



# Executive summary

## Deliverable 4.4

Report on generalized criteria to support decision-making

Lauri Kujanpää, Hanna Pihkola (VTT)

## Credits

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# Introduction

This report presents examples and recommendations about informative criteria that could be used for monitoring the performance of a waste collection system, comparing collection systems in different regions and evaluating the impacts of alternative collection strategies (or means of collection). Additionally, this report includes recommendations about criteria that could be used for identifying potential benchmarks among other systems, taking into account relevant regional characteristics. Proposed criteria are presented together with expert evaluations regarding their usefulness, limitations and potential challenges in data collection or performance evaluation. The focus of the work was on identifying and evaluating criteria, which can be used to evaluate PPW, WEEE and CDW collection systems

## Why are evaluation criteria important?

Decision-making related to waste collection is often affected by lack of precise or comparable data. Filling in existing data gaps requires systematic efforts, implementing monitoring activities and cooperation (data exchange) between actors in the recycling value chain. This is necessary for improving all stages of the decision-making process in future. Evaluation criteria can be used to guide data collection, but they are also helpful for considering, what kind of issues should be monitored, in order to better evaluate the performance of the waste collection system.

## Background for the study

This report focuses on the evaluation criteria that were applied in the MCDM exercises during the COLLECTORS project. The exercises were attended by European experts from waste management companies, waste agencies, municipalities and producer responsibility organisations. During the project, these criteria have been applied in different contexts and for different waste streams, and their applicability and importance has been evaluated by the waste experts who participated in the MCDM exercises.

The criteria discussed in this report could be applied in the context of MCDM studies, but also in other contexts, to support decision-making and monitoring activities related to waste collection. It is considered, that the developed criteria can help decision-makers and producer responsibility organisations (PROs) for identifying and integrating important aspects in their decision-making process when implementing new waste collection systems.

The report complements COLLECTORS deliverable D3.4 "Report on multiple criteria assessment of the studied waste collection systems and applicability of different methods for decision-support".

## Materials and methods applied in the study

The COLLECTORS project has relied on participatory approach. This means that experts, external to the project consortium, have shared their knowledge and experience on benchmarking and assessing waste collection systems and strategies. The expert workshops organised as part of the project were referred to as Regional Working Group (RWG) meetings. The workshops included facilitated group discussions using open-ended questions and group-based multicriteria decision-making (MCDM) exercises. All the criteria applied in this study have been identified from the information gathered from the COLLECTORS database (webportal), the case studies and the expert workshops.

During all MCDM workshops, the experts' preferences on the importance of different criteria were measured using a method referred to as SWING weighting. The criteria weights describe the importance given for a waste collection system's performance in a certain criterion, such as capture rate of plastics. Conclusions based on the importance of the criteria, as evaluated by the experts, are presented in this report.

# Main conclusions and recommendations

The criteria studied during the project were divided into six clusters that were identified as important for well performing waste collection systems.

Proposed clusters include:

- Capture and recycling rates
- Degree of separation and quality
- Convenience & coverage
- Engagement & participation
- Environment, health & safety
- Socio-economic impacts

Together, the clusters represent multiple objectives that constitute a well performing waste collection system. In order to make informed decisions related to waste collection, it is recommended that at least one criterion from each cluster should be included in decision-making at local or regional level. Efforts should be made in order to eventually increase the number of criteria that describe performance of the system within each cluster. The criteria presented here

could be applied in local studies that apply methods of multicriteria decision-making, or for regular decision-making, management and monitoring activities.

The findings from the project indicate that proposed criteria differ in data availability. Some variation may take place due to differences in current monitoring practices, maturity of the collection system and how the collection has been organised. Some of the criteria are already part of existing monitoring systems, some require further adjustments or monitoring activities, while some are expected to gain more importance in future, due to changing recycling targets and emphasis in policies related to circular economy. Based on the experiences gained in this study, it is recommended that in all criteria clusters, both quantitative and qualitative information can be used. This makes it easier to include important social aspects in decision-making.

The need for more efficient monitoring practices, and harmonizing terminology and reporting related to waste flows has been identified by many projects. Effective monitoring of local systems is necessary for evaluating whether the national and European recycling targets are achieved. However, monitoring is important also for improving collection rates at local level. The findings from COLLECTORS project identified that good performance can be achieved with different kinds of collection strategies, but detailed knowledge about the existing system and its functioning is necessary, in order to find the best solutions for improving the situation. Thus, improving monitoring and reporting practices and increasing transparency are essential for improving performance. Public reporting makes also the benchmarking between systems easier.

The criteria presented in this report (and applied within the COLLECTORS database) aim to make at least partial comparison between different systems and collection strategies possible, even if the results have to be considered taking into account relevant regional characteristics, and uncertainties in applied background data.

In benchmarking, the criteria need to be comparable between regions that may have different amount of inhabitants, varying area sizes and large differences in generated amounts of waste, etc. Therefore, the units of measure in benchmarking are generally ratios (such as costs/inhabitant). The study further discussed the challenges in comparing socio-economic performances of waste collection systems between regions with different economic environment. Criteria between benchmarking and strategy selection may differ also according to available resources and methods for acquiring data.

The COLLECTORS project has given practical examples of applying life cycle assessment (LCA) and cost-benefit analysis (CBA) methods in regional case studies. These methods provide detailed information that can be used as support for waste management strategy selection. However, this kind of detailed regional information is incomparable, or at least limited in comparability, between separate regions. Benchmarking waste collection systems within a larger sample will have to rely on publicly available data (for which large differences were detected between regions). The results point out the importance of developing both monitoring and reporting practices related to

recyclable waste materials. This is important and necessary also considering the goals of the new European Circular Economy Action Plan.

## Limitations of the study

Aside from complementary results from other COLLECTORS work packages and literature, the usefulness and weights of the presented decision-criteria are based on opinions of several experts working in waste management. When summarizing the criteria weights from several MCDM exercises, it is important to note that results from a group decision-making are always related to the context in which they were produced. Thus, the results from one exercise cannot directly be generalised as applicable to different contexts. However, the results may reveal aspects that are interesting and important, and they may apply in other contexts as well.

In this report, effort was made to present the expert preferences and opinions preserving the connection to the decision-making context. Moreover, the summarized results regarding the criteria and their weights from the MCDM workshops were presented to the final RWG meeting for review, which contributed to the general conclusions on the criteria clusters. Additionally, the findings from expert evaluations were reflected with findings from the COLLECTORS case studies and relevant literature.

The criteria presented in this report may be used as an example or as a starting point for more extensive data collection, but also for benchmarking purposes. However, careful problem structuring and definition of the most applicable evaluation criteria, fitting the purpose and the context of the evaluation, should be done in each case before the assessment.

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