Evaluation Plan: CDW sector, Bodø

Deliverable 6.2

Bodø Municipality

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Abstract	This report details how the city of Bodø will evaluate the impact of the CityLoops tools and demonstration activities aimed at improving the circularity of the CDW sector.
Keywords	Evalution, Indicators, Bodø, CDW
License	

Contents

1. Introduction

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.

In Bodø an old military airport will be demolished, and a new part of the city will be built in this area. In another area a new airport will be built. Bodø wants to influence the material and mass handling of the process: Less waste, more reuse and repurposing of structures. The 5,000,000 m2 land currently occupied by the air-force have to be cleaned-up regarding soil, CDW and other infrastructure. A stakeholder involvement platform will help facilitate decision processes related to demolition, re-circulation and re-purposing of a large number of military surface and underground structures and infrastructures. On-site soil treatment and re-use will be demonstrated, reducing the net mass deficit in the new airport area. At the new airport area there will be on-site circular demonstration actions related to re-use, re-purposing and re-cycling of infrastructure (CDW, soil) facilitated by the CityLab platform and a 3D planning tool.

The Municipality of Bodø will use this evaluation plan as a "living document". The plan will be updated and improved whenever relevant knowledge emerges from the planning and execution of the demonstration actions.

1.1. Demo Action 1: Demolish the military airport with circular material management processes

Bodø has developed a CDW management plan for the whole project, which will be accessible in english. With such large scale and complexity, it's important to have general

requirements for selective demolition, establishing a central recycling plant and logistics facility to prepare them to be delivered to new constructions, establishing a marketplace for reused and recycled materials. Focus in the planning is to reduce demolishing and integrating circular thinking into all procurement for the new airport new city project.

The following CityLoops tools will be tested in the Demonstration Action:

Tool 1) Life Cycle Assessment for demolition and renovated sites: The LCA tool will be used to quantify the emission savings by keeping soil and CDW on-site. For this purpose, the LCA tool will be used in the 3D tool to simulate this, feeding the visualisation tool with emission and traffic data.

Tool 2) Screening procedures and tool for selective demolition: Screening procedures and guidelines for selective demolition will be used for chosen buildings. It will be included in tendering. The buildings have not been identified yet. This will be done in collaboration with the New Airport New City-team. They will help identify best practise in terms of demolishing in order to reuse materials and masses, and focus on methods on how to demolish military shelters.

Tool 8/9) Construction-material passport and CDW materials databank & Databank and digital marketplace for recovered materials

Bodø have their own databank up and running and will engage and challenge vendors to use the materials on hand. The databank will be used to bookkeep the demolished materials' specifications and location and bookkeep holdings and ins and outs in the storage facility of the demolished materials. The data will also be used to identify which materials may be subject for reuse and recycling. Material passports will be integrated in this solution to keep track of where the different materials are located and their characteristics. There is no plan for digital or physical marketplace yet. It doesn't have to be a webpage, but it can be some form of an exchange of information and materials for this new city development. Bodø will compare/ exchange experiences with Mikkeli and Apeldoorn who are developing databanks as well.

Tool 11) 3D GIS-based visualisation tool for monitoring and planning

This tool uses existing 3D technology in new, innovative ways for monitoring and planning handling of mass and materials. The existing information is used for mapping the masses and their degree of pollution and visualizing this using PowerBI and Augment City. Next step is to use the tool to plan which buildings should be kept or demolished, to simulate how a building may be demolished in order to reuse/recycle materials, and how to utilize the freed space and material. Furthermore the tool is used to simulate material and waste flows.

Expected outcomes:

- 100% of masses & materials have been mapped and evaluated for their reuse potential

- 100% of tenders to suppliers with business interests in the demolition project have contained requirements for circular treatment of materials
- All decisions related to demolition shall be data-based and supported by information from the 3D-GIS based visualisation tool, LCA tool and circular business cases
- An intermediate storage facility on demonstration site or nearby to enable reuse of materials has been established
- A databank and a marketplace for reused materials has been established
- 80% of materials & masses stored onsite/near demonstration site has been prepared for reuse

1.2. Demo Action 2: Involve stakeholders and citizens in city development using innovative tools

The large "New City New Airport" project has three main actors: the military (Norconsult), Avinor airport (Norconsult) and the municipality. The citizens are a large interest group.

Bodø have included the stakeholders in the transformation of the airport and the new city from the beginning. They want the professional stakeholders (e.g. construction consultants, entrepreneurs, architects) to engage in dialogue on practices of screening and (selective) demolition. And they have involved both professional stakeholders and citizens in a dialogue on how to reuse and prolong lifetime of existing buildings and materials when designing the new city.

The following CityLoops tools will be tested in the Demonstration Action:

Tool 12) CityLab (ByLab) stakeholder engagement platform at Bodø town hall (BOD)

The CityLab is a municipal platform to inform, activate and involve citizens. Bodø have already had some CityLab arrangements regarding the development of a new part of the city. Different architect companies have in the CityLab presented their construction and city plan suggestions, but everyone and anyone in the city is invited to participate in this planning. The plan is to keep arranging these meetings, but also possibly arrange CityLab-meetings exclusively for professional and extra relevant stakeholders. Young people and children have been invited to demonstrate how they would develop the new part of the city using the materials we have identified on site.

Tool 11) 3D GIS-based visualisation tool

This tool will be used to show future scenarios to citizens of different visions of the new city development. Can also be used to raise awareness of climate and circular issues, like emissions and waste generation in the city, by presenting it in a visual, captivating and easy to understand way that is more accessible for citizens.

Expected outcomes:

- Increased degree of involvement of citizen and stakeholder inputs in city planning processes
- Improved capacity for stakeholder involvement in urban planning decision-making
- Increased early market engagement ensuring that the circularity potential present in the market will be fully utilized
- Long-term changed procedures on involving stakeholders in construction projects at city level

1.3. Demo Action 3: Embed circular strategies into the planning of a new city district

Given the timespan of CityLoops it is not likely that the new city will be constructed within the timeframe of the project. This action focus on circular city planning: how is the new city part going to look, and how should we build it in a circular way? How can we plan for specific recycling and reuse from demolishing of the old airport? How do we prepare and select materials to be used? CityLoops is a part of the planning of the construction project. Establishing circular procurement policies in the organisation is one of the initiatives from CityLoops. Furthermore, the tools and concepts developed in CityLoops will be put to use in the project.

The following CityLoops tools will be tested in the Demonstration Action:

Tool 11) 3D modelling tool for monitoring and planning

Use the tool to design hypothetical constructions in the new city part that is to be developed. Use the tools to visualise how it may be possible to "move" demolished materials, and freed masses, to construct new structures. Use the tool as city planning tool, and a tool that can show us data related to constructions, i.e. emissions or energy consumption. Use tool to plan, simulate, visualise what demolished/strategic deconstructed materials can be used in new constructions.

Tool 8/9) Construction-material passport and CDW materials databank & Databank and digital marketplace for recovered materials

Use the appropriate reusable materials presented in Bodøs databank to plan construction activities

Tool 12) CityLab (ByLap) stakeholder engagement platform at Bodø town hall

For the new city development, specifically, it will be used for:

Suggestions on how existing structures and solutions may be repurposed, and how materials and masses can be upcycled. CityLab arrangements regarding the development of a new part of the city involving both professional stakeholders and citizens.

Expected outcomes:

- Improved practice of including sustainability and circularity considerations in procurement activities
- CityLoops-initiated goals and ambitions regarding circular materials handling have been manifested in municipal public strategy documents
- Increase in urban planning decisions that are supported by information from the 3D-GIS based visualisation tool, LCA tool and circular business cases
- Within the plans for the new city disctrict, 70% of materials & masses from the demolition site shall be reused, reducing city wide use of virgin materials by 40%
- Circular material use rate increased by 10%

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 if relevant the application of CityLoops tools outside the scope of the demonstration actions) 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).

The indicators are selected because of their relevance to the demonstration project and the city's sustainability goals. The demonstration project is a demolition and construction project where hundreds of thousands of tonnes of masses and materials needs to be treated in a sustainable and circular manner. The indicators help us measure if CityLoops actions to support this, is effective. The city of Bodø have ambitions to improve how CDW is treated in the city in general, and to reduce emission. Both in the demonstration project, and on city level, it is important to involve stakeholders and citizens development projects.

Measuring the selected indicators helps us quantify how much CDW handling, stakeholder involvement, circular innovation and emission values are improved as a result of CityLoops initiatives, actions and tools.

Table 1 to Table 4 list the selected indicators for each of 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.

Table 1: List of indicators related to Vision Element 1 "Local Stakeholder Actions"

Indi-cator #	Indicator name	Scope (Demo/City)	Demo action 1 Demo-lition of airport	Demo action 2 Stake-holder Involve-ment	Demo action 3 New city develop ement
3 & 20	New tools for better mapping of resources and their location: Qualitative description and impact	D	X		X
7 & 8	New methods and technologies for stakeholder involvement: Qualitative description and impact	D / C		X	X
10	Stakeholder contribution to improved circularity	D		X	X
12 & 15	Circularity requirements in procurement beyond existing levels	D / C	X	X	
13	Circular procurement ambition set out in strategy / policy documents.	C		X	
16 & 17	Procurements making use of stakeholder dialogue to strengthen circularity: Qualitative description and impact			X	
21 & 22	New planning instruments/tools for improved circularity: Qualitative description and impact	D	X		X

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

Indi-cator #	Indicator name	Scope (Demo/City)	Demo action 1 Demo-lition airport	Demo action 2 Stake-holder Involve-ment	Demo action 3 New city develop ement
29	New material hotels: Mass of material stored in hotel	D	X		X
30	New digital material databank/marketplace: Qualitative description	D	X		X
31	New digital material databank/marketplace: Impact	D			X
32.1	Tool-based urban planning decisions	D			X

Table 3: List of indicators related to Vision Element 3 "Closing material loops and reducing harmful resource use"

Indi-cator #	Indicator name	Scope (Demo /City)	Demo action 1 Demo-lition airport	Demo action 2 Stake-holder Involve-ment	Demo action 3 New city develop ement
55	EOL-RR (End of Life Reuse Rate)	D	X	X	X
57	Amount of sector specific waste that is produced	D	X		

Table 4: List of indicators related to Vision Element 4 "Improving human wellbeing and reducing environmental impacts"

Indi-cator #	Indicator name	Scope (Demo /City)	Demo action 1 Demo-lition airport	Demo action 2 Stake-holder Involve-ment	Demo action 3 New city develop ement

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: Demolish the military airport with circular material management processes.

Vision Element	Expected outcome	Indicator
1 Local Stakeholder Actions	100% of masses & materials have been mapped and evaluated for their reuse potential	3/20. New tools for better mapping of resources and their location
	100% of tenders to suppliers with business interests in the demolition project have contained requirements for circular treatment of materials	12/15. Circularity requirements in procurement beyond existing levels
	All decisions related to demolition shall be data-based and supported by information from the 3D-GIS based visualisation tool, LCA tool, and circular business cases	21/22. New planning instruments/tools for improved circularity
2 Circular business models and behaviour patterns	An intermediate storage facility on demonstration site or nearby to enable reuse of materials has been established	29. New material hotels: Mass of material stored in hotel
	A databank and a marketplace for reused materials has been established	30/31. New digital material databank/marketplace: Qualitative description

Vision Element	Expected outcome	Indicator
3 Closing material loops and reducing harmful resource use	80% of materials & masses stored onsite/near demonstration site have beend prepared for reuse	55. EOL-RR (End of Life Reuse Rate)

Table 6: Linking expected outcomes to the selected indicators for Demonstration Action 2: Involve stakeholders and citizens in city development using innovative tools.

Vision Element		
1 Local Stakeholder Actions	Increased degree of involvement of citizen and stakeholder input in city planning processes	6. Circularity related stakeholder activities 10. Stakeholder contribution to improved circularity
	Improved capacity for stakeholder involvement in urban planning decision making	7/8. New methods and technologies for stakeholder involvement: Qualitative description
	Increased early market engagement ensuring that the circularity potential present in the market will be fully utilized	10. Stakeholder contribution to improved circularity
	Long-term changed procedures on involving stakeholders in construction projects at city level	10. Stakeholder contribution to improved circularity

Table 7: Linking expected outcomes to the selected indicators for Demonstration Action 3: Embed circular strategies into the planning of a new city district.

Vision Element	Expected outcome	Indicator
1 Local Stakeholder Actions	Improved practice of including sustainability and circularity considerations in procurement activities	12/15. Circularity requirements in procurement beyond existing levels 16/17. Procurements making use of stakeholder dialogue to strengthen circularity: Qualitative description
	CityLoops-initiated goals and ambitions regarding circular materials handling have been manifested in municipal public strategy documents	13. Circular procurement ambition set out in strategy / policy documents. | City, 19. Progress towards circular city strategy objectives
2 Circular business models and behaviour patterns	Increased urban planning decisions that are supported by information for the 3D-GIS based visualisation tool, LCA-tool and circular business cases	32.1. Tool-based urban planning decisions
3 Closing material loops and reducing	Within the plans for the new city disctrict, 70% of materials & masses from the demolition site shall be	55. EOL-RR (End of Life Reuse Rate)

Vision Element	Expected outcome	Indicator
harmful resource use	reused, reducing city wide use of virgin materials by 40%	
	Circular material use rate increased by 10%	39. Circular Material Use Rate | Demonstration action

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) vary from case to case and are therefore customized by each city to fit the scope and focus of their demonstration activities and the tools that they will test.

3.1. Indicator 3/20. New tools for better mapping of resources and their location | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	3/20
	2	Indicator name	New tools for better mapping of resources and their location: Qualitative description & New tools for better mapping of resources and their location: Impact
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Engagement and capacity building Regulation and incentives Vision and urban management
Indicator definition and description	5	Definition / description of indicator	3: Qualitative description of individual tools, including scope and scale (e.g. demonstration vs city level), target users. Describe impact of CityLoops tools described in indicator Number 3 on material flows and other relevant parameters 20: Describe impact of CityLoops tools described in indicator # 3 on material flows and other relevant parameters
	6	Rationale	Use the information in the tool to plan how resources can be stored and treated in order to ensure circular treatment by i.ex. using them in nearby projects Bodø has chosen this indicator because of the need to map and identify the resources on the demonstration site in order to evaluate and plan its reuse potential. Expected outcome DA1: 100% of masses & materials have been mapped and evaluated for their reuse potential
	7	Methodology	3: Qualitative description 20: For each tool (estimate) Volume of materials impacted per year Other relevant parameter per year
	8	Unit	3: Qualitative data 20: Tonnes / year. Other relevant quantitative units (Monetary, jobs etc)

Metadata group	#	Metadata category	Description / comments
Data	9	Baseline data / definition	The mapping activities before project initiation versus mapping activities after demonstration phase. This has not been done in the same way before, so the baseline is basically 0.
	10	Data sources / relevant databases	NGI tests/analyses on the masses on site (locally stored report), construction reports, Norconsult's mass analyses. Procurement tenders. Scanning, measurements and inventory assements of buildings on demo site.
	11	Overall accuracy	Very accurate test point data. Not very accurate mass volume data. Some uncertainty in generalizing mass data from test points to nearby areas. Tender data is accurate.
Context	12	Sector coverage	CDW, city developement, tech.dept.
	13	Reference area / spatial implementation scale	Demonstration area incl. city development area
	14	Reference period	2019-2023 Yearly reconciliation, # of tools used
	15	SDG reference	
Other	16	Comments	

3.2. Indicator 6. Stakeholder contribution to improved circularity | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	6
	2	Indicator name	Stakeholder contribution to improved circularity
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Engagement and capacity building
Indicator definition and description	5	Definition / description of indicator	Qualitative description of input from stakeholder activities and how it has contributed to improved circularity
	6	Rationale	Stakeholders have interest and competence in city developement relevant subjects. It is interesting to see if we can operationalize inputs and initiatives from stakeholders i.ex. from CityLab arrangements. Expected outcomes: • DA2: Increased degree of involvement of citizen and stakeholder input in city planning processes
	7	Methodology	List inputs from stakeholders Describe how it has been used by those that invited the stakeholder activity

Metadata group	#	Metadata category	Description / comments
			Describe how it has contributed to improved circularity
	8	Unit	Qualitative data and potentially quantitative impact data
Data	9	Baseline data / definition	Number of initiatives materialised from stakeholder inputs before and after involvement arrangements.
	10	Data sources / relevant databases	Data from projects descriptions, arrangement logs, tenders, grants
	11	Overall accuracy	The very qualitative nature of the data might comprimise its accuracy.
Context	12	Sector coverage	CDW, housing developement, city planning, infrastructure, construction & demolition
	13	Reference area / spatial implementation scale	Mainly demonstration area, but not necesarrily limited to it
	14	Reference period	Yearly reconciliation. # of stakeholder involvement initiatives, # of stakeholder contributions, # of contributions resulting in municipal decisions
	15	SDG reference	
Other	16	Comments	

3.3. Indicator 7/8. New methods and technologies for stakeholder involvement | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	7/8
	2	Indicator name	New methods and technologies for stakeholder involvement
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Engagement and capacity building
Indicator definition and description	5	Definition / description of indicator	7: Number of methods, and for each a qualitative description of the method 8: Description of stakeholder groups involved Number of of people impacted
	6	Rationale	Demonstrating circular solutions to get understanding of its importance. Involvement. Awareness. In this indicator, two tools will be central: Tool 11 (3D tool) and Tool 12 (Stakeholder & citizen

Metadata group	#	Metadata category	Description / comments
			involvement tool). These arrangements will not only be related to the demonstration projects, but also to initiatives in the city in general. Expected outcome DA2: Improved capacity for stakeholder involvement in urban planning decision making
	7	Methodology	7: a) Describe technologies used in stakeholder processes b) Describe technology advantage / disadvantage 8: a) Describe the identified stakeholder groups b) Number of people impacted per stakeholder group
	8	Unit	7: Number of methods, Qualitative data 8: Qualitative data, Number of people
Data	9	Baseline data / definition	Innovative stakeholder activities before the projects versus after the demonstration phase. Number of actions initiated as a direct result from stakeholder inputs
	10	Data sources / relevant databases	Arrangement database: number of arrangements, type of arrangements, number of participants
	11	Overall accuracy	# of attendees and # of arrangements are 100% accurate. It might be difficult to identify the number of actions that have been materialised directly as a result from stakeholder & citizen initiatives.
Context	12	Sector coverage	CDW, city development, citizens, anyone with interest in the demonstration intera, quality of life
	13	Reference area / spatial implementation scale	City level
	14	Reference period	2019-2023 Yearly reconciliation, # of tools & methods used
	15	SDG reference	
Other	16	Comments	

3.4. Indicator 7/8. New methods and technologies for stakeholder involvement | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	7/8
	2	Indicator name	New methods and technologies for stakeholder involvement
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Engagement and capacity building

Metadata group	#	Metadata category	Description / comments
Indicator definition and description	5	Definition / description of indicator	Number of methods, and for each a qualitative description of the method Description of stakeholder groups involved # of people impacted
	6	Rationale	Demonstrating circular solutions to get understanding of its importance. Involvement. Awareness. In this indicator, two tools will be central: Tool 11 (3D tool) and Tool 12 (Stakeholder & citizen involvement tool). The expected outcome is that a guide with generelizable methods for citizen & stakeholder involvement in city planning processes is prepared. Expected outcome DA2: Improved capacity for stakeholder involvement in urban planning decision making
	7	Methodology	Describe technologies used in stakeholder processes Describe technology advantage / disadvantage
	8	Unit	7: Number of methods, Qualitative data 8: Qualitative data, Number of people
Data	9	Baseline data / definition	Innovative stakeholder activities before the projects versus after the demonstration phase. Number of actions initiated as a direct result from stakeholder inputs.
	10	Data sources / relevant databases	Arrangement database: number of arrangements, type of arrangements, number of participants
	11	Overall accuracy	# of attendees and # of arrangements are 100% accurate. It might be difficult to identify the number of actions that have been materialised directly as a result from stakeholder & citizen initiatives.
Context	12	Sector coverage	CDW, city development, citizens, anyone with interest in the demonstration intera, quality of life
	13	Reference area / spatial implementation scale	Demonstration site
	14	Reference period	2019-2023 Yearly reconciliation, # of tools & methods used
	15	SDG reference	
Other	16	Comments	

3.5. Indicator 10. Stakeholder contribution to improved circularity | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	10

Metadata group	#	Metadata category	Description / comments
	2	Indicator name	Stakeholder contribution to improved circularity
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Engagement and capacity building
Indicator definition and description	5	Definition / description of indicator	Qualitative description of input from stakeholder activities and how it has contributed to improved circularity
	6	Rationale	Stakeholders have interest and competence in city developement relevant subjects. It is interesting to see if we can operationalize inputs and initiatives from stakeholders i.ex. from CityLab arrangements.

Expected outcomes DA2:
• Increased degree of involvement of citizen and stakeholder input in city planning processes
• Increased early market engagement ensuring that the circularity potential present in the market will be fully utilized
• Long-term changed procedures on involving stakeholders in construction projects at city level |
| | 7 | Methodology | List inputs from stakeholders
Describe how it has been used by those that invited the stakeholder activity
Describe how it has contributed to improved circularity |
	8	Unit	Qualitative data and potentially quantitative impact data
Data	9	Baseline data / definition	Number of initiatives materialised from stakeholder inputs before and after involvement arrangements.
	10	Data sources / relevant databases	Data from projects descriptions, arrangement logs, tenders, grants
	11	Overall accuracy	The very qualitative nature of the data might comprimise its accuracy.
Context	12	Sector coverage	CDW, housing developement, city planning, infrastructure, construction & demolition
	13	Reference area / spatial implementation scale	Mainly demonstration area, but not necesarrily limited to it
	14	Reference period	Yearly reconciliation. # of stakeholder involvement initiatives, # of stakeholder contributions, # of contributions resulting in municipal decisions
	15	SDG reference	
Other	16	Comments	

3.6. Indicator 12/15. Circularity requirements in procurement beyond existing levels | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	12/15
	2	Indicator name	Circularity requirements in procurement beyond existing levels
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Regulation and incentives
Indicator definition and description	5	Definition / description of indicator	12: Description of requirements in procurements going beyond what is current standard practice 15: Number of procurements with circularity requirements Value of procurement with circularity requirements
	6	Rationale	As a public procurer we have the opportunity to change how providers are practising because of our significant purchasing power. More requirements to circular practise – more incentives from providers – more circularity in society. The city developement project/demonstration project/construction project is presumably suitable for setting a standard to prepare better tenders with high quality requirements to circularity. Expected outcomes DA1: 100% of tenders to suppliers with business interests in the demolition project have contained requirements for circular treatment of materials
	7	Methodology	12: Decide which procurements are relevant for analysis (e.g. demo action focussed procurements only or a wider range of procurements) Describe current standard practice in terms of CE requirements For each procurement case, describe additional requirements beyond standard practice In case of several relevant procurements, summarize relevant progress beyond existing levels 15: For each action: • Type of procurement action • Value of procurement For the whole period considered: • Time period • Number of procurement contracts • Sum up the total value of these contracts
	8	Unit	Qualitative data and potentially quantitative impact data Number of actions Monetary value of procurements

Metadata group	#	Metadata category	Description / comments
Data	9	Baseline data / definition	A comparison of a representative selection of tenders before and after demonstration phase, evaluating amount of tenders with circularity requirements, and the quality of the specific requirements. In this indicator, tenders related to the demonstration project will be evaluated. As the project is not yet initiated, the baseline is 0.
	10	Data sources / relevant databases	Tender history, purchasing history, data gathered before improvement actions, data gathered after demonstration phase, spend data
	11	Overall accuracy	Very good accuracy. Easy to uncover improvement.
Context	12	Sector coverage	Construction & demolishing sector, architects, transport sector, waste mangers, purchasing dept, project managers and decision makers in Bodø Municipality
	13	Reference area / spatial implementation scale	Demonstration site
	14	Reference period	2021-2023. Yearly reconciliation. Data source: procurement history, including tenders.
	15	SDG reference	
Other	16	Comments	

3.7. Indicator 12/15. Circularity requirements in procurement beyond existing levels | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	12
	2	Indicator name	Circularity requirements in procurement beyond existing levels
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Regulation and incentives
Indicator definition and description	5	Definition / description of indicator	12: Description of requirements in procurements going beyond what is current standard practice 15: Number of procurements with circularity requirements Value of procurement with circularity requirements
	6	Rationale	As a public procurer we have the opportunity to change how providers are practising because of our significant purchasing power. More requirements to circular practise – more incentives with providers – more circularity in society.

Metadata group	#	Metadata category	Description / comments
			Expected outcome DA3: Improved practice of including sustainability and circularity considerations in procurement activities
	7	Methodology	12: Decide which procurements are relevant for analysis (e.g. demo action focussed procurements only or a wider range of procurements) Describe current standard practice in terms of CE requirements For each procurement case, describe additional requirements beyond standard practice In case of several relevant procurements, summarize relevant progress beyond existing levels 15: For each action: • Type of procurement action • Value of procurement For the whole period considered: • Time period • Number of procurement contracts • Sum up the total value of these contracts
	8	Unit	Qualitative data and potentially quantitative impact data Number of actions Monetary value of procurements
Data	9	Baseline data / definition	A comparison of a representative selection of tenders before and after demonstration phase, evaluating amount of tenders with circularity requirements, and the quality of the specific requirements. Sustainability has in some tenders (~50%) been taken into consideration, but circularity isolated has not been defined very well.
	10	Data sources / relevant databases	Tender history, purchasing history, data gathered before improvement actions, data gathered after demonstration phase, spend data
	11	Overall accuracy	Very good accuracy. Easy to uncover improvement.
Context	12	Sector coverage	Construction & demolishing sector, architects, transport sector, waste mangers, purchasing dept, project managers and decision makers in Bodø Municipality
	13	Reference area / spatial implementation scale	City level
	14	Reference period	2021-2023. Yearly reconciliation. Data source: procurement history, including tenders.
	15	SDG reference	
Other	16	Comments	

3.8. Indicator 13/19. Circular procurement ambition set out in strategy / policy documents | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	13/19
	2	Indicator name	Circular procurement ambition set out in strategy / policy documents.
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Regulation and incentives
Indicator definition and description	5	Definition / description of indicator	List and describe ambition and to which degree the ambitions are being fulfilled
	6	Rationale	While the city has some guidelines and policies on to how sustainability is to be weighted in tenders, there is no policies that demands requirements to circularity. As an initiative from CityLoops, circularity is to be weighted in relevant tenders, and we need to measure how tenders has improved as a result of this. Not only the increase of numbers of tenders with such requirements, but also the quality of the requirements. Expected outcome DA3: CityLoops-initiated goals and ambitions regarding circular materials handling have been manifested in municipal public strategy documents
	7	Methodology	Evaluate each ambition on scale: no progress, little progress, some progress, ambition nearly reached, ambition reached or beyond.
	8	Unit	Score on categorical scale (1-5)
Data	9	Baseline data / definition	A representative selection of tenders before the CityLoops initiatives to improve, versus a selection of tender after. Has the number of tenders with circularity requirements increased? Has the quality of these requirements improved?
	10	Data sources / relevant databases	Tender history, spend data
	11	Overall accuracy	Number of tenders with requirements are very accurate. The quality of the specific tenders is not quantitative, but it's fairly easy to evaluate the quality of the qualification and grant criteria.
Context	12	Sector coverage	Everyone with business interest in the demonstration area, contractors, entrepreneurs, city development dept.
	13	Reference area / spatial	City level

Metadata group	#	Metadata category	Description / comments
		implementation scale	
	14	Reference period	2021-2023. Yearly reconciliation. Data source: procurement history, including tenders.
	15	SDG reference	
Other	16	Comments	

3.9. Indicator 16/17. Procurements making use of stakeholder dialogue to strengthen circularity: Qualitative description | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	16/17
	2	Indicator name	Procurements making use of stakeholder dialogue to strengthen circularity: Qualitative description
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Regulation and incentives
Indicator definition and description	5	Definition / description of indicator	16: Description of stakeholder dialogue in procurement processes focussing on circularity (e.g. demonstration action related or at city level) 17: For each procurement action value of procurement described in indicator # 16, mass of materials impacted
	6	Rationale	If suppliers are involved early in projects, it may increase the chances of them being equipped & prepared for fulfilling our requirements for circularity. Expected outcome DA3: Improved practice of early market dialogue to prepare the suppliers for circularity demands
	7	Methodology	16: List number of procurements processes using stakeholder dialogue. For each of these procurements processes: Describe the stakeholders/actors involved in the dialogue Description of the dialogue including when in the process 17: List number of procurements processes using stakeholder dialogue. Sum up the total value Define how to identify material impacted Sum up volume of material impacted
	8	Unit	16: Qualitative data

Metadata group	#	Metadata category	Description / comments
			17: Monetary value. Tonnes / year.
Data	9	Baseline data / definition	Market involvement timing before and after demonstration phase. Has the time interval between market involvement and project initiation been prolonged?
	10	Data sources / relevant databases	Tender history reports, market involvement literature, master thesis for Bodø Municipality/CityLoops
	11	Overall accuracy	As time is quantitative, it's presumably uncomplicated to measure improvement.
Context	12	Sector coverage	Construction & demolishing sector, architects, transport sector, waste mangers
	13	Reference area / spatial implementation scale	City level
	14	Reference period	2019-2023. Yearly reconciliation. Data source: procurement history, including tenders.
	15	SDG reference	
Other	16	Comments	

3.10. Indicator 21/22. New planning instruments/tools for improved circularity: Qualitative description | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	21/22
	2	Indicator name	New planning instruments/tools for improved circularity
Link to Circular City Definition	3	Vision element	Local stakeholder actions
	4	Category	Vision and urban management
Indicator definition and description	5	Definition / description of indicator	21: Define and select planning instruments/ tools relevant to improve circularity 22: Quantify impact of all planning instruments/tools tools described in indicator # 21.
	6	Rationale	There is a need for the city to map all masses & materials on the demonstration site in order to evaluate its reuse potential, then plan how these resources might be used in other nearby projects. Via CityLoops, Bodø Municipality is using a digital twin for

Metadata group	#	Metadata category	Description / comments
			this, to plan, simulate, visualise how a new part of the city can be built using reused materials and masses.
			Expected outcome DA1: All decisions related to demolition shall be data-based and supported by information from the 3D-GIS based visualisation tool, LCA tool, and circular business cases
	7	Methodology	21: Qualitative description of each instrument/tool 22: For each instrument/tool: # of projects where tool was used Total mass of materials that the tool has impacted on per year Recirculated mass of materials that the tool has impacted on per year
	8	Unit	21: Qualitative data 22: Number of tools. Tonnes / year.
Data	9	Baseline data / definition	Reuse rate after use of the CityLoops tool versus before. Evaluate if the tool has had effect on circular treatment of CDW. Evaluation of whether the practise of using tools for data-based decisions has increased after implementation of CityLoops developed solutions. Baseline: the tools used before implementation of CL-tools.
	10	Data sources / relevant databases	Digital material databank, reuse rates, laser scannings, building assements from building engineer
	11	Overall accuracy	Accurate
Context	12	Sector coverage	CDW, reuse, city developement, waste managers
	13	Reference area / spatial implementation scale	Demonstration site
	14	Reference period	2019-2023 Yearly reconciliation, # of tools & methods used.
	15	SDG reference	
Other	16	Comments	Tool 11

3.11. Indicator 29. New material hotels: Mass of material stored in hotel | City

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	29

Metadata group	#	Metadata category	Description / comments
	2	Indicator name	New material hotels: Mass of material stored in hotel
Link to Circular City Definition	3	Vision element	Circular business models and behavioural patterns
	4	Category	Circular value chains and infrastructure Re-use and recycling
Indicator definition and description	5	Definition / description of indicator	The indicator assesses the impact and significance of the material hotel by logging the flow and stock of materials in the hotel.
	6	Rationale	Much of the city's construction project's materials will be placed in an intermediate storage facility, enabling it for reuse in nearby projects. It is interesting to measure what resources are stored in such a material hotel, and how much of the total amount of material in the demonstrations site are stored this way. Expected outcome DA1: An intermediate storage facility on demonstration site or nearby to enable reuse of materials has been established
	7	Methodology	The indicator assesses the impact and significance of the material hotel by logging three variables: The mass of materials entering the hotel in a given time period (e.g. monthly of per year). The mass of materials exiting the hotel in a given time period (e.g. monthly of per year). The total mass of materials in store in the material hotel by the end of each time period (month or year) In addition to logging the total mass, the mass can be logged by selected material fractions.
	8	Unit	Tonnes / year, Tonnes
Data	9	Baseline data / definition	The baseline will be 0, as the material hotel on site is not yet established.
	10	Data sources / relevant databases	Databank that represents the resources in the material hotel.
	11	Overall accuracy	Very good accuracy if the bookkeeping of material movements is good
Context	12	Sector coverage	Entrepreneurs, contractors, organizations with interest of building components in general
	13	Reference area / spatial implementation scale	Demonstration site
	14	Reference period	Second part of 2021 - 2023. Monthly reconciliation in databank.
	15	SDG reference	
Other	16	Comments	

3.12. Indicator 30/31. New digital material databank/marketplace | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	30/31
	2	Indicator name	New digital material databank/marketplace: Qualitative description
Link to Circular City Definition	3	Vision element	Circular business models and behavioural patterns
	4	Category	Circular value chains and infrastructure Re-use and recycling
Indicator definition and description	5	Definition / description of indicator	30: Description of the digital material databank/marketplace in term of objective, type, scope, stage of development, target/user groups and other aspects deemed relevant 31: The impact of the digital marketplace is assessed by estimating the mass and value of material registered and traded per time period.
	6	Rationale	Accounting of materials from the demonstration site, put on a markedplace to make reused resources avaliable for contractors, housing developers, entrepreneurs, public city developers with projects preferrably with nearby projects. The ambition is to make -all- resources avaliable on this markedplace. Expected outcome DA1: A databank and a marketplace for reused materials has been established
	7	Methodology	30: See definition 31: Mass of materials registered per time period Mass of materials traded per time period Value of materials traded per time period Time period can be month or year Total mass should be registered, and optionally key material fractions
	8	Unit	30: Qualitative data 31: Tonnes / year, Monetary value/time
Data	9	Baseline data / definition	30: Amount of reused materials before and after the establishment of the markedplace. 31: As the demolition is not yet initiated, the baseline is 0. It is interesting to compare the amount of masses and materials that is -not- registered in this databank, with the resources that -is-.
	10	Data sources / relevant databases	30: Marketplace, contractors data, demolition data 31: Data from contractors, waste management companies, drone data, demolition logs
	11	Overall accuracy	Not very accurate as some mass quantitites needs to be assumed/modelled/calculated as opposed to when you actually weigh the resources.

Metadata group	#	Metadata category	Description / comments
Context	12	Sector coverage	Contractors, waste managers, city developers, housing developers
	13	Reference area / spatial implementation scale	Demonstration site
	14	Reference period	Second part of 2021 - 2023. Monthly reconciliation in databank.
	15	SDG reference	
Other	16	Comments	The city development project's timescale is almost 100 years

3.13. Indicator 32.1. Tool-based urban planning decisions | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	32.1
	2	Indicator name	Tool-based urban planning decisions
Link to Circular City Definition	3	Vision element	Circular business models and behavioural patterns
	4	Category	Circular value chains and infrastructure
Indicator definition and description	5	Definition / description of indicator	The proportion of urban planning decisions that are supported by tools for improved circularity (e.g. LCA tool)
	6	Rationale	The deployment of relevant data-based tools in decision-making potentially leads to reduced costs due to improved circularity. Expected outcome DA3: Increase in urban planning decisions that are supported by information from the 3D-GIS based visualisation tool, LCA tool, and circular business cases
	7	Methodology	Number of planning decions supported by information from the 3D-GIS based visualisation tool, LCA tool, and circular business cases divided by total number of planning decisions
	8	Unit	%
Data	9	Baseline data / definition	0%
	10	Data sources / relevant databases	Project managers and decision-makers in Bodø Municipality
	11	Overall accuracy	Accurate

Metadata group	#	Metadata category	Description / comments
Context	12	Sector coverage	Project managers and decision-makers in Bodø Municipality
	13	Reference area / spatial implementation scale	Demonstration site
	14	Reference period	Second part of 2021 - 2023
	15	SDG reference	
Other	16	Comments	

3.14. Indicator 39. Circular Material Use Rate | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	39
	2	Indicator name	Circular Material Use Rate
Link to Circular City Definition	3	Vision element	Closing material loops and reducing harmful resource use
	4	Category	Re-use and recycling
Indicator definition and description	5	Definition / description of indicator	The circular material use rate (CMU), also called Circularity rate measures, in percentage, the share of material recovered and fed back into the economy - thus saving extraction of primary raw materials - in overall material use. A higher circularitity rate value indicates more secondary materials substituting for primary raw materials i.e. avoiding the environmental impacts of extracting primary material.
	6	Rationale	Expected outcome DA3: Circular material use rate increased by 10%
	7	Methodology	"Circularity rate (CMU) is defined as the ratio of the circular use of materials (U) to the overall material use (M). CMU = U/M = (RCV_R - IMPw + EXPw) / (DMC + RCV_R - IMPw + EXPw) The overall material use is measured by summing up the aggregate domestic material consumption (DM3. and the circular use of materials (M = DMC + U). DMC is defined in economy-wide material flow accounts. The circular use of materials is approximated by the amount of waste recycled in domestic recovery plants (RCV_R), minus imported waste destined for recovery (IMPw), plus exported waste destined for recovery abroad (EXPw). Waste recycled in domestic recovery plants comprises the recovery operations R2 to R11 as defined in the Waste Framework Directive 75/442/EEC. European statistics on international trade in goods (ITGS) are used to approximate the imports and exports of waste destined for recycling, i.e. the amount of imported waste bound for

Metadata group	#	Metadata category	Description / comments
			recovery (IMPw), and the amount of exported waste bound for recovery (EXPw)." Source: https://ec.europa.eu/eurostat/cache/metadata/EN/env_ac_cur_esms.htm
	8	Unit	%
Data	9	Baseline data / definition	Degree of circularity before and after CityLoops Derive data from national standards and evaluation point can then be likley taken from UCA.
	10	Data sources / relevant databases	Databank/material hotel, data from waste managers, contractors, entrepreneurs, Statistics Norway
	11	Overall accuracy	The complex nature of these calculations might compromise the accuracy
Context	12	Sector coverage	CDW, contractors, entrepreneurs, municipal waste handling
	13	Reference area / spatial implementation scale	Demonstration site
	14	Reference period	2019-2023. Yearly reconcilation. Data source: public reports, material databank, waste data. Measure improvement.
	15	SDG reference	
Other	16	Comments	At this indicator, we can look at baseline data that's older than CityLoops

3.15. Indicator 55. EOL-RR (End of Life Recycling/Reuse Rate) | Demonstration action

Metadata group	#	Metadata category	Description / comments
Identifier	1	Indicator number	55
	2	Indicator name	EOL-RR (End of Life Recycling Rate)
Link to Circular City Definition	3	Vision element	Closing material loops and reducing harmful resource use
	4	Category	Re-use and recycling
Indicator definition and description	5	Definition / description of indicator	The End-of-Life Recycling Rate (EoL RR) measures the efficiency with which the mass contained in End-of-Life products is collected, pre-treated, and finally recycled.
	6	Rationale	Get a clear and data-based understanding of the EoL RR of the masses on demonstration site

Metadata group	#	Metadata category	Description / comments
			Expected outcome DA1: 80% of materials & masses stored onsite/near demonstration site have been prepared for reuse Expected outcome DA3: Within the plans for the new city disctrict, 70% of materials & masses from the demolition site shall be reused, reducing city wide use of virgin materials by 40%
	7	Methodology	For each material fraction, the End-of-Life reuse rate is defined as the End-of-Life mass reuse degree divided by the available mass of End-of-Life materials.
	8	Unit	%
Data	9	Baseline data / definition	EoL RR of masses on demonstration site
	10	Data sources / relevant databases	Databank/-hotel, data from contractors and entrepreneurs
	11	Overall accuracy	Complexity might compromise accuracy
Context	12	Sector coverage	CDW, contractors, entrepreneurs
	13	Reference area / spatial implementation scale	Demonstration site
	14	Reference period	2019-2023. Yearly reconcilation. Data source: public reports, material databank, waste data. Measure improvement.
	15	SDG reference	
Other	16	Comments	

4. References

Vangelsten, B.V., Bjarne Lindeløv, Nhien Nguyen, Jens Ørding Hansen, Are Jensen, Nikolai Jacobi, Simon Clement, Carolin Bellstedt, Aristide Athanassiadis, Pernille Kern Kernel, Edwin Keijsers (2021). Circular City Indicator Set. CityLoops Deliverable 6.1. 2021.

5. Annex 1: CityLoops impacts as listed in the Grant Agreement

Scientific impacts

- Sector and City-Wide Material Flow and Stock Accounting Methodology
- Development of an open-source urban metabolism data repository
- Circular Procurement tools and indicators
- Operationalisation of EC circular economy monitoring framework to small and medium cities
- IT decision making support tools
- Planning and decision-making framework for reuse and recycling of CDW

Innovation/economic impacts

- Increased CE jobs potential in demonstration and replication cities
- New innovative CE related procurement partnerships and dialogues in demonstration and replication cities
- Growth in green economy (e.g. increase in reuse / recycling infrastructure capacity)
- Business cases for valorisation of CDW and soil
- Increased use of new decision-making support tools to improve circular management practices
- Optimised and new links between the social economy and other sectors, promoting circularity (e.g. links between food distribution sector and the social economy sector decreasing food waste production)

Societal impacts

- Sustained community benefits including skills, training and green jobs
- Improved Well Being (e.g. QoL indicators)
- Provision of food support to economically disadvantaged families in the social economy sector
- New jobs for currently unemployed people due to development of CE

Environmental impacts

- Increased reuse and recycling of CDW and soil resulting in reduced energy consumption, improved resource efficiency, reduced heavy-duty transport
- Recycling of OW
- Reduced landfill

- Reduced greenhouse gas emissions

6. Annex 2: Strategic objectives defined in D6.1

<u>Vision Element 1 "Local stakeholder actions": Strategic Objectives</u>

- Facilitation of repair and reuse platforms, and the secondary materials market
- Increased capacity building on CE for public employees and other local stakeholders
- Increased collaboration with local and regional stakeholders in CE planning and implementation, and the promotion of regional upscaling
- Increased engagement with national and international policy makers and researchers on the CE
- Increased provision of information on CE to local stakeholders
- Improved regulatory framework to support circularity
- Increased use of economic incentives and fiscal measures to promote circularity as well as removal of subsidies hindering circularity
- Integration of circularity principles into public procurement and financing processes
- Existence of city-wide strategy on CE with measurable objectives translated into targeted actions
- Integration of circularity principles into asset management, including publicly owned land, buildings and infrastructure
- Integration of circularity principles into urban planning decisions such as zoning and planning decisions, construction and demolition permits, and mobility planning

<u>Vision Element 2 "Circular business models and behaviour patterns": Strategic Objectives</u>

- Increased asset lifetimes, including through flexible design and use
- Increased provision of local, sustainable and healthy food
- Increased rate of exploitation of assets (including equipment, machinery, buildings, infrastructure)
- Increased sustainable urban mobility options
- Enhanced waste collection, treatment and processing systems, including increased on-site reuse and treatment of waste
- Increased cooperation among sectors
- Increased use of repair and reuse platforms, and the secondary materials market
- Localisation of supply chains
- Increased gross value added of circular economy activities (repair, reuse, sharing, recycling)

- Increased number of jobs in the local circular economy (repair, reuse, sharing, recycling, ecodesign)

Vision Element 3 "Closing material loops and reducing harmful resource use": Strategic Objectives

- Reduced (harmful) raw material consumption
- Reduced overall energy demand and increased share of renewable energy
- Increased share of renewable and secondary raw materials in overall material demand
- Increased self-sufficiency / self-reliance
- Increased quantity of materials available for the next cycle
- Reduced waste generation
- Reduced incineration and landfilling activities and amounts subjected

Vision Element 4 "Improving human wellbeing and reducing environmental impacts": Strategic Objectives

- Improved education
- Improved public health
- Improved recreational services
- Improved access to basic services
- Reduced unemployment
- Reduced poverty and inequality
- Human-centred land-use and urban planning
- Biodiversity loss and deforestation
- Improved water quality
- Improved air quality
- Reduced soil degradation
- Mitigate climate change
- Reduce global adverse environmental impact of local consumption
- Transformed, sustainable local economy
- Increased resilience of local economy
- Reduced risk of urban infrastructure against natural disasters

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.