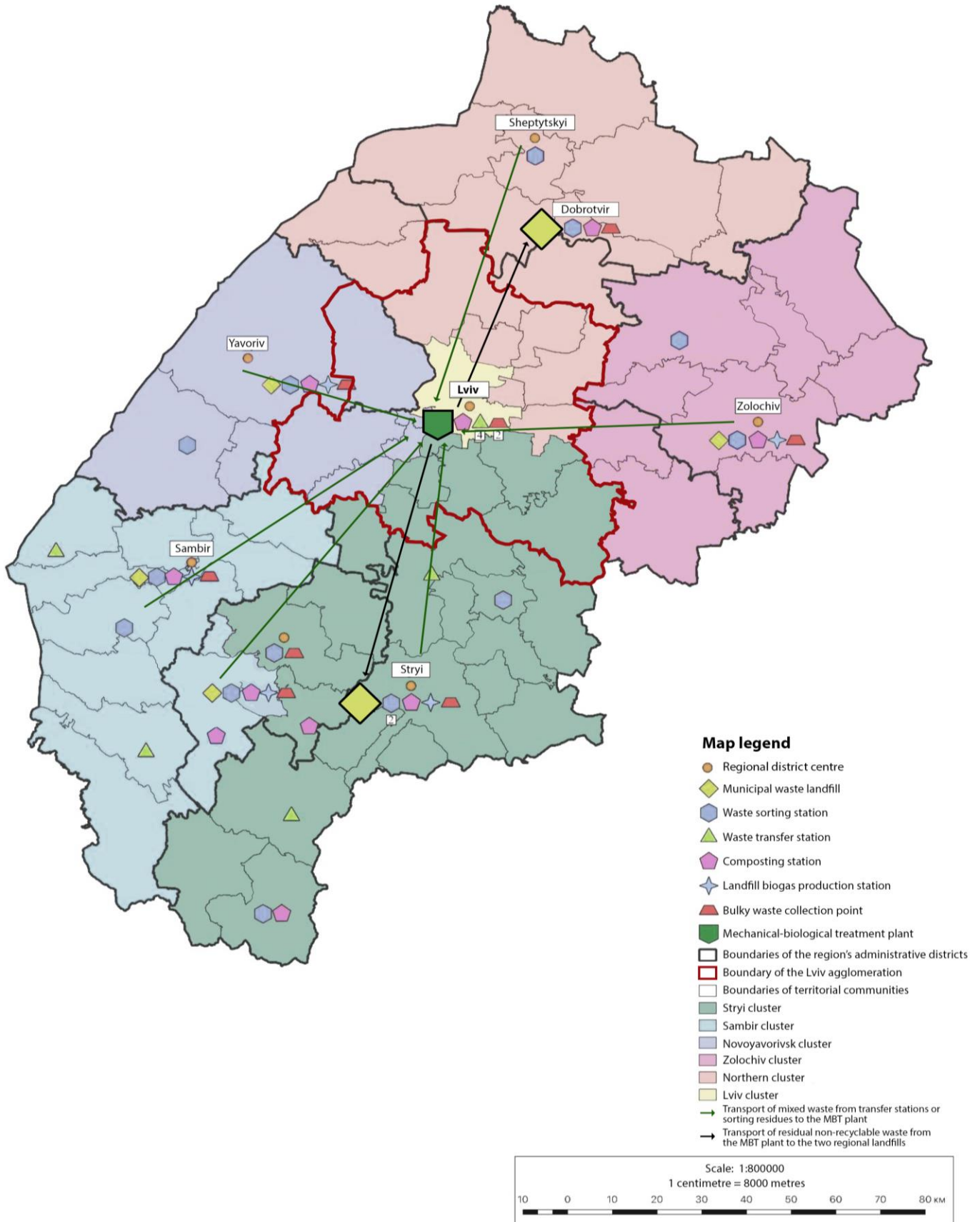
Does the Lviv agglomeration, including the city of Lviv, need its own landfill?

The Lviv agglomeration, including the city of Lviv, does not necessarily need its own landfill within its territory. What it does need is secure long-term access to sufficient EU-compliant residual disposal capacity through enforceable inter-municipal arrangements.

This is consistent with current practice, as Lviv already relies on partner-city landfills. It is also consistent with the planned MBT plant, after which only a residual share of waste — up to approximately 35% — would still require landfilling. In this context, a regional residual-landfill solution linked to the emerging cluster approach around the Stryi and Dobrotvir landfills appears more rational than developing a separate city-owned facility, especially given that initial investment costs can reach EUR 1.5–2.8 million per hectare.

Figure 7. Alternative project development pathway for the Lviv region.

Source: adopted from Lviv region state administration, *Регіональний план управління відходами у Львівській області до 2034 року*, 292, 2025.



Conclusion

The Lviv agglomeration is already one of the most important testing grounds for modern municipal waste reform in Ukraine. It combines political relevance, economic weight, donor attention, and a partially developed infrastructure base. But progress will remain incomplete unless planning is matched by implementation, and implementation is matched by financing.

Lviv does not need more fragmented municipal responses. It needs a coordinated agglomeration and regional system built around separate collection with focus on organics and hazardous municipal waste diversion, modern treatment, compliant residual disposal, and transparent cost recovery. If national authorities provide the enabling framework, the region coordinates implementation, local authorities cooperate across municipal borders, and donors back bankable projects, the Lviv agglomeration can become a sustainable municipal waste management model to replicate across all regions and communities in Ukraine.