

BEST PRACTISES IN PLASTIC-FREE SOLUTIONS

The BALTIPLAST project co-financed by Interreg BSR helps to drive the transition to a green and resilient Baltic Sea region.

Improving plastic waste sorting efficiency with an innovative scanning tool

DAUGAVPILS, LATVIA



DAUGAVPILS is the second-largest city in Latvia, located in the southeastern part of the country. With a population of around 79 000 residents, the city is known for its rich history, cultural diversity, and industrial significance.

Daugavpils has been taking steps toward sustainability by promoting recycling, waste reduction, and the use of eco-friendly materials. The city actively participates in initiatives to eliminate plastic waste, encouraging citizens to reduce single-use plastics and supporting projects aimed at increasing environmental awareness and green practices.

Daugavpils addressed the challenge of improving plastic waste sorting and recycling by enhancing the identification of different plastic types. By using the trinamiX NIR scanner, the city could be able to automate and improve the accuracy of sorting, particularly for bio-based plastics.

Challenges and actions

The pilot in Daugavpils, Latvia, focused on improving plastic waste sorting and recycling capabilities, specifically by using advanced identification techniques.

The main challenge addressed was the efficient identification and sorting of different types of plastic waste, including bio-based plastics, which is crucial for improving recycling rates. The solution involved using the trinamiX handheld NIR scanner for polymer identification, enhancing the sorting process compared to traditional manual methods. However, some challenges were faced, such as difficulties in identifying dark-colored plastics and the need for additional campaigns to assess non-labeled plastics.

Despite these issues, the pilot demonstrated positive results and is seen as replicable in other Baltic Sea Region (BSR) countries.

Brief description of activities:

To overcome the challenge of efficient plastic waste sorting, the pilot involved several key activities:

1. **Selection of Sampling Locations:** In collaboration with local stakeholders, specific locations for plastic waste sampling were chosen.
2. **Formation of Representative Waste Samples:** A protocol was developed to ensure the waste samples accurately represented the variety of plastic waste from post-consumer packaging.
3. **Sorting of Post-Consumer Waste:** Plastic and non-plastic materials were sorted visually, and plastics were further categorized by type, including bottles, jars, films, and rigid packaging.
4. **Polymer Identification with NIR Scanner:** The trinamiX NIR scanner was used to identify the polymer types in the plastics, improving sorting accuracy and identifying bio-based plastics.
5. **Weighing and Documentation:** After sorting, the plastics were weighed and recorded, ensuring detailed tracking of waste types for reporting.
6. **PR and Stakeholder Engagement:** The pilot was publicly promoted, and knowledge-sharing activities with external experts helped refine the approach.

These activities helped to enhance plastic waste sorting, with NIR scanning showing a significant improvement over manual methods.

Target groups

Municipalities: Local government authorities responsible for waste management and environmental policies

Municipal Waste Operators: Companies or organizations handling waste collection, sorting, and recycling

Waste Management Companies: Entities involved in the overall management, processing, and disposal of waste

Residents (Indirectly): Community members who contribute to the plastic waste and benefit from improved sorting and recycling systems

Timeline

The pilot in Daugavpils took place over a **two-day period**, on 20-21 May 2024. However, **preparation activities**, including stakeholder coordination, planning, and equipment acquisition (such as securing funding for the trinamiX tool), likely took additional time leading up to these dates. Based on the available information, the full implementation, including preparatory work, could span **several weeks to a couple of months**.

Results

- **Improved Plastic Sorting:** The pilot demonstrated a significant increase in plastic waste sorting accuracy, particularly through the use of the trinamiX NIR scanner for polymer identification.
- **Higher Identification Rate:** The trinamiX tool successfully identified the polymer types in the majority of plastic waste, including traditional and bio-based plastics, which enhanced the sorting process.
- **Advancement over Manual Sorting:** NIR spectroscopy-based sorting outperformed manual methods, providing a more efficient and accurate approach to identifying different plastic types.
- **Potential for Enhanced Recycling:** The ability to identify a broader range of plastic types provides better opportunities for recycling and waste management optimization.
- **Public Awareness and Support:** The pilot received substantial support from municipalities, waste operators, and the public, highlighting the growing interest in improving plastic waste management.
- **Replicability and Expansion Potential:** The success of the pilot paves the way for expansion within Latvia and replication in other Baltic Sea Region (BSR) countries.

Piloting the solution

During the pilot implementation, Daugavpils city utilized the trinamiX NIR scanner as a key solution to improve plastic waste sorting. The scanner was used to identify and classify different types of plastic in post-consumer packaging waste, allowing for accurate polymer identification.

This advanced technology helped the city enhance the sorting process by automating the identification of plastic resins, reducing the need for manual sorting and improving efficiency.

The scanner also provided valuable data, which was used for detailed reporting, helping the city track the types and amounts of plastics being processed. Additionally, the solution contributed to the pilot's public engagement efforts by facilitating clear communication about the project's goals and results. Overall, the trinamiX tool enabled Daugavpils to address challenges in waste sorting, improve recycling capabilities, and set the foundation for more sustainable waste management in the future.

Enablers



- + **Strong support from stakeholders** and interest of target groups
- + **Successful collaboration** between local authorities, waste management companies, and academic institutions
- + **Availability of advanced technology** (trinamiX NIR scanner) that significantly improved the sorting process
- + **Positive public engagement and awareness** through PR activities
- + Willingness of the municipality and waste operators to **experiment with innovative solutions**

Barriers



- **High demand for human resources** to manage the development process
- **Financial constraints**, including the need for external funding to purchase the trinamiX tool
- **The challenge of identifying non-labeled and contaminated plastics**, which affected sorting accuracy
- **Limited existing infrastructure for plastic waste collection**, especially from multi-family and single-family households in the city

Key takeaways

The key takeaways from the Daugavpils pilot include the significant improvement in plastic waste sorting efficiency using the trinamiX NIR scanner, which **outperformed manual methods** in identifying polymer types, including bio-based plastics.

Collaboration between municipalities, waste operators, and research institutions was essential for success. External financial support was necessary to acquire the technology, highlighting the importance of funding for innovative waste management solutions. Challenges included identifying dark-colored or contaminated plastics, pointing to the need for further assessment.

The pilot's success shows its potential for replication in other regions, and public awareness efforts were crucial for gaining community support.