Module 4 Speaker Notes: Building a Circular Built Environment with Data

Please refer to the [how-to guide](https://www.circuit-project.eu/academy) which explains how to use these speakers notes.

Total estimated time: 120 minutes

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# Arrival

Time: 10 Total time: 0 (not part of full time)

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| Facilitation / Alterations | Script |
| If in person, get everyone settled into the room. If possible, provide the group with refreshments etc. Review any housekeeping required of the space – fire exits etc. If online, wait a few minutes for everyone to arrive. Run through how you will use the technology, when/how to use the chat box, explain how they should get your attention if they would like to speak or ask a question.  |  |

# Introductions and CIRCuIT Background

Time: 10 Total time: 10

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| Introduce yourself, tell the group how you have worked with circular building issues in the past / why you are the one delivering training. Provide a brief background to the CIRCuIT project (see script) for those who may not be familiar. Invite everyone in the room to briefly introduce themselves. Ask them to share how they have previously worked with circular construction. This is a good way to get to know everyone, but also allows you as the facilitator to get an insight into who has experience with which areas of learning.Thank everyone for attending.  | [CIRCuIT](https://www.circuit-project.eu/) is a four-year Horizon 2020 project. This means it is funded by the EU’s Research and Innovation arm. The main purpose of the project is to mainstream circular construction in European cities. The project has run across four cities, Copenhagen, Hamburg, Helsinki and London with over 31 partners. With this many people taking part, you can imagine the range of work that has been completed. We work across three themes: urban mining and material reuse, transformation and life cycle extension, and design for disassembly and adaptability. The consortium has developed pilots and assessed best practice across these themes. The findings and results of these are what we want to share with you via training.  |

# Introducing Module 4 – Driving Circular Actions and Initiatives Through Data

Time: 5 Total time: 15

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| Facilitation / Alterations | Script |
| Introduce the purpose of the session (see script) Connect the learning objectives of the module with the job descriptions and previous experiences learners shared in their introductions. Highlight how some of the learnings might be particularly relevant for some attendees. The full set of CIRCuIT training sessions can be given as stand-alone sessions or as a series to the same group of learners. Contextualise the module accordingly. Highlight any city policies or initiatives that are related to the learning outcomes of the module. Emphasise how these learning outcomes may be able to help further work on these areas.  | The purpose of this session is to think about the role data plays in enabling necessary circularity initiatives in the city. The CIRCuIT team has completed a number of research projects investigating:* The current state of built environment data in the four participating cites
* The data types that are necessary for certain circularity interventions
* How to improve collection of certain data types
* Naming circularity metrics that can be measured by the city

This has resulted in a wealth of knowledge. In this training we will be focusing on three select circularity initiatives and reviewing how you can use CIRCuIT’s outputs to identify the data needs and improve data capture in the necessary areas. To do this we will be using the following outputs developed during CIRCuIT research work:* List of circular actions and initiatives that require the input of data
* Matrix illustrating specific data needs for circular actions and initiatives
* Recommendations for how to improve collection of data

By the end of this module, you will be able to:* Understand why data is important for the circular economy
* Begin assessing the data landscape in your city
* Identify the key barriers to data capture and use
* Address data gaps in your city using CIRCuIT recommendations
* Describe data strategies that drive a circular built environment
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# Identifying the enablers you are looking for

Time: 10 Total time: 25

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| Facilitation / Alterations | Script |
| To allow the findings from the CIRCuIT project to be demonstrated, three circularity initiatives that are highly reliant on data will be used for illustrative purposes. If you have a relevant city-specific examples that aligns with any of the three cases (e.g building that needs to be transformed, existing material marketplace) below please feel free to incorporate them into the activity. However, if you know your group is focused on a specific project not represented here, consult [D3.2](https://www.circuit-project.eu/post/report-recommendations-for-improving-the-capture-of-material-flow-data-in-the-built-environment) and run the training referring to your chosen intervention. This will require independent preparation of the content but the structure of the session will remain the same Please note the alteration options on the left hand side if you are considering this option throughout.  | When discussing the potential of initiatives to drive circularity in the built environment, the same barriers tend to pop up. One of the most common is a lack of data. Technically the collection of data is not complex, there are no new technologies to be developed. If we develop a process that provides the right incentives for participation, and uses for the data, we can accelerate a great deal of circularity work. To make sure we think practically about the data strategies we will be covering today, we will start by imagining we are trying to implement the following three circularity initiatives:* **Determine whether to replace, transform or leave an existing building as is.** The costs and benefits associated with transforming or replacing an existing building can vary greatly depending on its characteristics and the local availability of skills, services, its location and urban mining infrastructure. Decision-makers dealing with existing buildings need to understand the various environmental, economic and social costs and benefits associated with different options for a building.
* **Creating a marketplace for reused and recycled construction products.** A crucial factor in a circular economy is the existence of a market for locally sourced reused and recycled construction products. On the supply-side, sellers (i.e. the owners of soon-to-be-demolished buildings) require a consistent pool of potential buyers, while on the demand-side, potential buyers need access to a straightforward and reliable supply of products that match their needs without additional hassle or expense (compared with conventional procurement methods).
* **Carry out benchmarking and target-setting regarding circular economy at city level.** Monitoring the performance and progress of a city’s circular economy and its various facets is important since it improves decision-makers’ understanding of how they should focus their efforts and investment to make further progress.

These are the three scenarios we will examine in detail over the course of this training. These are three of the 29 circularity actions that the CIRCuIT project investigated. If there are other circularity actions you would like to investigate after this training sessions please do refer to [D3.2.](https://www.circuit-project.eu/post/report-recommendations-for-improving-the-capture-of-material-flow-data-in-the-built-environment)  |

# Creating a data plan for our circularity initiatives – what data do we need and how will we collect it?

Time: 30 Total time: 55

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| Facilitation / Alterations | Script |
| In this section we will be repeating the same exercise three times for three different scenarios. Present the data points needed to inform a scenario and ask the participants to place these on a matrix indicating if these data points are measured/not yet measured and accessible/inaccessible in their city and context. Discuss how you might access the data points that are considered accessible, and what the barriers are for those that are not. Refer to the data flow diagram during this discussion if helpful:Remember, there are 29 different circularity scenarios detailed in D3.2. If you think one or more of the scenarios represented in this training should be switch with another scenario more relevant to the work of the training group, please make this change. Select a scenario from Table 1 page 14-19 in D3.2 and make a selection from Table 3 page 23 as to the relevant data points you would like to discuss. Carry out the exercise as outlined, placing the data points on a matrix from measured to not measured and from accessible to inaccessible and discussing the barriers.  | Let’s start with our first scenario.**Determine whether to replace, transform or leave an existing building as is.** The CIRCuIT Project Identified 21 different data points for this activity:We will focus on 9. Transformation potential:* A4: Guidelines for repair and maintenance of products and elements (e.g. necessary actions and their typical timeframes)
* A5: Real-time condition and performance of individual products/elements in building

Current social and economic value:* A2: Projected local/regional demand for space and functionality.

Urban mining potential: * A3 Guidance: Local marketing opportunities for products after preparation and processing of waste
* A9: Guidelines for non-destructive reversal/disassembly of products and elements
* A7: Typical rate of reuse/recycling for different product/material types
* A8: Predicted construction waste to be generated / materials to be released from project, split by material type/waste stream (based on building attributes and materials/waste management approaches)

Carbon balance:* A6: Current and expected future carbon performance of building in current form.
* A1: Typical whole life carbon impacts realised for elements, products or materials, based on type/class, circularity indicators and external system parameters.

Consider these potential data points. Imagine you wanted to assess whether to replace, transform, or retain an existing building in your city. How measurable are these data points in your city current? How accessible is this data/would this data be? Where would you go to look for these data points? **Create a marketplace for reused and recycled construction products** The CIRCuIT Project Identified 11 different data points for this activity:We will focus on 6. **General information/logistics:*** B2: Listings: Location, type, capacity and contact details of key services and infrastructure for circular treatment of waste materials and products

**To assess supply** * B1: Mass of reusable products and product components in existing building
* B3: Predicted construction waste to be generated / materials to be released from project, split by material type/waste stream (based on building attributes and materials/waste management approaches)

**To assess quality and type of materials** * B4: Type, quality and condition of waste materials and end-of-use products being handled

**To assess carbon impact** * B6: Data for modelling: Typical whole life impacts realised for elements, products or materials, based on type/class, circularity indicators and external system parameters

**To assess demand** * B5: Listings: Product requirements for upcoming projects in region (i.e. in construction, refurbishment, repair and replacement activities)

Consider these potential data points. Imagine you wanted to create a market place in your city. How measurable are these data points in your city current? How accessible is this data/would this data be? Where would you go to look for these data points? **Carry out benchmarking and target-setting regarding circular economy at city level** The CIRCuIT Project Identified 8 different data points for this activity:We will focus on 5. **Logistics and infrastructure** * C2: Capacities and geographic coverage of existing infrastructure, services and skills for management of prioritised waste streams

**Supply demand balance** * C1: Projected generation of different CDW streams in region
* C3: Projected future product material demand in city/region (up to 20 years, split by product/material class)
* C4: Total quantities of different material and product types embodied within building stock of interest
* C5: Typical rate of reuse/recycling for different product/material types

Consider these potential data points. Imagine you wanted to benchmark circularity of the construction sector in your city. How measurable are these data points in your city current? How accessible is this data/would this data be? Where would you go to look for these data points?  |

# Break

Time: 15 Total time: 70

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| This is the transition between two main topics of this session. Share that we will be moving on, and that now is the time for any remaining questions on the last section. Take your time answering these if time allows, if not tell the learners you will follow up on the session with responses to the questions. Before you recap the hierarchy and move on to the next section, allow for a comfort break. | To recap, we have just reviewed all the data points we may need to successfully* Determine whether to replace, transform or leave an existing building as is.
* Create a marketplace for reused and recycled construction products
* Carry out benchmarking and target-setting regarding circular economy at city level

And we understand how easy it is to measure these points and where we might be able to source them in our city.  |

# Investigating Frequent Data Gaps

Time: 12 Total time: 82

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| Facilitation / Alterations | Script |
| Following from the previous discussion, summarise the identified barriers. Start this section of the discussion off with a recap of the barriers found across the three scenarios. Once you have reviewed the data gaps identified by CIRCuIT, as the group whether any more resonate with the situation in your city and/or the scenarios discussed previously.  | From our previous discussion we identified the data that is easier for us to access, and the data that we don’t yet have access to. Some of the major issues and barriers identified from the data availability analysis, and which are common across the four CIRCuIT cities include: **Inadequate bottom-up data capture and/or data sharing*** A principal finding from our analyses was that, for many of the identified use cases, the data required to achieve it is not currently created. This may be because the data capture does not occur in the first place, however it is also true that a great deal of potentially useful data is captured but not made available for analysis and utilisation due to a lack of incentives or privacy concerns. There exists a general scarcity of data in built environment sectors that has only been flagged as a major hindrance to the industry in recent years. This scarcity means that even data that is easy to capture, and which could be highly useful for a range of purposes including circular economy, is not captured. Currently, a fully data-driven, digital-first approach is still mostly limited to large frontrunner organisations, and circular economy related application/rationale is yet to factor significantly into their data-related activities.

**Issues with data quality and validity*** It was often difficult to identify any indication of validity or quality of data available. For instance, bills of quantities can be obtained by exporting data from BIM models (and thus could assist with calculations of building-level urban mining potential), however this data often does not reflect what happened on site. City-level waste data is another area where data quality is questionable based on a lack of mechanisms for monitoring and validation, a pattern which is broadly repetitive across CIRCuIT cities.

**Lack of data transparency and data exchange*** One finding which came out in many cases was that the data necessary to support a use case may in fact exist but is not made available by the holder of that data. In these instances, the relevant data is often not shared simply because there is no motivation for providers to do so. It may be difficult to persuade potential data suppliers to carry out additional data capture when there is no tangible benefit to them. As well as an absence of incentives, data exchange is also hindered by a lack of understanding by the would-be data user that it exists and is available. A final barrier to data exchange is that the data fields, formats and software programs used vary significantly within and between stakeholder groups, especially where the groups operate at different levels of organisation within the city system (e.g. product manufacturers and construction project contractors), or at opposite ends of a value chain (e.g. product manufacturers and waste management organisations).

**Lack of data on available resources to enable circularity*** Across cities it was identified that for a stakeholder wanting to take action to promote the circular economy, there is little information on the key resources (i.e. products and services) that could be decided upon based on attributes that favour circularity, from the procurement of reused or recycled feedstocks for product manufacture to listings of organisations providing key services for urban mining from a building at end-of-life.

**Lack of quantitative data for measuring and monitoring circularity** * While approaches for measuring the circularity of products, buildings and whole cities have been and continue to be developed, the actual data necessary to underlie these indicators is often not available, and to capture this data would in many cases require substantial additional effort. Fundamentally, understanding and managing the material circularity of a system, whether a building, an organisation or a city, relies on having some idea of the quantities and pathways of the materials that flow through it. Aside from waste data, there is currently no data available on material stocks and flows in any of the cities and for most of the buildings and organisations within them.

**Lack of data on the impacts of actions that promote circular economy*** A major drawback of the existing data was that it is not possible for stakeholders to model and compare the likely impacts of different decisions they could make (such as product specifications, design features, or waste management protocols) on material circularity and whole life impacts. This is in large part due to the relatively early stage of primary research in this field; to obtain quantitative values for these requires significantly more research, both experimental as well as observational (the latter of which would ideally make use of large datasets on materials and buildings throughout their lifecycles).

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| Do any of these data gaps align with the barriers we have just discussed? How do these relate to the situation in our city? Discuss with your neighbour and share your thoughts. |

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# Recommendations for improved data collection - general

Time: 8 Total time: 90

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| Facilitation / Alterations | Script |
| In this section you will review the categories of data capture technique recommendations as outlined by the CIRCuIT project. This is an introduction to the more detailed activity for specific recommendations that follows. If you have opted to focus on a different intervention in the previous activity you may want to review the 17 different techniques and select those more appropriate to your case. They can be found in Table 5 page 24 in D3.2 | CIRCuIT Outputs present 17 different techniques for capturing data recommendations. These can be grouped into six different categories. **Recommendations on data creation through research*** While some data to support circular economy use cases could be obtainable through better data capture and exchange by industry practitioners (i.e. material handlers), there are some that cannot be obtained without primary experimental or observational research. These recommendations are thus intended to fulfil gaps in the knowledge which cannot be obtained fully through novel data capture and exchange by practitioners ‘in the field’.

**Recommendation on capture of data by practitioners*** The single recommendation under this category is intended to ensure that any data gaps which could be filled by practitioners with influence over material flows, are filled by them. Note that this recommendation does not provide a direct set of instructions for what data must be captured, by who and through what means; this information will be developed fully in Task 3.3, based in part on the circularity indicators developed as part of Task 3.2.

**Recommendations on data standardisation and interoperability*** As highlighted in section 4.4, a major drawback of much existing data on buildings and materials is the lack of standardisation and interoperability, which hinders a fluid transfer of data and ultimately limits data exchange and integration, an important means by which stakeholders could obtain information for decision-making. These recommendations are thus aimed at setting the foundation for easier exchange of data between different stakeholder groups (e.g. product manufacturers and building design teams), as well as making it easier to obtain and interpret data for analysis.

**Recommendations on exchange of data between stakeholder groups*** As discussed previously, many of the gaps in the available data required to support the identified use cases could be more easily obtained (i.e. by avoiding duplication of efforts) through the handover of data between relevant stakeholders, achievable through data sharing frameworks and Common Data Environments. These recommendations are therefore intended to address how to exchange the necessary data.

**Recommendations on integration of data into databases*** These recommendations are focused on the integration and collation of data from materials, projects and buildings at all points in their lifecycles and use cycles, from cradle to grave. The resulting databases would be highly useful for city-level analytics supporting benchmarking, strategy and policymaking (e.g. those to be developed within CIRCuIT work packages 7 and 8).

**Recommendations on data analysis*** These are intended to serve as examples of the types of analyses that could be carried out on existing data (where available), in support of circular economy decision-making. They are mostly focused around the type of analysis that would support CIRCuIT tasks, however, are also applicable more broadly. Ideally (although not necessarily) they would be achieved via analysis of the databases described in the ‘Recommendations on integration of data into databases’.
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# Recommendations for Improved data collection – our specific cases

Time: 20 Total time: 110

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| Five different data collection techniques are highlighted in this section. In each, the hypothetical actions to use this technique are outlined. Ask the participants what steps they would take in their city to apply this data collection technique. Encourage discussion after each of the recommendations, encourage participants to write down their thoughts.  | CIRCuIT Outputs present 17 different techniques for capturing data recommendations. We will be reviewing the 5 that relate most to our chosen initiatives.

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| We will discuss how each recommendation can be implemented in our city to help further our chosen circularity initiatives |

**Develop a methodology for calculating reuse potential of a component or element whilst in-use, based on available data** Currently it is not easy for stakeholders such as asset owners or prospective reused material procurers to understand the reuse potential of their building parts once demolished/disassembled. This means the value of the demolished/disassembled element is unknown and it is far more likely to be downcycled. Research is therefore required to derive an approach to this. **Actions:** * Observational research to determine typical reuse potentials for common components/elements depending on their relationship with the surrounding system
* Develop a process for detecting and extracting this from BIM data (see work by Dr Elma Durmisevic, e.g. the ongoing [Digital Deconstruction project](https://www.nweurope.eu/media/15456/211023-development-of-a-conceptual-digital-deconstruction-platform-with-integrated-reversible-bim-to-aid-decision-making-and-facilitate-a-circular-economy-elma-durmisevic-annie-guerriero-calin-boje-bruno-do-1.pdf))

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| What action can you or your city to take to implement this recommendation? |

**Develop and mainstream the use of circularity indicators** Indicators enable the consistent measurement of circular economy approach **Actions:*** Create/standardise indicators of circular economy performance at the level of materials/products, buildings, organisations, cities and economies
* Implement indicators and use them to guide decision making around e.g. procurement, design, construction, end-of-life material flow management, etc.
* Apply governance measures that mandate or incentivise the use of indicators for stakeholders responsible for implementation

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| What action can you or your city to take to implement this recommendation? |

**Develop and mainstream the use of circularity data templates at multiple levels** Data templates should be developed that identify what data is necessary to support circular action in the built environment, across stakeholder groups at different levels of organisation, and are made available for use by the relevant stakeholders. Ultimately this would facilitate the capture and exchange of data to support the identified use cases, and would enable the integration of relevant datasets into circularity databases (see Refs 3 – 5), which may be analysed to develop insights on how to manage materials, buildings and cities to promote circularity. Standardisation and interoperability are absolutely essential in this pursuit, to allow for the exchange of data between stakeholder groups at different levels of organisation and at different points in material lifecycles; as such, common semantics, ontologies and taxonomies are important to develop. **Actions:*** Templates should be created targeting different stakeholder groups with influence over material flows, that address the data gaps identified in section 5.4 (as well as any others that arise through further research).
* These should be standardised using data semantics, ontologies, taxonomies and formats that are applicable to all stakeholder groups across material and building lifecycles.
* Governance support/incentivisation for adoption of indicators
* Implementation same as indicators (see ref 7)

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| What action can you or your city to take to implement this recommendation? |

**Create a live database of material stocks & flows database** A city level database that records where materials are stocked and how they flow throughout the city system, including data of relevance to circular economy such as whether materials are reused or what their typical sale prices are. If aggregated and analysed, this would be an invaluable resource for planning and policymaking to enable city-level Material Flow Management (including waste management), as well as for other applications, for example prospective material sellers being able to understand the likely market value of their assets post-demolition. Given appropriate data security and privacy protocols, this database could also double as a basis for a material traceability database allowing material procurers to have a transparent view of the origin, history and circularity indicators of the materials or products they are procuring. Given sufficient development of methods such as those in Refs. 1 to 11 to enable prospective estimation of reusable components within a building planned for demolition, this database could also serve as the basis for the [Material Exchange Portal](https://materialreuseportal.com/) (Task 8.3; see discussion in [Charef & Emmitt 2020](https://www.sciencedirect.com/science/article/abs/pii/S0959652620348988)) and feed into the [Circularity Atlas](https://www.circuit-project.eu/circularity-atlas) (Task 8.4) and [Dashboard](https://www.circuit-project.eu/circularity-dashboard) (Task 8.5). **Actions:** Two main approaches: 1. Inference of material flows based on building stock characteristics dynamics (see e.g. [Gepts et al 2019](https://www.researchgate.net/publication/331313764_Existing_databases_as_means_to_explore_the_potential_of_the_building_stock_as_material_bank); [Kleemann et al 2017](https://www.cec4europe.eu/wp-content/uploads/2022/01/Capter-2.6.1_Kleeman-et-al_Urban-Mining.pdf)), imports data, waste data and so on
2. Direct measurement of material flows through material traceability approach to data capture

Capture standardised data on materials in a machine readable and interoperable format, following standardised data templates (Ref 8) * Utilise material tracking and traceability approaches to capture ‘live’ data on materials throughout their lifecycle from cradle to cradle to grave, including locations, use patterns, performance, condition, etc (see Ref 10). This would be the optimal solution since it would allow for true big data analytics, however the large volumes and constant inflows of data involved in this approach would likely require that the database be federated or fully decentralised (e.g. using Blockchain)
* Could in theory be combined with Building Stock Database (see Ref 14)
* Creation and ongoing maintenance of database
* Governance support, e.g. policies or incentives for practitioners to capture and supply relevant data to database – see e.g. [London Circular Economy Statement](https://www.london.gov.uk/programmes-strategies/planning/implementing-london-plan/london-plan-guidance/circular-economy-statement-guidance)

Example: Material Reuse Portal The Material Reuse Portal brings together construction materials from multiple marketplaces to create a single place where reusable materials can be found.Over time the portal will build up more data on the demand for different types of products in the built environment that can help demolition contractors understand the items that could cost-effectively be dismantled for reuse.Example: The Excess Materials Exchange (EME)The Excess Materials Exchange is another digital platform that allows materials that would normally go to waste, to be given a new lease of life on a different project. Set up by Enfield Council, this platform aims to keep the value of these materials in the local economy, welcoming Enfield businesses to get involved.Example: CIRCuIT City Circularity AtlasThe aim of the Circularity Atlas is to serve as a tool for policymakers, industry, commercial interests and the public to visualise the material stocks and flows of the built environment, with particular regard to circularity. The Atlas displays spatial analyses and data, providing an overview of the entirety of cities by combining relevant datasets, satellite imagery sensors and ad-hoc data deliverables. Relevant data is collected through the project as well as gathered from outside of the CIRCuIT project.

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| What action can you or your city to take to implement this recommendation? |

**Quantify and predict stocks and flows of (reusable/ recyclable) materials, components and elements from building stock** Understanding the profile and quantities of different building materials, components and elements within, and that are projected to emerge from, the building stock, can inform strategies and policies around recycling, reuse and building stock management. For example, investment in recycling infrastructure may be directed towards facilities and capabilities for those materials that are expected to emerge in significant quantities and/or which are expected to have the most prominent impacts. Another example would be combining this approach with recommendation Ref 17 to predict the optimal building stock segments to target for retrofit strategy based on the embodied carbon emissions (via the materials involved in retrofit) against the operational carbon savings achievable through retrofit. **Actions:** * Conduct Material Flow Analysis to determine quantities of materials, components and elements in different building stock segments
* Quantify recyclable and reusable portions of stocks by, where possible, combine with understanding of A) typical recycling efficiency for the material type, or B) typical reuse potential of materials according to the construction type or building typology they are embedded within,
* Combine with building stock survival analysis (see e.g. [Heeren and Hellweg, 2018](https://nheeren.github.io/publication/heeren-2018-jie/heeren-2018-jie.pdf)) to determine projected quantities of (reusable) components and elements arising
* Research into reuse potential and residual value of different materials, components and elements within the building stock; apply reuse potential, residual value etc. values to existing material stocks determined through MFA

Example – Material passportsThe materials passport concept involves creating a digital document with a breakdown of the materials within a product and tracing each material over the product’s lifecycle. For buildings, it would be a very detailed inventory of building components, including specific component materials and characteristics. Some of the proposed characteristics include: physical properties such as dimensions, chemical properties such as lifecycle environmental assessment, biological properties such as decomposability, and material health such as impact on indoor air quality. This enables more efficient maintenance and end of life activities as it easier to identify and reallocate/repurpose resources. As more buildings adapt this approach, it creates a secondary market for building materials and adds economic value to otherwise discarded/demolished products.A current example of materials passports being used currently is the [**Madaster Foundation**](https://madasterfoundation.org/), a material passport platform in the Netherlands which automatically generates secure, web-based BIM compatible passports for registered buildings and construction objects containing information about the quality, the origins and the location of materials and products. The passports also provide insight into the material, circular and financial (salvage) value of the buildings assessed. Another example is [BAMB](https://www.bamb2020.eu/topics/materials-passports/) (Buildings as material banks) an EU funded project. 300 materials passports were created during the BAMB project and the passports were published on a web-based platform. Take a look at a prototype on the slide.

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| What action can you or your city to take to implement this recommendation? |

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# Wrap up

Time: 10 Total time: 120

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| Facilitation / Alterations | Script |
| Wrap up and recap of what we have learned, who plays a role, what they might be able to feed into the data pool, and how that will help us become a circular city - using the diagram if useful. | Thank you all for your attention today.

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| Let’s recap what we discussed during this session: * Please share circularity actions that require data to support decision making.
* An example of a data point that needs to be collected to support the creation of each of these actions / initiatives
* An example of a technique to improve data capture that you think is most applicable to your context
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# Sources

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| WP3 | D3.2 | Recommendations for improving the capture of material flow data in the built environment<https://www.circuit-project.eu/post/report-recommendations-for-improving-the-capture-of-material-flow-data-in-the-built-environment> |

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| CIRCuIT Website | <https://www.circuit-project.eu/> |
| Durmisevic, E. et al. (2021) ‘Development of a conceptual digital deconstruction platform with integrated Reversible BIM to aid decision making and facilitate a circular economy’, *Proceedings of the 38th International Conference of CIB W78*, Luxembourg, 13-15 October.  | <https://www.nweurope.eu/media/15456/211023-development-of-a-conceptual-digital-deconstruction-platform-with-integrated-reversible-bim-to-aid-decision-making-and-facilitate-a-circular-economy-elma-durmisevic-annie-guerriero-calin-boje-bruno-do-1.pdf> |
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# Further Resources

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