Terjola

End of life tyres

Mixed municipal waste

Zestaponi

Unprocessed slag and wastes from processing of slag

INDUSTRIAL WASTE MAPS

LESSONS LEARNED AND RECOMMENDATIONS

What is industrial waste mapping?

Industrial Waste Mapping (IWM) is a common method used to quantify and demonstrate the distribution and management of waste within a geographic area. The overall objective of IWM is to identify, assess, and map the waste streams of manufacturing enterprises and help them develop options for improved resource efficiency. Within the European Union-funded, EU4Environment Action, between 2019-2024, IWM activities were carried out in three Eastern Partnership countries, namely Azerbaijan, Georgia, and Ukraine.
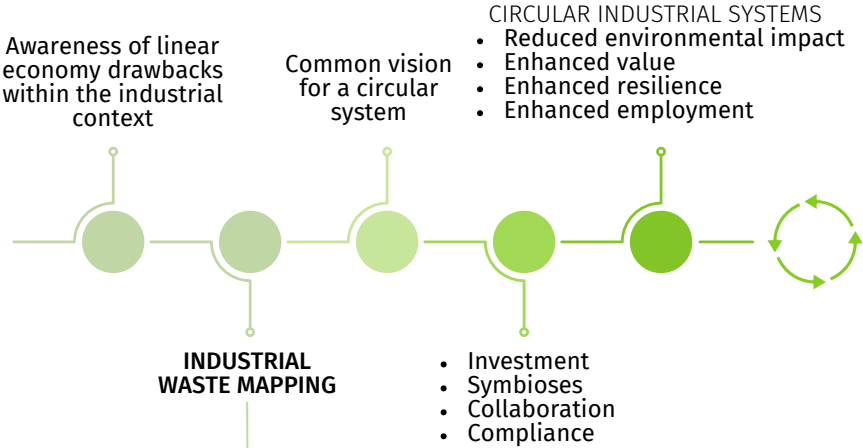
For more details, please scan the QR code to read the IWM executive summaries available in each of the three countries:

AZERBAIJAN   GEORGIA   UKRAINE

SCAN ME! ≫

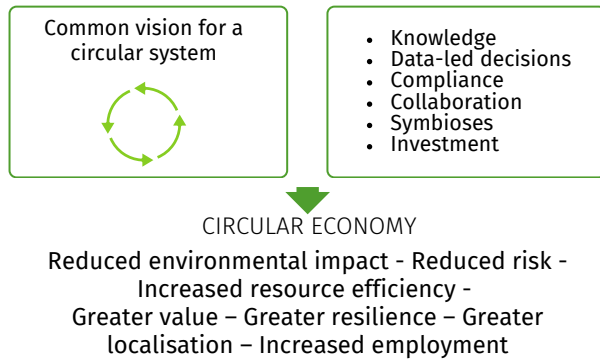# What is needed to achieve a circular system?

The following graph provides a basis for taking decisions to improve industrial material flows, with a focus on the necessary measures, actors, and steps.
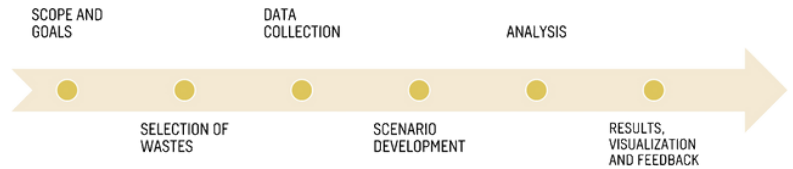
Awareness of linear economy drawbacks within the industrial context

Common vision for a circular system

CIRCULAR INDUSTRIAL SYSTEMS
- Reduced environmental impact
- Enhanced value
- Enhanced resilience
- Enhanced employment

INDUSTRIAL WASTE MAPPING

- Investment
- Symbioses
- Collaboration
- Compliance

STEPS	RESPONSIBLE STAKEHOLDER					OUTCOME	LESSONS LEARNED
	Facilitator	Businesses	Local authority	National authority	Donors		
Goal setting	○	○	●			• Agreed common vision • Circular system facilitator appointed	• Consider mapping whole regions, (resource management is usually taking place over a large area)
Establishing preconditions for Circular Economy		●	●	●		• Preconditions: robust data, leadership, change, management, innovation, planning, collaboration, system approach, holistic view	• Clarify that preconditions for Circular Economy are critical
Resource mapping	●	○	○			• Visualisation and understanding of material flows, identification of solutions and benefits	• Understand complexities • Direct engagement and visits are critical
Action plans		○	○			• Concrete steps • Business cases	• Establish clear and realistic actions • Avoid over-complication
Action coordination	●	○				• Coordination and mobilisation of stakeholders • Roles of circular systems established	• Steer towards the waste hierarchy • Recycling is not always the best option
Improving rules and laws			○	●		• Adjustment of linear-era legislation • Laws becoming an instrument for circular processes (e.g. town planning)	• Move laws and planning towards "resource management" rather than "waste management"
Financing and implementing action		●		○	○	• Access to financing • Showcasing business models	• Underline financial savings

A manual for Industrial Waste Mapping

Impacts of Industrial Waste Mapping

Common vision for a circular system

- Knowledge
- Data-led decisions
- Compliance
- Collaboration
- Symbioses
- Investment

CIRCULAR ECONOMY

Reduced environmental impact - Reduced risk -
Increased resource efficiency -
Greater value – Greater resilience – Greater
localisation – Increased employment
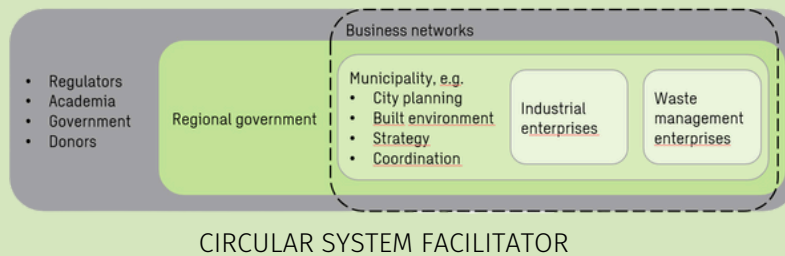
How IWM should be implemeted?

Step 1. Scope and Goals

Regarding scope, consider:
- Financial parameters, such as costs and values in the current system
- Environmental Parameters
- Geographical boundary
- Stakeholders

Figure 1. Groups of potential stakeholders

CIRCULAR SYSTEM FACILITATOR

Lessons learned from the IWM pilots on objectives and scope:
- Support from public authorities and sector organisations is crucial for elaborate results.
- Obtain a letter of commitment from stakeholders.
- Consider the importance of selling the mission of the project.
- State clearly from the beginning that the improvement suggestions will include all kinds of improvement suggestions at all steps in the waste hierarchy.

Lessons learned from the IWM pilots on the regions selection:
- Consider mapping a whole region at once, and creating clusters based on waste and logistics
- It was easier to get information of good quality if there were already connections with that business.
- Align project geographic scope with the areas in which data is reported.
- It is advisable to carefully map available recycling facilities and actors in the area included and in adjacent areas, not just those directly involved with the businesses who have been engaged.

Step 2. Selection of wastes

Select wastes according to the criteria
- Quantity
- Frequency
- Potential for circularity
- Industrial character

To consider:
- Project budget: Rather few wastes properly mapped than over-stretching the ambitions.
- Background information: What are the industrial and waste characteristics of the area? What data is available?

Lessons learned from the IWM pilots on the selection of wastes:
- Characterise the industrial base and waste management landscape before selecting waste
- Define "industrial" waste and choose wastes based on the most pressing needs
- Obtain flow diagrams of the processes that produce the wastes
- Think in terms of circular management systems, not just waste management
- Consider selecting waste types that include the most relevant and most engaged waste producers
- Keep in mind that municipalities do not always have 100% knowledge of the facilities that exist in their areas (it is advisable to consult national and/or regional authorities)

Step 3: Data collection

DATA COLLECTION PLANNING
For the data collection planning and performance, consider:
- Adjusting data collection methods according to the size of the business (smaller entities have less data but could be more accessible)
- Smaller enterprises need more facilitation/cooperation with similar actors, yet are more agile
- Larger enterprises might have different needs than smaller enterprises when it comes to waste mapping

THE REQUIRED WASTE DATA
- Clean and reliable data
- Quantity/volume
- Quality
- Supply frequency

DATA FORMS
- Keep data gathering forms as simple as possible
- Include separate columns for costs and incomes from waste handling
- Include waste classification systems in data collection forms

SITE DOCUMENTATION
- Take pictures of the waste
- If possible, fill the data collection form together with the company and ask for qualitative information
- Request flow diagrams of the processes that produce the wastes as it may be a valuable way of understanding how the wastes are produced

Step 4: Scenario development

- Both respondents and circular system facilitators can help provide improvement suggestions
- Find possible improvements through using the waste hierarchy, and evaluate the possibility to prevent waste in the first place
- Consider how to find solutions with the most efficient logistical flows

Figure 2. The waste hierarchy diagram

Step 5: Analysis

Where possible, quantify benefits of each scenario, considering:
- Collection costs and material value
- Environmental impacts

Describe other benefits
- Simplified supply chain and resource effectiveness
- Reduced indirect costs (e.g. haulage)
- Mutual benefits with customers
- Positive public relations

POTENTIAL RESULT	FINANCIAL IMPACT	CLIMATE IMPACT
47 tonnes plastic waste per year could be reduced or eliminated	At least 88,000 UAH avoided per year from avoided waste fees	Reduction of 117,500 kg of CO_2-eq per year

Figure 3. Example of potential results and impacts from the IWM in Ukraine

Step 6: Results, Visualization and feedback

- Visualise results to clarify what changes are possible
- Ask for feedback from stakeholders and agree on the action plans

Lessons learned from the IWM pilots on results, visualisation, and feedback
- The waste hierarchy is not well known, and Circular Economy concepts seem to focus to a large extent on recycling. If possible, steer solutions towards the most circular outcomes
- Underline the importance of financial savings and added value. This is crucial to getting buy-in from businesses
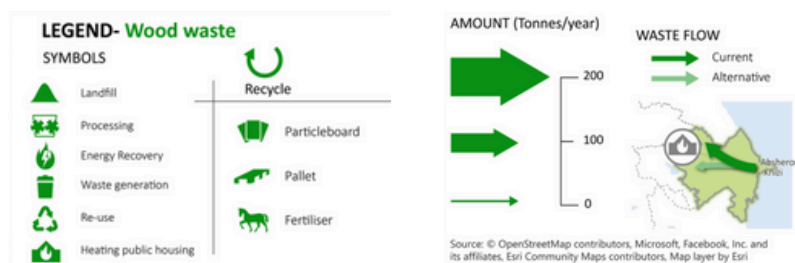

Figure 4. The IWM conducted in Azerbaijan

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About the EU4Environment

The European Union (EU) funded EU4Environment Action aims to help the EU's Eastern Partnership countries preserve their natural capital and increase people's environmental well-being. It does so by supporting environment-related action, demonstrating and unlocking opportunities for greener growth, and setting mechanisms for better management of environmental risks and impacts. EU4Environment is implemented by five partner organizations: OECD, UNECE, UNEP, UNIDO, and the World Bank between 2019-2024, with a budget of EUR 20 million. The leaflet gives an overview of activities the United Nations Industrial Development Organization (UNIDO), within EU4Environment Action, is working in Azerbaijan to implement activities related to Result 2 Circular Economy and New Growth Opportunities. The activities have been analyzed with the assistance of Sweco.

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