



Evaluation Plan: CDW sector, Seville

Deliverable 6.2

City Council of Seville - Seville CityLoops Cluster



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Authors	César Gallardo Soler, Ayuntamiento de Sevilla Santiago Rodríguez Pérez, IDENER
Reviewers	Graciano Carpes Hortal, EMASESA Emilio Benítez Flores; LIPASAM Pedro Cruces González, LIPASAM Jens Ørding Hansen, NRI Are Jensen, NRI Nikolai Jacobi, ICLEI Europe
Abstract	This report details how the city of Seville will evaluate the impact of the CityLoops tools and demonstration activities aimed at improving the circularity of the CDW sector.
Keywords	Evaluation, Indicators, Seville, CDW
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Contents

1.	Introduction	4
1.1.	Demonstration Action 1: Renovation of water pipelines with circular material management.....	6
1.2.	Demonstration Action 2: Optimising clean points.....	7
1.3.	Demonstration Action 3: Data-driven decision making and Best Practice Guidelines for CDW Management in Seville	9
2.	Indicators to be monitored	11
3.	Plan for monitoring	17
3.1.	CE-related knowledge building campaigns: Qualitative description Demonstration action 18	
3.2.	CE-related knowledge building campaigns: Impact Demonstration action	19
3.3.	Circularity-related stakeholder activities Demonstration action	21
3.4.	Communication measures on circular transformations and waste prevention Demonstration action	23
3.5.	CityLoops indicators used in procurement tenders and contracts Demonstration action 24	
3.6.	Number of tenders submitted by companies offering the use of recycled CDW City 26	
3.7.	Number of visits to the clean points Demonstration Action	27
3.8.	Number of external agents who express interest in guideline assessment City	28
3.9.	Number of visits to the applications City	30
3.10.	Share of local secondary materials in domestic material consumption Demonstration action	31
3.11.	Quantity of material subjected to recycling City	32
3.12.	Number of projects that implement CDW valorisation City	34
3.13.	Number of companies implementing CDW valorisation measures City	36
3.14.	Number of projects that implement reused soil City	37
3.15.	Amount of CDW collected at the clean points Demonstration Action	38
3.16.	Amount of recycled CDW from large producers City	40
3.17.	Landfilling rate City	41
3.18.	Assessment of illegal dumping sites City	43
4.	References.....	45

1. Introduction

As part of the project and associated with the implementation of the demonstration actions to be carried out in the city of Seville an evaluation plan will be made for both waste flows, biowaste and construction/demolition waste (BW and CDW) which are addressed in CityLoops.

The objective of the CityLoops evaluation work is to ensure a comprehensive evaluation framework is established for all demonstration actions to assess their impact on sustainability and to assess the progress towards a more Circular Economy (CE).

This document will guide the practical evaluation work based on the evaluation framework and CE indicators presented in CityLoops Deliverable 6.1 Circular City Indicator Set (Vangelsten et al., 2021). The evaluation aims to cover all the four Vision Elements at the core of the CityLoops circular city definition from Vangelsten et al. (2021). Thus, the evaluation will monitor local level processes and behaviour aimed at improving circularity, impact in terms of more circular material flow and energy use as well as outcomes in terms of improvements on the environment and on human wellbeing. The evaluation will focus both on the demonstration actions and on impacts at city scale.

This Evaluation Plan presents a list of specific indicators to be monitored over the duration of the Demonstration phase of the CityLoops project (Month 18-44). It further details what data needs to be collected, who is responsible for doing this, how it will be done, and when. The overall responsibility of the development of the Evaluation Plan and its implementation lies with the Evaluation Manager appointed in each city. The implementation of the Evaluation work will be documented in the Interim Evaluation Report to be submitted at Month 36 and the Final Evaluation Report to be submitted at Month 46.

CONTEXT

The city of Seville, located in the south of Spain, has 700,000 inhabitants and a surface area of 140.42 km². It is the most populated city in Andalusia, the fourth in Spain. The construction industry is one of the main economic activities that boosts the economic development of the city.

Construction and Demolition Waste (CDW) represents up to 45% of the total amount of waste generated in the city, i.e., 270,547 tonnes of CDW and 1,309,501 tonnes of excavated soil annually. Currently, only 16.1% of CDW is recycled, mostly for buildings works and road fillings.

The demonstration actions of the CityLoops project represent another step towards advancing Seville's path towards a more circular city, which is aligned with the declaration that the city itself led in 2017, together with more than 200 municipalities in Spain in the which underlines the importance of Local Governments to put into practice the commitment, the need to implement the Circular Economy.

Seville's declaration for the Circular Economy is also aligned with its City Model of the Seville 2030 Strategic Plan.

On the other hand, the city of Seville understands its commitment to the 2030 Agenda for sustainable development of the United Nations and assumes it as the standard of its strategic and sectoral planning. Likewise, the Seville 2030 Strategic Plan is aligned with the Sustainable Development Goals (SDG).

Other local and sectoral initiatives and plans converge in the Seville 2030 Strategic Plan, such as the Local Waste Management Program, currently the draft, which will incorporate, if the results are satisfactory, the actions piloted within the framework of the project CityLoops.

Seville's cluster of partners for the CityLoops project includes the Municipality of Seville, LIPASAM (Municipal Solid Waste Management company), EMASESA (Municipal Wastewater Treatment Management company) and IDENER (Private Research company). Together these partners are committed to CityLoops' approach to close the loops of waste material in the city, promoting a circular economy approach to the city's development.



Image 1. Images from a restoration pipeline work. EMASESA

The demonstration actions to be monitored are described below.

1.1. Demonstration Action 1: Renovation of water pipelines with circular material management

DESCRIPTION
<p>EMASESA, as the public entity responsible for water and waste infrastructure and management in Seville, will undertake circular renovation of old water and sewage pipelines by recycling concrete, road surface, filling, and soil. The pilot focuses on water network infrastructures and the materials are concrete pipes, road surface, soil, and filling material. The CDW quality and technical properties of the dug-up pipes in the demonstration sites will be analysed and compared to required specifications, which must be met for the recovered material to be used again in construction. If it meets the quality standards, the CDW will be used to replace primary raw materials such as filling under the pavements in pipe replacement works and/or to improve soil quality in nearby municipal sites. The piloted material management approach will be incorporated into green procurement criteria that can be used in other similar public works, to ensure as much CDW as possible can be reused or recycled instead of dumped. EMASESA will work to engage construction stakeholders to mainstream the use of circular considerations in public contracts and will also publish a practical guide for quality classification and handling of CDW according to the waste hierarchy.</p>
OBJECTIVES & KEY ACTIVITIES
<p>This demonstration action will be supported by the tool elaborated during the inception phase of the project:</p> <ul style="list-style-type: none">▪ Quality assessment of CDW. The quality assessment is a standard classification that aims to set a guideline to increase the number of bids for public infrastructure projects that contemplate CDW valorisation. In spring 2021, using the tool developed, a pilot area will be selected to compare the performance of conventional raw material versus CDW, including the physical properties within different static and dynamic contexts. Through this feedback process, the Quality Assessment tool will be iteratively improved. The classification will be applied to demolition material from multiple pipe replacement sites. Based on the result, FERMOVERT, the waste treatment company, will treat the material accordingly so that it can be used as construction aggregates. <p>The key activities that conform the demonstration action are:</p> <ul style="list-style-type: none">▪ Selection of the place for pilot action. Among the construction and demolition works EMASESA will select 2 sites to test the Quality assessment tool.▪ Testing phase. EMASESA will compare the performance of conventional raw material versus CDW, including the physical properties within different static and dynamic contexts.

- **Transformation of materials.** FERMOVERT will be in charge to transform the CDW to be re-used.
- **Analysis of the results.** Results on the procurement approach and the development of best practice guidance on CDW classification will be analysed.

EXPECTED OUTCOMES

- Strengthened awareness and knowledge of the improvement of CDW management among the main stakeholders and other socio-economic agents related to the bases of the circular economy.
- Increased share of “circular” indicators and specifications in tender documents and contracts.
- Increased use of recycled CDW by construction companies in the city.
- Increased amount of CDW that is prepared for recovery/recycling, and therefore reduced amount of material that is deposited in landfills, in accordance with Directive 851/2018 and 850/2018.
- Increased amount of recycled materials used in the construction projects, compared to similar construction projects
- Increased amount of soil reuse
- Reduced use of virgin materials

1.2. Demonstration Action 2: Optimising clean points

DESCRIPTION

IT software tools have been developed to optimise the use of Seville's five clean points for collection of CDW from citizens and small producers. Data will be shown through a web portal, with one interface for citizens to instruct them to the clean point best suited to receive their CDW, and one interface for city managers to understand the quantity of CDW at each clean point and plan for future scenarios of city growth to open new clean points. Data collected on the stocks and flows of CDW through the cities' clean points will be used to continuously optimise their management. The collected CDW will be treated by FERMOVERT if need be, to ensure its safety and quality for further future uses. LIPASAM, the waste management company of Seville, plans to analyse the composition of the CDW collected in Clean Points, to evaluate the potential uses of the material recovered and be able to take decisions with the aim of recuperating costs for the clean points management and CDW treatment. Finally, an awareness campaign will aim to introduce these tools to the public and encourage proper handling of CDW, in order to avoid the common practice of illegal dumping of CDW.

OBJECTIVES & KEY ACTIVITIES

This demonstration action will be supported by two tools elaborated during the inception phase of the project:

- **CDW flow optimisation tool.** This software tool was developed by IDENER and will be piloted by LIPASAM to model different scenarios regarding waste transport and routes as well as optimal use, management, and upscaling of the clean points. The objective is to improve the experience and increase the use of clean points for CDW by citizens and small producers like SMEs. Different scenario simulations will be used to plan for future city development and additional clean points.
- **Awareness campaign on CDW management.** One communication campaign target citizens/ SMEs - focused on prevention of illegal dumping. It will accompany the launch of the digital tools, so that users are aware and encouraged to use the tool to improve their experience using the clean points. A second campaign targets large generators of CDW (construction/ demolition contractors) - focused on the correct segregation and management of CDW.

The key activities that conform the demonstration action are:

- **Procurement.** Preparation and procurement of awareness campaign.
- **Testing phase.** Tuning the dataset to be analysed by the tool and increase the accuracy of the results.
- **Deployment of tools.** Launch and use of CDW optimisation tool, by citizens and by city managers.
- **Awareness campaign.** 1) Prevention of illegal dumping; 2) Correct segregation and management of CDW for large generators.
- **Analysis of the results.** Results will be analysed on potential measures to implement in the management of clean points, future clean point expansion, etc.

EXPECTED OUTCOMES

- Increased knowledge of CDW management among citizens and small producers.
- Increased use of clean points for CDW management by citizens and small producers.
- Increased amount of CDW managed through the clean points by citizens and small producers.
- Reduced illegal dumping and landfilling of CDW in the city.

1.3. Demonstration Action 3: Data-driven decision making and Best Practice Guidelines for CDW Management in Seville

DESCRIPTION
IDENER has developed IT software tools to integrate available data on environmental, economic, and social development in Seville municipality in order to facilitate data-driven decision-making and better understanding of the impacts of policies and initiatives on citizen wellbeing, and to ensure the city is on the right track towards the sustainable development goals. Citizens will also be able to access information about their waste generation, and how city initiatives are impacting a series of sustainability and wellbeing indicators. Based on the experiences in CityLoops demonstrations and the data visualised through the city simulation platform, best practice guidelines for construction and demolition waste management will be developed. These guidelines are expected to feed into a new Waste Management Plan for the city of Seville.
OBJECTIVES & KEY ACTIVITIES
<p>This demonstration action will be supported by two tools elaborated during the inception phase of the project:</p> <ul style="list-style-type: none">- Wellbeing monitoring tool. This software tool will collect and analyse data on public services, CO₂ emissions, waste generation, and other circularity indicators (see Evaluation Plan) and find correlations to better understand the current wellbeing of the city and citizens, and based on this will determine potential improvements, e.g., to waste management practices. The tool will also have some data and visualisation available for citizens, to engage them in more circular behaviour and inform them of forthcoming city initiatives, such as new separate waste collection routes. The interface for city managers will also be used to update data, evaluate results for prioritising and planning, and simulate some actions or improvements, in order to see how changes may impact the wellbeing of the district/city.- City simulation platform. IDENER has developed a central virtual platform to host all the software tools developed in Seville for CityLoops and the open data generated within the project. The digital platform will be used by citizens as a source of information and by local government partners to help decision making processes. This platform will improve data exchange between the partners of the city and enable dialogue about the potentials of urban development concerning the handling of CDW and soil beyond formal governmental organisations. The results will be used to inform a new municipal waste management plan. <p>The key activities that conform the demonstration action are:</p>

- ***Testing phase.*** Tuning the dataset to be analysed by the tool and increase the accuracy of the results.
- ***Deployment of tools.*** Launch and use of CDW optimisation tool, by citizens and by city managers.
- ***Best practice guidelines.*** Development of best practice guidelines for waste management based on experience of CityLoops demonstration actions and analysed data.
- ***Analysis of the results.*** If after analysis it is considered appropriate, incorporation of learnings into new Waste Management Plan for the municipality.

EXPECTED OUTCOMES

- Increased interest in the guidelines and tools among public companies and other stakeholders.
- Increased participation of stakeholders in the assessment of the guidelines.
- Increased commitment of citizens to circularity.
- Increased amount of recycled CDW.
- Increase in initiatives on circular CDW management.

2. Indicators to be monitored

This chapter presents an overview of the indicators that will be monitored during the CityLoops Implementation Phase (see table below). The indicator selection has been made based on several criteria:

- Relevance to the city's circularity strategies and the Demonstration Actions and Tools: Each selected indicator will monitor specific processes and impacts related to the Demonstration Action activities and serve to evaluate against the expected outcomes of the action. Indicators may be monitored either at Demonstration Action scale or at City scale, or in some cases at both. For each evaluation scale, the indicator is paired with the expected outcome or target value listed in the table below. This will allow evaluation of the progress and impact of demonstration- and city-wide actions towards improved circularity as well as the effectiveness of activities and tools.
- Data availability and quality: Through dialogue with local stakeholders internally and externally to the CityLoops consortium, data availability, accessibility and quality has been mapped to ensure that the evaluation process for the selected indicators can be carried out in a practical and timely manner.
- Cross-city comparison and adherence to the Circular City definition (Annex 2) and the CityLoops project plans (Annex 1): As part of the process of developing the Evaluation Plans continuous dialogue between the cities and the CityLoops partner coordinating the evaluation work has been carried out to ensure some overlap and consistency in the selection of indicator between cities to allow comparison where practical. This dialogue has also ensured that indicators are selected to monitor progress towards circularity in a broad sense covering as much as possible all four Vision Elements of the Circular City definition as described in Vangelsten et al. (2021).

Table 1 to Table 4 list the indicators selected by Seville according to the four Vision Elements in the CityLoops circular city definition (Vangelsten et al., 2021). The tables describe at which level the indicators will be applied (Demonstration Action or City level) and which Demonstration Actions they will evaluate.

The total number of indicators selected is an attempt to strike a balance between accomplishing a complete vision and at the same time having a manageable number of indicators for analysis and evaluation.

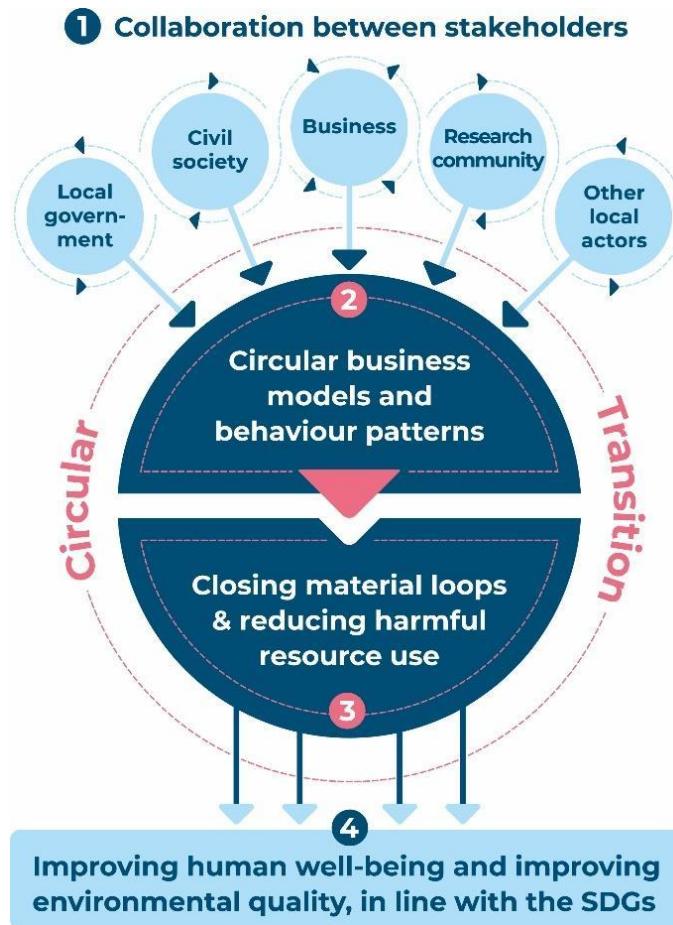


Figure 1. The four Vision Elements of the Circular City vision and causal links for CE transition. Source: D6.1 Circular city indicator set

The indicators were selected considering the impact of the demonstration actions individually and its impact in the city as a whole, and their relevance to analyse the circularity progress.

A large part of the indicators refers to pilot actions that are going to take place in the city for the first time, so there is no previous data available, in addition, it will be necessary to create new databases.

Also, the indicators selected will allow comparison with other cities in the project, in order to detect gaps of improvement.

Links between the selected indicators and the expected outcomes for the specific Demonstration Actions are shown in the tables below.

Table 1. List of indicators related to Vision Element 1 “Local Stakeholder Actions”.

INDICATOR #	INDICATOR NAME	SCOPE (DEMO/CITY)	DEMO ACTION 1	DEMO ACTION 2	DEMO ACTION 3
4	CE-related knowledge building campaigns: Qualitative description	D	X		
5	CE-related knowledge building campaigns: Impact	D	X		
6	Circularity-related stakeholder activities	D	X		X
11	Communication measures on circular transformations and waste prevention	D	X	X	
18	CityLoops indicators used in procurement tenders and contracts	D	X		
18.1	Number of tenders submitted by companies offering the use of recycled CDW	C	X		

Table 2. List of indicators related to Vision Element 2 “Circular business models and behaviour patterns”.

INDICATOR #	INDICATOR NAME	SCOPE (DEMO/CITY)	DEMO ACTION 1	DEMO ACTION 2	DEMO ACTION 3
32.1	Number of visits to the clean points	D		X	
32.2	Number of external agents who express interest in guideline assessment	D			X
32.3	Number of visits to the applications	D			X

Table 3. List of indicators related to Vision Element 3 “Closing material loops and reducing harmful resource use”.

INDICATOR #	INDICATOR NAME	SCOPE (DEMO/cITY)	DEMO ACTION 1	DEMO ACTION 2	DEMO ACTION 3
42	Share of local secondary materials in domestic material consumption	D	X		
52	Quantity of material subjected to recycling	D	X		
52.1	Number of projects that implement CDW valorisation	C	X		
52.2	Number of companies implementing CDW valorisation measures	C			X
52.3	Number of projects that implement reused soil	C	X		
52.4	Amount of CDW collected at the clean points	D		X	
52.5	Amount of recycled CDW from large producers	C			X
61	Landfilling rate	D	X		

Table 4. List of indicators related to Vision Element 4 “Improving human wellbeing and reducing environmental impacts”.

INDICATOR #	INDICATOR NAME	SCOPE (DEMO/cITY)	DEMO ACTION 1	DEMO ACTION 2	DEMO ACTION 3
61.1	Assessment of illegal dumping sites	C		X	

Links between the selected indicators and the expected outcomes for the specific Demonstration Actions are shown in the tables below.

Table 5. Linking expected outcomes to the selected indicators for Demonstration Action 1: Renovation of water pipelines with circular material management

Vision Element	Expected outcome	Indicator
1 Local Stakeholder Actions	Strengthened awareness and knowledge of the improvement of CDW management among the main stakeholders and other socio-economic agents related to the bases of the circular economy.	4. CE-related knowledge building campaigns: Qualitative description. 5. CE-related knowledge building campaigns: Impact 6. Circularity-related stakeholder activities 11. Communication measures on circular transformations and waste prevention
2 Circular business models and behaviour patterns	Increased share of “circular” indicators and specifications in tender documents and contracts.	18. CityLoops indicators used in procurement tenders and contracts
	Increased use of recycled CDW by construction companies in the city.	18.1 Number of tenders submitted by companies offering the use of recycled CDW
3 Closing material loops and reducing harmful resource use	Increased amount of CDW that is prepared for recovery/recycling, and therefore reduced amount of material that is deposited in landfills, in accordance with Directive 851/2018 and 850/2018.	52. Quantity of material subjected to recycling 61. Landfilling rate
	Increased amount of recycled materials used in the construction projects, compared to similar construction projects	52.1 Number of projects that implement CDW valorisation
	Increased amount of soil reuse	52.3 Number of projects that implement reused soil
	Reduced use of virgin materials	42. Share of local secondary materials in domestic material consumption

Table 6. Linking expected outcomes to the selected indicators for Demonstration Action 2: Optimising clean points.

Vision Element	Expected outcome	Indicator
1 Local Stakeholder Actions	Increased knowledge of CDW management among citizens and small producers.	11. Communication measures on circular transformations and waste prevention

Vision Element	Expected outcome	Indicator
2 Circular business models and behaviour patterns	Increased use of clean points for CDW management by citizens and small producers.	32.1 Number of visits to the clean points
3 Closing material loops and reducing harmful resource use	Increased amount of CDW managed through the clean points by citizens and small producers.	52.4 Amount of CDW collected at the clean points
4 Improving human wellbeing and reducing environmental impacts	Reduced illegal dumping and landfilling of CDW in the city.	61.1 Assessment of illegal dumping sites

Table 7. Linking expected outcomes to the selected indicators for Demonstration Action 3: Data-driven decision making and Best Practice Guidelines for CDW Management in Seville.

Vision Element	Expected outcome	Indicator
1 Local Stakeholder Actions	Increased interest in the guidelines and tools among public companies and other stakeholders.	6. Circularity-related stakeholder activities
2 Circular business models and behaviour patterns	Increased participation of stakeholders in the assessment of the guidelines.	32.2 Number of external agents who express interest in guideline assessment
	Increased commitment of citizens to circularity.	32.3 Number of visits to the applications
3 Closing material loops and reducing harmful resource use	Increased amount of recycled CDW.	52.5 Amount of recycled CDW from large producers
	Increase in initiatives on circular CDW management.	52.2 Number of companies implementing CDW valorisation measures

3. Plan for monitoring

The tables below detail the monitoring plan for each of the selected indicators. This will guide the CityLoops Evaluation work to be carried out and documented in the Interim Evaluation Report in Month 36 and the Final Evaluation Report in Month 46 of the project. The 16 metadata categories described for each of the selected indicators is based on the Circular City Indicator Set (Vangelsten et al., 2021). Metadata categories 1-5 and 7-8 are standard for all cities/waste streams whereas the others (6 and 9-16) are particular to the demo actions and objectives for the city of Seville.

The Seville team for the evaluation work is presented below:

Table 7. Evaluation team for Seville

EVALUATION TEAM		
Role	Tasks	Organizations
Evaluation manager	<ul style="list-style-type: none"> ▪ Data collection ▪ Monitoring and analysis 	Seville city council – César Gallardo Sóler.
Supporters	<ul style="list-style-type: none"> ▪ Data reporting ▪ Analysis 	Demo manager WP2: IDENER – Santiago Rodriguez. Rest of the Seville CityLoops Cluster.
Local stakeholder group	<ul style="list-style-type: none"> ▪ Analysis and data reporting ▪ Results sharing 	Treatment plant, waste and water managers (private and public), suppliers, public administration, universities, merchants' associations, distribution, social organizations and citizens.

3.1. CE-related knowledge building campaigns: Qualitative description | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	4
	2	Indicator name	CE-related knowledge building campaigns: Qualitative description
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	<ul style="list-style-type: none"> • Engagement and capacity building
Indicator definition and description	5	Definition description indicator / of	<p>Description of knowledge building campaigns. The campaigns would normally be in the form of formalized education events, e.g. classes, courses, education workshops. Describe type of groups reached and type of knowledge building campaign.</p> <p>(To be selected together with indicator number 5)</p>
	6	Rationale	<p>Participation in CE related activities local stakeholders (local business, civil society associations, etc) more aware of the impact and benefits to improve Circular Economy in the City. During the CityLoops project, several campaigns will take place to improve the circularity of CDW in the city of Seville. In that campaigns, knowledge and awareness about this issue will be shown.</p> <p>In DA2 communication campaigns will be performed allowing citizens to contribute to the new collection system to be implemented and to build up this capacity in order to learn more sustainable daily practices with the aim of avoid food waste.</p> <p>In a transversal way, other workshops and communication actions will be carry out with the local stakeholder group established of Seville, to boost circularity in the city (Reference: <i>Seville Stakeholder Engagement Plan</i>).</p> <p><i>(Selected together with indicator #5, #6, #11)</i></p>
	7	Methodology	<ol style="list-style-type: none"> 1. Identify and categorise knowledge campaigns

Metadata group	#	Metadata category	Description / comments
			2. Identify groups reached
	8	Unit	Qualitative data
Data	9	Baseline data / definition	Baseline 0 (only activities during the project are measured)
	10	Data sources / relevant databases	Meetings minutes; participant lists; list of other networking meetings and interviews (date and participants).
	11	Overall accuracy	Exact or estimated number of campaigns done. Exact or estimated number of groups reached.
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities 17. Partnerships for the Goals.
Other	16	Comments	

3.2. CE-related knowledge building campaigns: Impact | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	5
	2	Indicator name	CE-related knowledge building campaigns: Impact
	3	Vision element	Local stakeholder actions

Metadata group	#	Metadata category	Description / comments
Link to Circular City Definition	4	Category	<ul style="list-style-type: none"> Engagement and capacity building
Indicator definition and description	5	Definition description indicator / of	<p>Number of campaigns Number of people reached for each campaign (To be selected together with indicator number 4)</p>
	6	Rationale	<p>Participation in CE related activities local stakeholders (local business, civil society associations, etc) more aware of the impact and benefits to improve Circular Economy in the City. During the CityLoops project, several campaigns will take place to improve the circularity of CDW in the city of Seville. In that campaigns, knowledge and awareness about this issue will be shown.</p> <p>In DA2 communication campaigns will be performed allowing citizens to contribute to the new collection system to be implemented and to build up this capacity in order to learn more sustainable daily practices with the aim of avoid food waste.</p> <p>In a transversal way, other workshops and communication actions will be carry out with the local stakeholder group established of Seville, to boost circularity in the city (Reference: <i>Seville Stakeholder Engagement Plan</i>).</p> <p><i>(Selected together with indicator #4, #6, #11)</i></p>
	7	Methodology	<ol style="list-style-type: none"> Number of campaigns Number of people reached
	8	Unit	Number of campaigns, Number of people
Data	9	Baseline data / definition	Baseline 0 (only activities during the project are measured)
	10	Data sources / relevant databases	Meetings minutes; participant lists; list of other networking meetings and interviews (date and participants).
	11	Overall accuracy	Exact or estimated number of campaigns done. Exact or estimated number of people.
Context	12	Sector coverage	CDW

Metadata group	#	Metadata category	Description / comments
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities 17. Partnerships for the Goals.
Other	16	Comments	

3.3. Circularity-related stakeholder activities | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	6
	2	Indicator name	Circularity-related stakeholder activities
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	<ul style="list-style-type: none"> • Engagement and capacity building
Indicator definition and description	5	Definition / description indicator of	<p>Description of activity type and dialogue methods, which stakeholder groups and when in the process</p> <p>Number of people involved</p>
	6	Rationale	<p>Participation in CE related activities local stakeholders (local business, civil society associations, etc) more aware of the impact and benefits to improve Circular Economy in the City. During the CityLoops project, several campaigns will take place to improve the circularity of CDW in the city of Seville. In that campaigns, knowledge and awareness about this issue will be shown.</p> <p>Workshops and communication actions will be carrying out with the local stakeholder group established of Seville, to boost circularity in the city.</p>

Metadata group	#	Metadata category	Description / comments
			(Selected together with indicator #4, #5, #11)
	7	Methodology	<ol style="list-style-type: none"> 1. Identify stakeholder activity 2. Describe process and when stakeholders are involved 3. Identify dialogue methods used 4. Number of people involved
	8	Unit	Qualitative data, Number of people
Data	9	Baseline data / definition	<p>During February 2020, a workshop was held aimed at involving local stakeholders previously identified in the demonstration actions as well as in the work package related to the evaluation of the circularity of the city's materials. Likewise, prior to this workshop, several preparatory actions took place:</p> <ul style="list-style-type: none"> - Personalized emailing explaining project and purpose of the workshop. No. of people reached: 11. - Individual phone calls and snowball sampling: No. of people reached: 11. - First round of preparation meeting for workshops: No. of people reached: 11. - Workshop: No. of people reached: 14.
	10	Data sources / relevant databases	Meetings minutes Participant lists List of other networking meetings and interviews (date and participants)
	11	Overall accuracy	Exact or estimated number of stakeholders involved
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities 17. Partnerships for the Goals
Other	16	Comments	

3.4. Communication measures on circular transformations and waste prevention | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	11
	2	Indicator name	Communication measures on circular transformations and waste prevention
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	<ul style="list-style-type: none"> • Engagement and capacity building
Indicator definition and description	5	Definition description indicator / of	<p>Describe type of communication measures, e.g. campaigns, provision of information, events for the public/companies.</p>
	6	Rationale	<p>Participation in CE related activities local stakeholders (local business, civil society associations, etc) more aware of the impact and benefices to improve Circular Economy in the City.</p> <p>During the CityLoops project, several campaigns will take place to improve the circularity of CDW in the city of Seville. In that campaigns, knowledge and awareness about this issue will be shown.</p> <p>In DA2 communication campaigns will be performed allowing citizens to contribute to the new collection system to be implemented and to build up this capacity to learn more sustainable daily practices with the aim of avoid food waste.</p> <p>In parallel, other workshops and communication actions will be carry out with the local stakeholder group established of Seville, to boost circularity in the city (Reference: Seville Stakeholder Engagement Plan).</p> <p>(Selected together with indicator #4, #5, #6)</p>
	7	Methodology	<ol style="list-style-type: none"> 1. Number of communication measures towards general public on CE transformation 2. Number of people reached

Metadata group	#	Metadata category	Description / comments
	8	Unit	Number of communication measures, Number of people
Data	9	Baseline data / definition	Baseline 0 (only activities during the project are measured)
	10	Data sources / relevant databases	Reports of communications actions List of communications (date and participants).
	11	Overall accuracy	Exact or estimated number of communications actions done. Exact or estimated number of people reached.
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities
Other	16	Comments	

3.5. CityLoops indicators used in procurement tenders and contracts | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	18
	2	Indicator name	CityLoops indicators used in procurement tenders and contracts
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	<ul style="list-style-type: none"> • Regulation and incentives

Metadata group	#	Metadata category	Description / comments
Indicator definition and description	5	Definition description indicator / of	For each procurement action, describe to which degree CityLoops indicators have been used as part of circularity requirements in procurements. For this, see Table on “Circularity requirements beyond standard/existing levels” in D6.1 data collection template for Circular Procurements (Appendix C)
	6	Rationale	The implementation of circular procurement practices it's a vehicle to making the city more circular. Part of the demonstration actions to be carried out in the city of Seville, require the purchase of equipment, materials, etc. In the cases that are mandatory, clauses will be established that result in a greater circularity of the elements / solution to be purchased. Circular procurement practices will be applied in DA2 in the tenders related with containers acquisition, materials for communication campaigns, etc.
	7	Methodology	Number of indicators used in procurement tenders and contracts with similarity/link to the CityLoops indicators
	8	Unit	Number of indicators
Data	9	Baseline data / definition	Baseline 0 (only activities during the project are measured).
	10	Data sources / relevant databases	Internal report of EMASESA for demo action 1.
	11	Overall accuracy	Description of the specifications established in procurement tenders.
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	12 – Sustainable Consumption and Production.
Other	16	Comments	

3.6. Number of tenders submitted by companies offering the use of recycled CDW | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	18.1
	2	Indicator name	Number of tenders submitted by companies offering the use of recycled CDW
Link to Circular City Definition	3	Vision element	Circular business models and behaviour patterns
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description indicator	Number of offers that participate in the tenders implementing CDW circular management
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Monitoring the number of offers in the tendering process of Emasesa and checking if they offer CDW circular management. Data from Emasesa.
	8	Unit	number of offers
Data	9	Baseline data / definition	For 2021: - 12
	10	Data sources / relevant databases	Emasesa Internal Management Report.
	11	Overall accuracy	High
Context	12	Sector coverage	CDW

Metadata group	#	Metadata category	Description / comments
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only Emasesa data will be measured with this indicator.

3.7. Number of visits to the clean points | Demonstration Action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	32.1
	2	Indicator name	Number of visits to the clean points
Link to Circular City Definition	3	Vision element	Circular business models and behaviour patterns
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description indicator	Number of CDW small producers and citizens managing their CDW through the clean points in a circular approach
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Quantifying the number of visits to the clean points and comparing with historical data.
	8	Unit	number of visits

Metadata group	#	Metadata category	Description / comments
Data	9	Baseline data / definition	For 2021: - 0
	10	Data sources / relevant databases	Lipasam & Idener Internal Management Report.
	11	Overall accuracy	
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	Demonstration Action
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only Lipasam & Idener data will be measured with this indicator.

3.8. Number of external agents who express interest in guideline assessment | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	32.2
	2	Indicator name	Number of external agents who express interest in guideline assessment

Metadata group	#	Metadata category	Description / comments
Link to Circular City Definition	3	Vision element	Circular business models and behaviour patterns
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description indicator	A measure of the potential interest from Stakeholders into circular CDW management.
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Monitoring the initial interest and the evolution of the stakeholders' commitment with the CDW circular management by means of their involvement in the guideline development. Bi-annual workshops will be used to monitor this engagement.
	8	Unit	Number of involved stakeholders
Data	9	Baseline data / definition	For 2021: - 0
	10	Data sources / relevant databases	CLN Internal Management Report.
	11	Overall accuracy	
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	CLN will be used to engage stakeholders.

3.9. Number of visits to the applications | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	32.3
	2	Indicator name	Number of visits to the applications
Link to Circular City Definition	3	Vision element	Circular business models and behaviour patterns
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description indicator	Monitoring the initial interest and the evolution of citizens and stakeholders' commitment with the waste circular management.
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Quantifying the number of visits to IT software tools and comparing with historical data.
	8	Unit	number of visits
	9	Baseline data / definition	For 2021: - 0
Data	10	Data sources / relevant databases	Idener Internal Management Report.
	11	Overall accuracy	
Context	12	Sector coverage	CDW

Metadata group	#	Metadata category	Description / comments
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only Lipasam & Idener data will be measured with this indicator.

3.10. Share of local secondary materials in domestic material consumption | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	42
	2	Indicator name	Share of local secondary materials in domestic material consumption
Link to Circular City Definition	3	Vision element	Closing material loops and reducing harmful resource use
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description indicator	Mass local secondary materials in domestic material consumption.
	6	Rationale	Project activities aim to reduce the use of virgin materials. It is considered appropriate to evaluate the impact of these activities in terms of demonstration action.
	7	Methodology	Amount used in the demonstration actions. Data from Constructors and Emasesa.

Metadata group	#	Metadata category	Description / comments
	8	Unit	kg
Data	9	Baseline data / definition	0 kg
	10	Data sources / relevant databases	FERMOVERT Internal Management Report. Constructors Internal Management Report. Emasesa Internal Management Report.
	11	Overall accuracy	%; weighted/estimated.
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	Demonstration action
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only CDW from Emasesa demo actions will be measured with this indicator.

3.11. Quantity of material subjected to recycling | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	52
	2	Indicator name	Quantity of material subjected to recycling
Link to Circular City Definition	3	Vision element	Closing material loops and reducing harmful resource use
	4	Category	<ul style="list-style-type: none"> • Re-use and recycling

Metadata group	#	Metadata category	Description / comments
Indicator definition and description	5	Definition description indicator / of	<p>Estimate material subjected to recycling at demo, sector and city level. 'Recycling' means processing of materials to achieve the original high-quality or reduce to low quality.</p> <p>Definition from Potting; José and Aldert Hanemaaijer (eds.) (PBL), Roel Delahaye and Rutger Hoekstra (CBS), Jurgen Ganzevles and Johannes Lijzen (RIVM) (2018). Circular economy: what we want to know and can measure. Framework and baseline assessment for monitoring the progress of the circular economy in the Netherlands. PBL Netherlands Environmental Assessment Agency publication number 3217. The Hague, 2018.</p>
	6	Rationale	<p>Part of the actions planned by the city of Seville consists in testing the use of recycled CDW in water infrastructures building works.</p> <p>As part of this pilot, it is essential to know the quantity of recycled CDW used in water infrastructures building works, to optimize the process itself.</p> <p>It is considered interesting measure how demo action could impact in these indicators. These actions are expected to contribute to advance in the fulfilment of the European, national, and regional objectives, in the matter of selective collection, recycling and not disposal in landfill, marked by Directive 851/2018 and 850/2018.</p>
	7	Methodology	Sum up mass of each waste material category subjected to recycling. Data may come from contractors, statistical offices, waste management companies or the Sector Circularity Assessment Method.
	8	Unit	Tonnes/year
Data	9	Baseline data / definition	<p>CDW 252,207 tons/year (EMASESA) + 18,340 tons/year (LIPASAM) = 270,547 tons/year.</p> <p>Recycled CDW 25,221 tons/year (EMASESA) + 18,340 (LIPASAM) tons/year = 43,561 tons/year.</p> <p>Total amount of waste 333,693 tons/year (No CDW) + 270,547 tons/year (CDW) = 604,240 tons/year.</p> <p>Percentages:</p> <p>CDW vs Total waste 44.77%</p> <p>CDW Recycled 16.10%</p>

Metadata group	#	Metadata category	Description / comments
	10	Data sources / relevant databases	Annual Declaration of Municipal Waste Collection (LIPASAM). EMASESA internal report of waste management for construction works.
	11	Overall accuracy	tonnes/year, % amount
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities
Other	16	Comments	

3.12. Number of projects that implement CDW valorisation | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	52.1
	2	Indicator name	Number of projects that implement CDW valorisation
Link to Circular City Definition	3	Vision element	Closing material loops and reducing harmful resource use
	4	Category	<ul style="list-style-type: none"> • Waste generation / management

Metadata group	#	Metadata category	Description / comments
Indicator definition and description	5	Definition description indicator / of	Number of projects implementing CDW circular management
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Evaluate if there are other projects that implement CDW valorisation beyond the demonstration actions
	8	Unit	number of projects
Data	9	Baseline data / definition	For 2021: - 0
	10	Data sources / relevant databases	Emasesa Internal Management Report.
	11	Overall accuracy	
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only Emasesa data will be measured with this indicator.

3.13. Number of companies implementing CDW valorisation measures | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	52.2
	2	Indicator name	Number of companies implementing CDW valorisation measures
Link to Circular City Definition	3	Vision element	Improving human wellbeing and reducing environmental impacts
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description indicator	Number of companies implementing CDW circular management
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Evaluate if there are other private or public company that implement CDW valorisation beyond the demonstration actions
	8	Unit	Number of companies and/or projects
Data	9	Baseline data / definition	For 2021: - 0
	10	Data sources / relevant databases	CLN Internal Management Report. Local Workshops
	11	Overall accuracy	

Metadata group	#	Metadata category	Description / comments
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only CDW data will be measured with this indicator.

3.14. Number of projects that implement reused soil | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	52.3
	2	Indicator name	Number of projects that implement reused soil
Link to Circular City Definition	3	Vision element	Closing material loops and reducing harmful resource use
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description indicator	Number of projects implementing soil circular management
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.

Metadata group	#	Metadata category	Description / comments
	7	Methodology	Evaluate if there are other projects that implement soil circular management beyond the demonstration actions
	8	Unit	Number of projects/kg soil reused
Data	9	Baseline data / definition	For 2021: - 0
	10	Data sources / relevant databases	Emasesa & Constructors Internal Management Report.
	11	Overall accuracy	
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only Emasesa & constructors data will be measured with this indicator.

3.15. Amount of CDW collected at the clean points | Demonstration Action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	52.4

Metadata group	#	Metadata category	Description / comments
	2	Indicator name	Amount of CDW collected at the clean points
Link to Circular City Definition	3	Vision element	Closing material loops and reducing harmful resource use
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description indicator	Kilograms of CDW from small producers and citizens managed by the clean points in a circular approach
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Quantifying the CDW managed kilograms by clean point annually.
	8	Unit	kg CDW
	9	Baseline data / definition	For 2021: - 0
Data	10	Data sources / relevant databases	Lipasam Internal Management Report.
	11	Overall accuracy	
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	Demonstration Action
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.

Metadata group	#	Metadata category	Description / comments
Other	16	Comments	Only Lipasam data will be measured with this indicator.

3.16. Amount of recycled CDW from large producers | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	52.5
	2	Indicator name	Amount of recycled CDW from large producers
Link to Circular City Definition	3	Vision element	Closing material loops and reducing harmful resource use
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description of indicator	Kilograms of CDW from large producers managed under a circular approach
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Quantifying the CDW managed kilograms
	8	Unit	kg CDW
Data	9	Baseline data / definition	For 2021: - 0
	10	Data sources / relevant databases	CLN Internal Management Report. Local Workshops Fermovert

Metadata group	#	Metadata category	Description / comments
	11	Overall accuracy	
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only CDW data will be measured with this indicator.

3.17. Landfilling rate | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	61
	2	Indicator name	Landfilling rate
Link to Circular City Definition	3	Vision element	Closing material loops and reducing harmful resource use
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition description indicator / of	Mass percentage of waste which is landfilled.
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Mass of materials landfilled divided by total amount of waste. Data from waste management companies.

Metadata group	#	Metadata category	Description / comments
	8	Unit	%
Data	9	Baseline data / definition	<p>For 2020:</p> <p>a) Total of waste not collected separately: 258.118 tons)</p> <p>b) Light-packaging waste collected separately: 8.800 tons.</p> <p>c) Material recovered + losses for fermentation: 84.721 tons.</p> <p>Formula: $((a+b) - c)/(a+b)$.</p> <p>Landfilling rate: 68.26%.</p>
	10	Data sources / relevant databases	<p>Plan de Residuos no peligrosos de la Provincia de Sevilla (Non-hazardous Waste Plan of the Province of Seville).</p> <p>Annual Declaration of Municipal Waste Collection (LIPASAM).</p> <p>ABORGASE Internal Management Report.</p> <p>FERMOVERT Internal Management Report.</p>
	11	Overall accuracy	%; weighted/estimated.
Context	12	Sector coverage	BW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only municipal waste will be measured with this indicator.

3.18. Assessment of illegal dumping sites | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	61.1
	2	Indicator name	Assessment of illegal dumping sites
Link to Circular City Definition	3	Vision element	Improving human wellbeing and reducing environmental impacts
	4	Category	<ul style="list-style-type: none"> • Waste generation / management
Indicator definition and description	5	Definition / description indicator	Evolution assessment of the illegal dumping locations on the public areas in the city.
	6	Rationale	Project activities aim to increase recycling and upcycling of materials instead of landfilling. It is considered appropriate to evaluate the impact of these activities in terms of city.
	7	Methodology	Evolution assessment of the illegal dumping locations on the public areas in the city, measuring the CDW amount collected from them annually.
	8	Unit	kg CDW
Data	9	Baseline data / definition	For 2021: - 0
	10	Data sources / relevant databases	Lipasam Internal Management Report.
	11	Overall accuracy	

Metadata group	#	Metadata category	Description / comments
Context	12	Sector coverage	CDW
	13	Reference area / spatial implementation scale	City of Seville
	14	Reference period	Project period 1.10.2019 – 30.9.2023
	15	SDG reference	11. Sustainable Cities and Communities.
Other	16	Comments	Only Lipasam data will be measured with this indicator.

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CityLoops is an EU-funded project focusing on construction and demolition waste (CDW), including soil, and organic waste (OW), where seven European cities are piloting solutions to be more circular.

Høje-Taastrup and Roskilde (Denmark), Mikkeli (Finland), Apeldoorn (the Netherlands), Bodø (Norway), Porto (Portugal) and Seville (Spain) are the seven cities implementing a series of demonstration actions on CDW and OW, and developing and testing over 30 new tools and processes.

Alongside these, a sector-wide circularity assessment and an urban circularity assessment are to be carried out in each of the cities. The former, to optimise the demonstration activities, whereas the latter to enable cities to effectively integrate circularity into planning and decision making. Another two key aspect of CityLoops are stakeholder engagement and circular procurement.

CityLoops runs from October 2019 until September 2023.



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