

Module 5: Understanding the industrial landscape

This project has received funding from the European Union's Horizon Europe program under GA Project 101058426.





SYMSITES

Module Overview

In this module, local authorities can explore how to identify and engage key stakeholders, ranging from industries and utilities to local administrations and research institutions, while navigating the challenges of multi-actor collaboration. The module also explains how to map local resources and waste streams, analyse material and energy flows, and identify opportunities for symbiotic exchanges. By the end of the module, learners will understand how to connect stakeholder engagement with technical resource mapping to design effective, scalable, and collaborative I-US initiatives.

- [Chapter 5.1: Stakeholder Identification and Engagement](#)
- [Chapter 5.2: Mapping Resources and Waste Streams](#)





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Chapter 5.1: Stakeholder Identification and Engagement

This chapter explores stakeholder identification and engagement, detailing how municipalities can map out key players, including industries, small and medium-sized enterprises (SMEs), waste management companies, utilities, and research institutions. It will present some effective engagement strategies that are crucial to building trust and fostering cross-sector collaboration, while addressing resistance to change and creating a culture of innovation.

- Target audience: Local Authorities and Municipalities
- Estimated time: 20 minutes
- Includes:

Explanations

Tools

Case Studies

Exercises





Why Stakeholder Engagement Matters

Symbiosis - cooperating by definition

Industrial Symbiosis, Industrial Urban Symbiosis and Circular Economy, all foundational concepts in this training, all have one thing in common: Solutions are highly dependent on cooperation models and can't be achieved by one actor alone. Internal optimization of resource use and flows with circular principles is always possible, however true symbiosis and circularity depend on new collaboration models on all scales. While I-US is a technical and economic process, it is also a social one about bringing relevant stakeholders together. Engaging stakeholders helps with identifying the relevant possible opportunities, building trust and commitment over time, navigating the existing frameworks efficiently through cooperation and in the long run to also scale up.



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Why Stakeholder Engagement Matters

In I-US, stakeholder engagement can be approached from a number of perspectives to achieve such means:

From a public administration perspective: As chapter 3.2 points out, there are many ways for a local administration to get active in I-US and typically engaging stakeholders from a public administration's points of view can take a number of shapes. These include facilitating exchange across departments to align internally, identifying potential opportunities in their own territory or bringing and balancing public interest in I-US approaches.

From a public utility perspective: Public utility companies are in a unique position at the interface of the public domain and the integration of actual resource streams such as energy, water or waste. Integrating new solutions in such as system requires a thorough and reliable process to ensure stability and cost-efficiency while positioning utility companies in a special position to make the collaborations happen with the greater good in mind.



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Why Stakeholder Engagement Matters

From a company's perspective: For companies engaging in I-US is oftentimes about cost and resource-optimization. New cooperations and organising or cooperating in I-US stakeholder engagement can be a lever to meet the right public and private partners to make the symbiosis happen.

From a hub perspective: In the past years, numerous hubs and other physical or ad-hoc spaces have started to come up with the goal of bringing different actors together to create a symbiosis. Consequently, the driving actors behind these processes are typically keen on creating impact.



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Common challenges in multi-stakeholder processes

Engaging stakeholders in Industrial-Urban Symbiosis is both essential and complex. Actors come with different priorities, resources, levels of awareness, and decision-making dynamics. Even when the willingness to cooperate exists, practical barriers often prevent discussions from turning into concrete action. There are a number of critical and common challenges when engaging stakeholders. Knowing these, as well as some strategies to address them, is key for successful stakeholder engagement.

The following challenges and solutions can help with that:

Misaligned incentives and motivations between actors

- Transparency and making motivations explicitly clear early on.
- Focusing on shared benefits and mutual gains.
- Using neutral facilitators to ensure balancing.



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Common challenges in multi-stakeholder processes

Limited resource and participation capacity (Time, staff, budget)

- Picking the right engagement format to either be short and to the point with more meetings or fewer events with more time depending on the audience and goals.
- Providing a clear agenda and expectations in advance.
- Align meetings with existing networks or events where possible.
- Clarify with the participants about the desired and possible engagement level.



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Common challenges in multi-stakeholder processes

Lack of trust between actors with differing motivations

- Starting with informal exchanges or site visits before diving into formalised agendas.
- Using neutral data sources and transparent communication.
- Celebrate successes jointly.
- Emphasising long term relationship building early on.



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Common challenges in multi-stakeholder processes

Difficulty in activating actors outside usual networks (“the non-usual suspects”)

- Using existing multipliers such as clusters, chambers or associations to reach new groups.
- Targeted outreach with tailored messages explaining concrete benefits for that actor.
- Starting with bilateral conversations before inviting to group formats.



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Common challenges in multi-stakeholder processes

Staying concrete and avoiding superficial discussions

- Preparing case examples or data points up front.
- Framing challenges and solutions specifically.
- Providing templates to bring structure to discussions.
- Work towards concrete actionable points.





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Common challenges in multi-stakeholder processes

Ensuring all perspectives are heard (imbalanced voices)

- Structured facilitation with the help of clear methods such as rounds, polls or breakout groups.
- For sensible topics, anonymous input options can be beneficial.
- Inviting diverse actors from the get-go brings perspectives.
- Actively engaging the “silent” actors to ensure an even balance in participation.

Difficulty sustaining engagement over time

- Establishing regular touchpoints.
- Share visible progress updates to keep momentum and show the value.
- Connect activities to broader policy or funding opportunities.





Common challenges in multi-stakeholder processes

Moving from ideas to implementation

- Agreeing early on on prioritised opportunities (e.g. before the meeting).
- Defining roles, next steps, and simple timelines during the session creates accountability.
- Identifying potential funding or policy support options together as potential follow-ups.
- Planning follow-up meetings before ending the sessions.
- Piloting actions and starting small to get used to collaboration and show results.





Exercise – Reflection:

Reflecting on Stakeholder Engagement

Instructions:

- **Step 1:** Review the common challenges in engaging stakeholders for I-US projects, such as limited capacity, misaligned incentives, or lack of trust.
- **Step 2:** Select three challenges you anticipate facing in your own context.
- **Step 3:** Define specific actions or strategies to address each challenge, considering practical tools and engagement formats.

(Optional) Reflect on how successfully addressing these challenges can build trust, foster collaboration, and support innovation.





Identifying Relevant Stakeholders

Key categories of stakeholders:

No matter who drives the stakeholder engagement process, working towards categorizing the stakeholders is one of the most common and proven starting points. By categorizing it is easily possible to identify priority areas, gaps and to find prevailing stakeholder types to focus on. How granular to be with these categories depends on the specific goals and needs, however typically in the context of I-US we find the following stakeholder types to be relevant:

- Industry
- Public utility companies
- Local administration
- Multiplier organisations (networks)
- Academia
- CSOs & citizens



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Identifying Relevant Stakeholders

Another important consideration is setting the scope of your stakeholder engagement. This way, you don't run risk to think too big or too small. Are you mostly interested in working with local stakeholders or is a regional focus more sufficient? In some cases, thinking even bigger can be a good idea, e.g. when discussing policy topics.



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Identifying Relevant Stakeholders

Methods and tools for mapping

Mapping stakeholders is no rocket science but rather a straightforward process that typically happens anyway, often informally. Actually mapping stakeholders is a way to purposefully bring a system into your existing and expanding network. If you want to start from scratch, you can follow these steps to get to your stakeholder mapping:

Step 0 - Objective check

Reflect on why you're mapping the stakeholders and set your scope. This will help you in staying on point.

Step 1 - Pick a tool

Mapping stakeholders can be as simple as writing names on a piece of paper or a blank document. However, there are tools that can help.



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Identifying Relevant Stakeholders

Methods and tools for mapping

Below you find tested tools that you can use yourself (from simple to more advanced)

- Spreadsheets are great for lists, filters and exports
- Visual whiteboards can also include spreadsheets and tables with and can be set-up as a one stop shop for planning
- Network and mapping tools like Kumu, Gephi or NodeXL are advanced tools to show network relations and can help in visually showcasing the mapping
- Contact management tools like HubSpot or Salesforce can be used for a long term and detailed relationship management

In order to pick the right tool, you can look at your resources, your ways of working and the purpose of your mapping (e.g. quick approaches vs. long term strategies).



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Identifying Relevant Stakeholders

Methods and tools for mapping

Step 2 - Define mapping categories

When conducting a stakeholder mapping, you want to identify which categories to include. There are some common categories you'll always find such as the name, organisation, role & job title, contact details and locations. Beyond that, you have a lot of freedom and possibilities to shape your mapping. You can for example include why they're relevant, capacity to get involved, their influence on your initiative, their interest to get involved, your existing relationship with them, potential contributions they could make and more. Some of these can also help you prioritize in a later step explained below.



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Identifying Relevant Stakeholders

Methods and tools for mapping

Step 3 - Check for GDPR related issues

Depending on how you want to use the stakeholder mapping, GDPR and data related topics can become relevant, especially for maps stored on specific servers. To avoid any issues here, it is advised to check with the GDPR responsible person in your organisation.

Step 4 - Populate the list

A stakeholder mapping is a living exercise. While the main chunk of work typically takes place in an initial phase, you can always go back and add more contacts, change their status or take them out. Starting is the most important step as there is no right or wrong way to do it. Everyone has a network and to think about these actors first, eases the way. Additional research can help in the next steps.



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Identifying Relevant Stakeholders

Methods and tools for mapping

Step 5 - Transferring the mapping results

Mapping stakeholders is not a means in itself but rather a step in a long chain of tasks to engage stakeholders effectively. One common next step that follows is a prioritisation. This can help in understanding the types of stakeholders you want to focus on most. One way to achieve this is to design a matrix in which one axis shows the relevancy you see for the stakeholders and the other axis showing their interest to be engaged. Those who meet both criteria are relevant and motivated and will help you achieve your goals the most, while those who are only motivated need to find their future role and those who are relevant but not motivated need to be activated.



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Designing Effective Engagement Strategies

Engagement plans and strategies

Designing an engagement plan is the bridge between stakeholder mapping and actual collaboration, and it works best when it is both intentional and flexible. A good strategy does not aim to predict every step in advance but provides a clear direction, rooted in the insights gained from the mapping: who matters most, why they matter, and what kind of relationship you need to build with them. Rather than overengineering the process or waiting for the “perfect” plan, it is far more effective to start with a simple, focused approach that prioritises a few impactful actions. This means identifying the stakeholders who truly influence or benefit from your I-US initiative, defining what you want to achieve with each of them, and outlining concrete next steps such as outreach methods, timing, responsibilities, and desired outcomes.



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Level of engagement

The potential levels of engagement for the stakeholders are:

- **Collaborate** (high interest/high influence): The stakeholders are likely to be the most beneficial for the project and have the potential of becoming close partners via the engagement process. They are able to provide relevant information, informed feedback, connections and resources. They can also be highly impacted by the project results.
- **Consult** (high interest/low influence): The stakeholders are supportive of the project, or they are otherwise strongly impacted by it, but they lack capacity to concretely help the project. However, they can become influential with the support from stronger stakeholders. These are often marginal stakeholders who are sometimes hard to reach. Thus, special attention is required to ensure their engagement. Excluding these groups from the project can lead to gaps in knowledge and inequitable impacts of the project and its results.



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Level of engagement

- **Involve** (low interest/high influence): These stakeholders are highly influential, with power to impact the project and its success, but they have little interest or low capacity to engage. Special efforts may be necessary to engage this group and therefore, the efforts should be made as early as possible in reaching out to this group.
- **Inform** (low interest/low influence): These stakeholders have both little interest and they have little interest over the project outcomes. Considering the limited resources in the project, engaging with this group can be limited and focusing on general communication of the progress and results.



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Designing Effective Engagement Strategies

Engagement formats

Designing the right engagement format is just as important as identifying who to engage. Different situations call for different levels of structure, interaction, and creative space. In I-US processes, it is useful to distinguish between more formalised formats (such as advisory boards, bilateral meetings or steering groups) and co-creation-oriented formats (such as workshops, design sprints or innovation labs). Formal formats work well when clarity, accountability and decision-making are needed, while co-creation formats help generate ideas, build relationships and explore opportunities across sectors.

Choosing the right one should always be tailored to the audience's availability, comfort, expectations, and level of engagement.



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Designing Effective Engagement Strategies

Below are some concrete categories and examples:

- **Formalised formats** (e.g., steering committees, advisory boards, bilateral meetings, public consultations): structured, agenda-driven, suitable for decision-making, alignment with municipal or corporate procedures, and progressing concrete I-US projects.
- **Co-creation formats** (e.g., design thinking workshops, material flow mapping sessions, innovation labs, co-design sprints): interactive, exploratory, suitable for generating ideas, identifying synergies, or building trust across unfamiliar partners.
- **Networking-focused formats** (e.g., industry breakfasts, thematic roundtables, match-making events, site visits): great for early-stage engagement, discovering partners, building informal connections and lowering the entry barrier for new actors.



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Designing Effective Engagement Strategies

- **Digital formats** (e.g., webinars, online co-creation, virtual roundtables, digital Q&A): inclusive for busy stakeholders, cross-regional engagement, lower cost, good for preparation and follow-up.

Choosing the right engagement format means balancing the level of interaction needed, the time stakeholders can realistically invest, and the maturity of your I-US initiative. The key is to select formats that meet participants where they are, respect their constraints, and move the process one meaningful step forward.



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Designing Effective Engagement Strategies

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Case Study: SYMSITES Stakeholder Forums

The SYMSITES project demonstrated how stakeholder engagement can be effectively integrated with technical I-US implementation. At its core, SYMSITES combines technological innovation with community-driven strategies to valorise underutilized resources (including municipal waste, industrial by-products, and wastewater) across four pilot EcoSites in Austria, Denmark, Greece, and Spain. Each EcoSite serves as a living laboratory where circular economy solutions are tested and optimized, while simultaneously fostering multi-stakeholder collaboration.

A central mechanism for community building in SYMSITES has been the organisation of **local stakeholder forums**, with a total of 14 events held between 2023 and 2025. These forums aimed to involve a diverse range of actors (including public representatives, local administrations, research institutions, industries, NGOs, educators, cross-national funding agencies, and citizens) in project design, implementation, and knowledge sharing.





Case Study: SYMSITES Stakeholder Forums

Objectives included creating opportunities for co-creation, validating project strategies, promoting local uptake of I-US initiatives, and ensuring that technical interventions align with community needs.

The formats of the forums varied depending on the EcoSite and the targeted stakeholders. Austria hosted three expert-focused events on water and wastewater topics, while Denmark held two meetings emphasizing cross-national collaboration and funding engagement. Greece organized six events, blending civil society participation and technical discussions on sustainability and I-US practices. Spain conducted three forums focused on waste and wastewater management, alongside educational initiatives. Across all sites, the forums used a combination of structured discussions, co-creative workshops, networking sessions, and citizen engagement activities, tailored to the specific goals of each event.





Case Study: SYMSITES Stakeholder Forums

The results underline the value of these stakeholder forums in promoting collaboration and knowledge exchange. Over 700 participants attended the 14 forums, providing diverse perspectives and fostering dialogue across sectors. Feedback consistently highlighted the benefits of inclusive, co-creative formats and the involvement of youth and civil society, while technical sessions benefited from deeper, expert-level discussions. The forums also facilitated practical actions, such as linking new infrastructure installations to stakeholder input, and supported dissemination and exploitation of project results.

The SYMSITES stakeholder forums provide a replicable methodology for creating sustained dialogue, building trust, and mobilizing local actors, offering valuable insights and inspiration for municipalities and regional authorities seeking to implement similar collaborative circular economy initiatives.

Find out more in the [D5.8 Report on held stakeholder forum events](#)





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Chapter 5.2: Mapping Resources and Waste Streams

This chapter covers the mapping of resources and waste streams, providing methodologies for conducting material flow analysis within industrial and urban areas. By identifying existing resource flows (such as water, energy, materials, and by-products) municipalities can pinpoint opportunities for synergies that reduce waste and increase efficiency.

- Target audience: Local Authorities and Municipalities
- Estimated time: 15 minutes
- Includes: Explanations Tools





Mapping Resources and Waste Streams

Mapping resources and waste streams is a critical step in developing I-US initiatives. Before synergies between actors can be identified, it is necessary to understand how resources currently flow through a territory. This includes identifying where materials, energy, water, and by-products are generated, where they are transported, how they are processed, and where inefficiencies occur.

By making these flows visible, municipalities and regional authorities can identify opportunities where the output of one actor can become the input of another, thereby reducing waste, lowering costs, and improving resource efficiency. Resource mapping also supports evidence-based decision-making and provides a shared understanding among stakeholders about the opportunities and constraints within a local industrial ecosystem.



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Mapping Resources and Waste Streams

Resource mapping is closely linked to the stakeholder engagement process introduced in the previous chapter. Resource flows are always associated with specific actors: companies producing by-products, utilities managing infrastructure, or municipal services handling waste and water streams.

Connecting the technical mapping of flows with the identification of stakeholders therefore creates a more complete picture of the system and enables municipalities to move from theoretical opportunities to real collaborations between actors.



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Material Flow Analysis (MFA) as a Key Method

One of the most widely used approaches for analysing resource flows is Material Flow Analysis (MFA). MFA is a systematic method that quantifies the flows and stocks of materials and energy within a defined system over a given period of time. The basic principle is simple: define the boundaries of the system being studied, identify the inputs entering the system, track how they are transformed or consumed, and quantify the outputs leaving the system. These outputs may include products, emissions, waste streams, or recoverable by-products.

For I-US initiatives, MFA provides a structured way to identify inefficiencies and opportunities for exchange. For example, a company producing excess heat may be located close to a facility requiring thermal energy, or organic waste streams from the food sector may be suitable inputs for biogas production. By systematically mapping flows, municipalities can detect these opportunities and facilitate connections between relevant actors.



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Material Flow Analysis (MFA) as a Key Method

MFAs can be conducted at different **scales**, depending on the goals of the analysis:

City-scale MFA:

At the urban scale, MFA can help understand the “metabolism” of a city by analysing major resource streams such as water, energy, construction materials, biomass, and waste. This perspective is useful for identifying large-scale circular economy opportunities or infrastructure improvements.

Industrial area or business park MFA:

This level focuses on clusters of industries, utilities, and municipal infrastructure. It is particularly relevant for identifying potential exchanges of heat, CO₂, water, wastewater, or production by-products between neighbouring facilities.



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Material Flow Analysis (MFA) as a Key Method

Site or company-level MFA:

At the most detailed level, MFAs analyse individual production processes within a company. They quantify inputs such as raw materials and energy and identify outputs such as waste streams, emissions, and by-products. This level of analysis often reveals opportunities for both internal efficiency improvements and external symbiosis.

Sector-specific MFA:

Some MFAs focus on a single material category or sector, such as plastics, organic waste, construction and demolition materials, or metals. These analyses help identify systemic opportunities across an entire value chain.

By combining these different scales, municipalities can develop a comprehensive understanding of the local resource system and identify where the greatest potential for symbiotic exchange lies.



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Material Flow Analysis (MFA) as a Key Method

Key Steps in Conducting a Material Flow Analysis

Conducting an MFA typically follows a structured sequence of steps. While the complexity of the analysis may vary depending on the scope and available data, the core process remains consistent.

1. Define the system boundary

The first step is to determine the scope of the analysis. This includes defining the geographic boundary (for example a municipality, industrial district, or port area) as well as the thematic focus (such as water flows, energy flows, construction materials, or organic waste). A clearly defined system boundary helps keep the analysis manageable and ensures that results are relevant to the objectives of the I-US initiative.



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Material Flow Analysis (MFA) as a Key Method

Key Steps in Conducting a Material Flow Analysis

2. Link flows to stakeholders

Once the scope is defined, the next step is to identify which stakeholders are responsible for producing, managing, or consuming the relevant resource flows. This step builds directly on the stakeholder mapping exercise and ensures that the analysis remains grounded in real actors who can potentially participate in symbiosis projects.

3. Collect and organise data

Data collection involves gathering information on resource inputs, outputs, and stocks within the system. Potential sources include company environmental reports, municipal statistics, waste management records, research studies, and direct interviews with stakeholders. In many cases, precise data may not be available, and practitioners may need to rely on estimates or proxy indicators.





Material Flow Analysis (MFA) as a Key Method

Key Steps in Conducting a Material Flow Analysis

Typical information collected during this stage includes:

- Quantities of raw materials entering a system
- By-products generated during production processes
- Waste streams (hazardous and non-hazardous)
- Excess heat or energy flows
- Wastewater generation and treatment
- Existing recycling or recovery processes
- Storage conditions and transport logistics
- Economic costs associated with disposal or treatment

Both quantitative data (such as volumes and energy content) and qualitative data (such as material properties, seasonal variability, or regulatory constraints) are important for identifying feasible symbiosis opportunities.



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Material Flow Analysis (MFA) as a Key Method

Key Steps in Conducting a Material Flow Analysis

4. Visualise resource flows

After data has been collected, flows are typically visualised to make patterns and inefficiencies more visible. Sankey diagrams are commonly used for this purpose, as they represent flows proportionally and clearly illustrate where large resource streams occur. Flow charts, geographic maps, or structured spreadsheets can also be used depending on the level of detail required.

Visualisation tools help stakeholders quickly understand complex systems and often serve as an effective communication tool during workshops and stakeholder meetings.



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Defining the Scope of a Symbiosis Hub

Mapping resource flows is closely connected to defining the **scope and thematic focus of an Industrial-Urban Symbiosis hub**. This step determines where collaboration will take place, and which sectors or value chains should be prioritised.

A well-defined scope helps translate strategic ambitions into concrete actions. It enables practitioners to prioritise the most relevant opportunities and design targeted interventions that can be implemented in the short or medium term. Importantly, defining a scope should not be seen as limiting the initiative. Many successful I-US initiatives begin with a small number of actors or exchanges and gradually expand as trust, infrastructure, and institutional capacity develop.



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Defining the Scope of a Symbiosis Hub

When defining the scope of a hub, municipalities should consider several factors:

Territorial context: Local patterns of production and consumption, resource dependencies, environmental challenges (such as waste generation or water scarcity), and socio-economic development priorities.

Existing strategies: Regional development plans, climate strategies, circular economy roadmaps, or industrial policies that can support or align with the initiative.

Material-intensive sectors: Industries with large resource flows—such as construction, agri-food, chemicals, metals processing, or energy production—often offer the greatest potential for symbiotic exchanges.

Potential anchor actors: Large companies, key industrial sectors, or institutional actors (such as municipalities or industrial park operators) that can provide stability and credibility to the network.





Identifying Opportunities Through a Value-Chain Perspective

Once resource flows and priority sectors have been identified, a **value-chain perspective** can help translate the mapping results into potential symbiosis opportunities. This approach examines the sequence of activities within a sector: from raw material extraction and production to manufacturing, distribution, use, and end-of-life management.

Within this framework, practitioners look for points where resource inefficiencies occur or where outputs from one stage could serve as inputs for another actor. For example:

- Surplus raw materials from one company may replace virgin materials in another process.
- By-products or waste streams may be used as secondary resources in nearby industries.
- Energy exchanges may involve the transfer of excess heat, steam, or electricity.



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Identifying Opportunities Through a Value-Chain Perspective

- Utilities and infrastructure, such as transport, storage facilities, or wastewater treatment systems, may be shared among several actors.

To identify these opportunities, practitioners often follow a four-step process:

- Companies map their internal processes and identify all relevant inputs and outputs.
- These flows are quantified to determine their scale and potential economic value.
- Flows are visualised to reveal inefficiencies or underutilised resources.
- Potential exchanges between different actors are explored and assessed for feasibility.

For the most promising opportunities, further analysis may be conducted to evaluate technical compatibility, economic viability, regulatory compliance, and operational risks.





Identifying Opportunities Through a Value-Chain Perspective

Challenges and Limitations of Resource Mapping

While MFA and resource mapping provide valuable insights, practitioners should be aware of several limitations. One of the most common challenges is **data availability and reliability**. Industrial data may be confidential or incomplete, and companies may not always measure flows at the level of detail required for symbiosis analysis. As a result, estimates and assumptions are often necessary.

Another challenge is the **technical complexity** of MFA. Conducting a detailed analysis requires expertise in process analysis, unit conversion, system boundary definition, and data visualisation. Many municipalities therefore collaborate with universities, research institutes, or specialised consultants to conduct these analyses.

Despite these challenges, even simplified resource mapping exercises can reveal valuable insights and help initiate dialogue between stakeholders.



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Linking Resource Mapping to Implementation

Linking Resource Mapping to Implementation

Ultimately, mapping resources and waste streams is not an end in itself but a step toward identifying actionable symbiosis opportunities. Once potential exchanges have been identified, practitioners must work with stakeholders to evaluate feasibility, build partnerships, and design pilot projects. These early initiatives can demonstrate the benefits of Industrial-Urban Symbiosis and create momentum for larger-scale implementation.

The next chapter therefore focuses on how municipalities can move from analysis to action by **identifying and prioritising the most promising symbiosis opportunities** based on their economic, environmental, and social impact.





Tool: Online Material Flow Analysis Tool (OMAT)

A variety of digital tools can support the MFA process. These range from simple spreadsheet-based calculations to advanced modelling software and geographic information systems (GIS).

One example is the **Online Material Flow Analysis Tool (OMAT)** developed by Metabolism of Cities, which allows users to quantify and visualise resource flows within defined system boundaries.

These tools can help practitioners build databases of resource flows, visualise results through diagrams or maps, and identify priority materials or sectors for further investigation.

Click here to access the tool: [Metabolism of Cities – OMAT](#)

Click here to watch an introductory course: [Material Flow Analysis: How-to Full Tutorial \(Short Online Course\)](#)

Metabolism of Cities About OMAT Publications & Research Data Stakeholders Initiative More Logout

OMAT Dataset: Cape Town

From this dashboard you can manage your dataset.

Your Data

You have 4 data groups, with a total of material classifications in your dataset.

- A. Domestic Extraction Used
- B. Imports
- C. Exports
- D. Domestic Processed Output

[Manage your dataset](#)

[Resources](#) [Contacts](#) [Sources](#) [Notes](#) [Registration](#)

Log

Date	Material	Action
Nov 23, 2015	Nitrous oxides (NOx)	Value for 2013 added.
Nov 23, 2015	PM10	Value for 2013 added.
Nov 23, 2015	PM2.5	Value for 2013 added.
Nov 23, 2015	Sulfur dioxide (SO2)	Value for 2013 added.
Nov 23, 2015	Non-methane volatile organic compounds (NMVOC)	Value for 2013 added.

[View full log](#)

Reports

[Data Overview](#) [Indicators](#) [Graphs](#) [Data Tables](#)

Your Settings

Dataset name: Cape Town
Type: Urban economy-wide MFA
Access: private
Project: Feasibility study of an urban ...
Period: 2013
Decimal precision: 2
Standard measure: tons

[Change settings](#)

Other Options

[Copy this dataset](#)
[Reset dataset](#)
[Delete this dataset](#)

[Admin](#)



Tool: Screening Tool

The **screening tool**, developed by Symbiosis Center Denmark with the Technical University of Denmark, is a dialogue-based checklist or questionnaire designed to guide industrial symbiosis facilitators through company assessments. It helps businesses understand their internal resource flows and identify ways to optimize them, laying the groundwork for future symbiotic partnerships and business matchmaking.

The tool has five modules:

1. **Basic company information:** contacts, locations, and financial data.
2. **Business model and sustainability outlook:** company's green transition potential and motivations.
3. **Resource flows:** energy, water, and material streams, including potential optimization opportunities.
4. **Readiness assessment:** evaluates the company's willingness and capacity to engage in industrial symbiosis.

Part 1 - Characterization of enterprise

Purpose:

The purpose of this paragraph is to gather basic company information on the specific enterprise and its connected enterprises. Be aware that the BIS project is targeting 50% small or medium enterprises (SMEs). To be considered an SME, the enterprise must have a staff headcount below 50, turnover or balance sheet below 10 million. To be categorized as an SME, the enterprise must have a staff headcount below 50 or below 10 million. These ceilings apply to the figures for individual firms only. A firm that is part of a larger group may need to include information from that group too.

1.1 Company data		Comments
Company name		
Company number		
Industry code		
Number of employees		

1.2 Contact information		Title	Comments
Contact person 1			
Contact person 2			

Part 2 - Business model

Purpose:

This paragraph has two purposes: 1) To get an overview of the enterprise's business model, and 2) to hear the enterprise's view on its opportunities and preconditions for green transition and sustainability. Both will form the foundation for developing a green business model. The questions are based on the Business Model Canvas.

2.1 Describing the business model

The purpose of these questions is to get a view into how your business model is structured.

2.1.1 Value proposition	2.1.2 Customer segments	2.1.3 Customer relations	2.1.4 Suppliers	2.1.5 Organization
What value do we deliver to the customer? Which of our customer's problems are we helping to solve? What products and services are we offering to	For whom are we creating value? Who are our most important customers?	What type of relationship does each of our Customer Segments expect us to establish and maintain with them? Which ones have we established? How are they integrated with the rest of our business model? How costly are they?	Who are your core suppliers? How is your relationship with your suppliers, ad hoc or continued exchange? Are you in close collaboration	Do you have your own production or are you outsourcing? Are you part of a company group?





Tool: Screening Tool

5. Facilitator evaluation: expert assessment of the company's potential for resource efficiency, green business development, and symbiotic opportunities.

Data from the tool is compiled into a summary report, often enriched with notes from interviews and site visits. The report highlights key resource streams, identifies optimization priorities, and assesses readiness for participation in symbiotic projects. This approach has proven effective across Nordic and Baltic regions for helping companies realize circular economy opportunities. Future improvements could include web-based interfaces, local language versions, and more intuitive visualizations to broaden accessibility and usability.

Click here to access the tool: [Screening tool Download](#)

Click here to watch an introductory course: [Symbiosis Center Denmark - WORKSHOP ON SCREENING TOOL](#)

Part 1 - Characterization of enterprise

Purpose:

The purpose of this paragraph is to gather basic company information on the specific enterprise and its connected enterprises. Be aware that the BIS project is targeting 50% small to medium enterprises (SMEs). The purpose of this paragraph is to gather basic company information on the specific enterprise and its connected enterprises. Be aware that the BIS project is targeting 50% small to medium enterprises (SMEs). The purpose of this paragraph is to gather basic company information on the specific enterprise and its connected enterprises. Be aware that the BIS project is targeting 50% small to medium enterprises (SMEs).

1.1 Company data

	Comments
Company name	
Company number	
Industry code	
Number of employees	

1.2 Contact information

	Title	Comments
Contact person 1		
Contact person 2		

Part 2 - Business model

Purpose:

This paragraph has two purposes: 1) To get an overview of the enterprise's business model, and 2) to hear the enterprise's view on its opportunities and preconditions for green transition and sustainability. Both will form the foundation for developing a green business model. The questions are based on the Business Model Canvas.

2.1

Describing the business model

The purpose of these questions is to get a view into how your business model is structured.

2.1.1 Value proposition	2.1.2 Customer segments	2.1.3 Customer relations	2.1.4 Suppliers	2.1.5 Organization
What value do we deliver to the customer? Which of our customer's problems are we helping to solve? What products and services are we offering to	For whom are we creating value? Who are our most important customers?	What type of relationship does each of our Customer Segments expect us to establish and maintain with them? Which ones have we established? How are they integrated with the rest of our business model? How costly are they?	Who are your core suppliers? How is your relationship with your suppliers, ad hoc or continued exchange? Are you in close collaboration	Do you have your own production or are you outsourcing? Are you part of a company group?





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CONSORTIUM MAP

