ECOLE:

ECO industrial park network for the Alpine Regions Leveraging smart and Circular Economy

Representative model of the systemic thinking community for circular economy in eco-industrial parks in the Alpine region

Deliverable D1.3.1

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Short Description

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Develop a methodology for a representative model of the systemic thinking community for circular economy in eco-industrial parks in the Alpine region.

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ABBREVIATIONS USED

AP	Associated Partner
AS	Alpine Space
CM	Communication Manager
ECOLE	ECO industrial park network for the Alpine Regions Leveraging smart and Circular Economy
KPI	Key performance indicator
STCM	Systems thinking community model
UNIDO	United Nations International Organization
WP	Work Package
WPL	Work Package Leader

INDEX

1. Objectives and summary

This document aims to describe the process by which to achieve coordination and engagement in a structured and effective way among different stakeholders (public and private) to enable EIPs to reach their performance standards and to support traditional parks to successfully transform towards EIPs. We call this process a systemic thinking community model. "Systemic thinking" because achieving the type of outcomes necessary for EIP performance requires deep synergies across firms within and outside the industrial park and with the surrounding urban and/or rural communities. Hence, it calls for a systemic approach from designing and planning to implementation and operation. The "community" term refers broadly to the close coordination and alignment of interests and resources necessary across the range of relevant stakeholders within and outside the perimeter of the industrial park. For this purpose, close communication and continuous engagement are critical for harnessing co-benefits (discussed in deliverables D1.1.1 and D1.2.1) and for the overall success of such a project, i.e., brownfield or greenfield EIP project.

We start in **section 2** by explaining the policy cycle model, which should guide any project implementation process, and which serves as a useful tool to guide the process of stakeholder engagement within the EIP and with the surrounding rural and/or communities. In **section 3** we elaborate on a structured 4-steps process to understand who the stakeholders are, what role they play, what interests they have, influence on the decision-making process, which would then allow one to prioritize and plan with whom to engage and how. Such a process starts with identifying stakeholders, analysing them in terms of interests and influence/power, mapping them accordingly, and then prioritizing for subsequent actions.

In **section 4** we discuss a further step necessary to guide cross-stakeholder engagement; specifically, we believe it is important to also get a deep understanding on how and to what extent stakeholders have engaged so far within EIPs, traditional industrial parks seeking transformation towards sustainable/circular economy processes, or in planning greenfield EIP developments. Lastly, in **section 5** we briefly define the systemic thinking community model (STCM), proposing examples of actions that could be taken to implement the various stages.

Ultimately, this document should be read along with deliverable D1.3.2, which will provide more evidence-based detail on the need for such a cross-stakeholder engagement process, the rationale behind it drawing on theoretical and empirical evidence, and best practice examples from around the world. In addition, deliverable D1.3.2 will also explain the concept of urban/rural-industrial symbiosis, which is the core concept at the core of the ECOLE project, stressing that EIPs are fully effective if they also leverage synergies in terms of flow of materials, resources, and knowledge with the surrounding communities (be it municipalities, rural areas, or other companies outside the industrial park).

2. The policy cycle as a guiding process

The policy cycle is a useful tool to guide decisionmakers on the cyclical process required to get from an idea to implementation of a policy or intervention. As figure 1 suggests, the process is interactive and cyclical, implying that the process continues until the policy or intervention is perfected, adapted, or even abolished. Given the high level of coordination
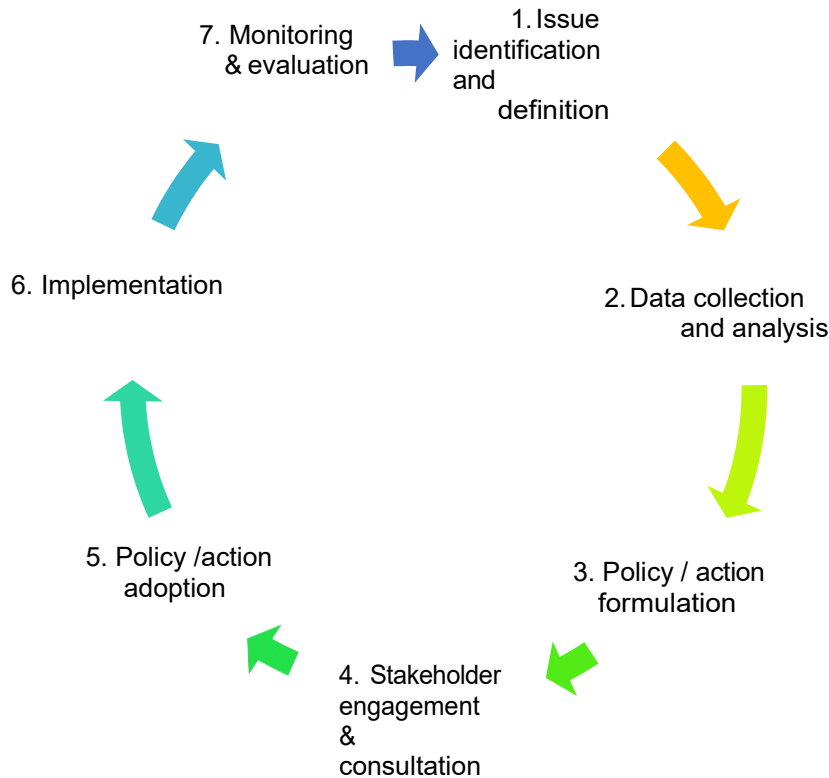
necessary for an effective EIP, and the high level of commitment and engagement across the EIP tenant firms and with public and financial institutions, as well as with education and training and the surrounding communities, we

believe that the policy cycle offers an "organising" process for the STCM design and implementation.

Let us briefly explain each of the seven steps that make up the policy cycle.

Figure 1 – The stages of a policy cycle

7. Monitoring & evaluation

1. Issue identification and definition

2. Data collection and analysis

3. Policy / action formulation

4. Stakeholder engagement & consultation

5. Policy /action adoption

6. Implementation

Source: Own design

Stage 1 – Issue identification and definition

This first stage involves a clear definition of the problem or objective identification and diagnosis. In the context of the EIP this would mean identifying the vision and objective related to the EIP project (brownfield or greenfield) (e.g., reduce environmental degradation, improve industrial competitiveness) and providing a general diagnosis related to gaps in performance and needed resources. Such a process can be initiated by a public entity, private investor, or a public-private partnership. Regardless of the driving entity, this early stage does require consultation with other stakeholders and a good understanding of the inter-stakeholder dynamics. Stakeholder consultation is also important to ensure a clear problem/goal definition, as this will determine the effectiveness of interventions at later stages.

Stage 2 – Data collection and analysis

This stage is the evidence building phase shaping actions. It implies extensive collection of quantitative and qualitative data on relevant aspects at firm, industrial park, regional, sectoral, and even national level. The problem definition (stage 1) will guide this process and

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will lead to the definition of key performance indicators (KPIs) to be measured across the EIP development process. The analysis of this data will lead to detailed diagnosis that will point to key opportunities and

challenges in terms of necessary actions. Data analysis will also point to existing resources, waste streams, and potential synergies across firms and communities in terms of industrial symbiosis.

Stage 3 – Policy / action formulation

Following the examination of evidence, several options for policy / actions will emerge. Compliance with sectoral, regional, national, and international regulations will then also be considered at this stage. In addition, specific policy / action related instruments are also discussed in this stage, always in close coordination cross key stakeholders.

Stage 4 – Stakeholder engagement and consultation

While stakeholder engagement and consultation should be conducted across the entire policy cycle, it may be that engagement with select stakeholders is prioritized at a specific stage (see section 3). This stage stresses, however, that once policy/action options have been formulated, testing these ides with both those directly and indirectly impacted and those topical experts, is key. This contributes to refining policy actions, proposed instruments, and ultimately contributes to higher effectiveness. Moreover, broad stakeholder engagement and consultation also contributes to reducing conflict, building trust, and harmonizing interests.

Stage 5 – Policy / action adoption

The agreement on and adoption of a particular policy or action strongly depends on the extent to which stakeholders have been engaged, have contributed to the definition of needs and actions, and have been aligned.

Stage 6 – Implementation

The implementation of actions itself also involves several stakeholders and is a time-consuming process, especially if consensus is widely achieved or if compliance issues are still unresolved. Here, stakeholders such as the park managers or operators play a critical role to guide implementation, establish roles and responsibilities, and monitor progress.

Stage 7 – Monitoring and evaluation

As the last stage in the policy cycle, monitoring and evaluation is crucial for establishing whether the set action plan has reached its objectives and evaluate whether it needs to be adjusted and how. Monitoring ultimately helps decisionmakers to anticipate problems and make appropriate adjustments in order to reach the set goals for the various KPIs. Park managers and operators are drivers of this stage, working in close cooperation with all stakeholders who provide crucial insights into progress, drivers, and barriers towards achieving objectives.

As is perhaps already evidence, the necessary dynamics associated with the various steps along the policy cycle, especially in the context of EIPs, are highly complex and relying on interrelated systems (e.g., across firms from different sectors, with public entities, knowledge providers, surrounding communities). To drive and optimise such complex projects (i.e., transforming traditional industrial parks into EIPs or planning and implementing greenfield EIP projects)

requires that stakeholders **"think in systems"**, aiming to understand how specific entities influence each other within a whole.

Therefore, especially in the EIP context, **systems thinking is key across the entire policy cycle** to both examine complexity and to simplify it (e.g., by recognizing patterns) in order to allow strategic

and systematic action. Understanding and approaching problems from a systems perspective is especially important in technical and diverse stakeholders' environments.

3. Understanding stakeholders and planning engagement

Identifying and describing the relationships among entities related to the EIP system is key for its effective implementation across the policy cycle. Further, engaging the stakeholders in an effective way requires a good understanding of their role, their interests in and influence on the project design and implementation, as well as the relationships between them. Such an assessment allows one to identify who to focus on, in what way, and who else to bring to the table. In a nutshell, there are four fundamental steps to take towards mapping relevant stakeholders:
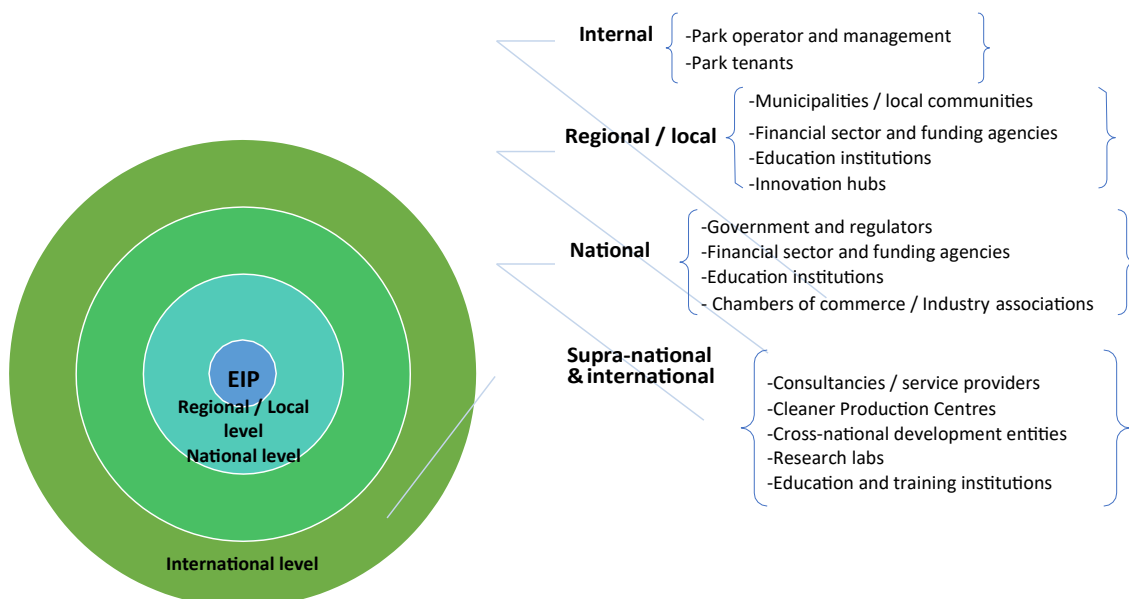
1. **Identify stakeholders**: Who is connected to, or who is interested in the project.
2. **Analyse stakeholders**: Their level of interest and power in this project.
3. **Map stakeholders**: Create a visualization to understand the ecosystem.
4. **Prioritize stakeholders**: Create a plan on how to engage with them.

Below we discuss each of these steps in more detail, providing some practical tools to be used in the process.

3.1. Identify stakeholders

The stakeholders relevant for EIPs (regardless if we speak of greenfield or brownfield projects) are diverse and can be grouped in different ways. In D1.1.1 we grouped the stakeholders into internal (park operators and management, and tenants) and external to the EIP (regional and national and supra-national /international, listing type of stakeholders in each of these categories (see Figure 1). The stakeholders could also be grouped into topical/sectoral categories, such as industrial actors, utilities, education and training, service providers, local government, community groups, NGOs, etc.

Figure 1: Key stakeholders, internal and external to the EIP (examples)

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Economy

For each of these categories all the relevant stakeholders should be listed, to define the landscape of actors. Such a list (presented in a word or excel file), should be validated with various stakeholder groups to make sure that everyone is considered, regardless of their interests and level of influence. For each of the stakeholders, their role should also be defined/explained.

3.2. Analyse stakeholders

Once the stakeholders have been identified, the next step is to analyse them based on their level of interest and the degree of power (or influence) to implement the necessary actions required for an EIP.

Table 1 – Stakeholder analysis template

Stakeholder category	Institutions / Organisations	Roles	Influence	Interest
Government / policy makers	Ministry of Industry	Set high level policy agenda	Authority to convene stakeholders relevant to EIP development	Align EIP with national policy priorities
	…	…	…	…
	…	…	…	…
Implementing agency /staff	Park operator	Promote EIPs as a differentiator to attract investment	Influence government on national policy and planning	Attract investment
	…			
	…			
Tenant firms in sector X **…**	Firm A	Manage waste for the industrial park	Can affect the extent to which waste gets collected and sorted from different facilities	If there is a business for managing waste streams, the firm may have high interest.
	…	…	…	
Investors	…	…	…	…
Business associations / Chambers of commerce	…	…	…	…
Service providers	…	…	…	…
Employees	…	…	…	…
Municipalities	…	…	…	…
Customers of tenant firms	…	…	…	…

International organisations	…	…	…	…

| Civil society	…	…	…	…
Suppliers	…	…	…	…
….	…	…	…	…

Source: Own design

Such an analysis can be performed based on secondary data and existing expertise of the PPs, which can be validated through interviews or even a workshop.

3.3. Map stakeholders

Step 2, above, is not yet sufficient to get an understanding on how to structure engagement and on whom to focus most on driving action. Therefore, a mapping of the stakeholders by interest and influence is key, generally aiming to visualize the results using a low-medium-high matrix. Figure 2 below illustrates how results from such a mapping exercise could look like. Such mapping exercise would assist EIP decision-makers on prioritizing stakeholder engagement along specific issues (step 4).

Figure 2: Stakeholder mapping matrix
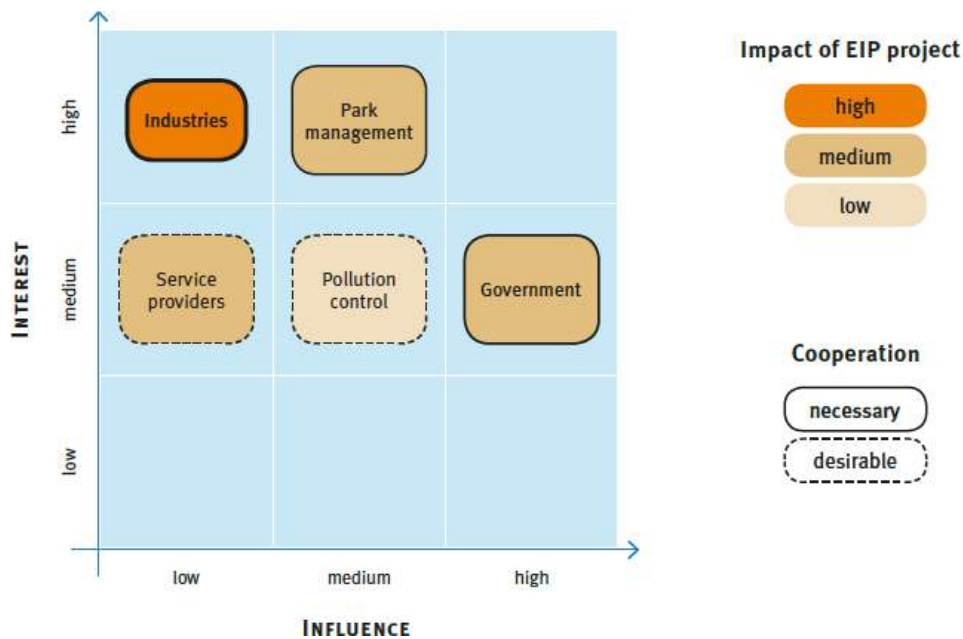
Source: CII-Godrej GBC (2016) in UNIDO (2017)

To assess stakeholders on their influencing power and interests, one can rely on the supporting tool "Stakeholder analysis" (see Excel template provided as supplemental material) based on UNIDO's EIP Policy Support Tool V2. The Stakeholder Mapping template (see screenshot in Figure 3 below) should be completed for each relevant stakeholder, including relevant government agencies, private sector, NGOs, and others. Completing the analysis will result in an overall qualitative score (high, medium, or low) for the influencing ability and interest of each stakeholder. These scorings can be inserted manually into a matrix for stakeholder mapping (as in Figure 2), included in the same template, below the analysis table.

Figure 3: Screenshot of the stakeholder mapping template
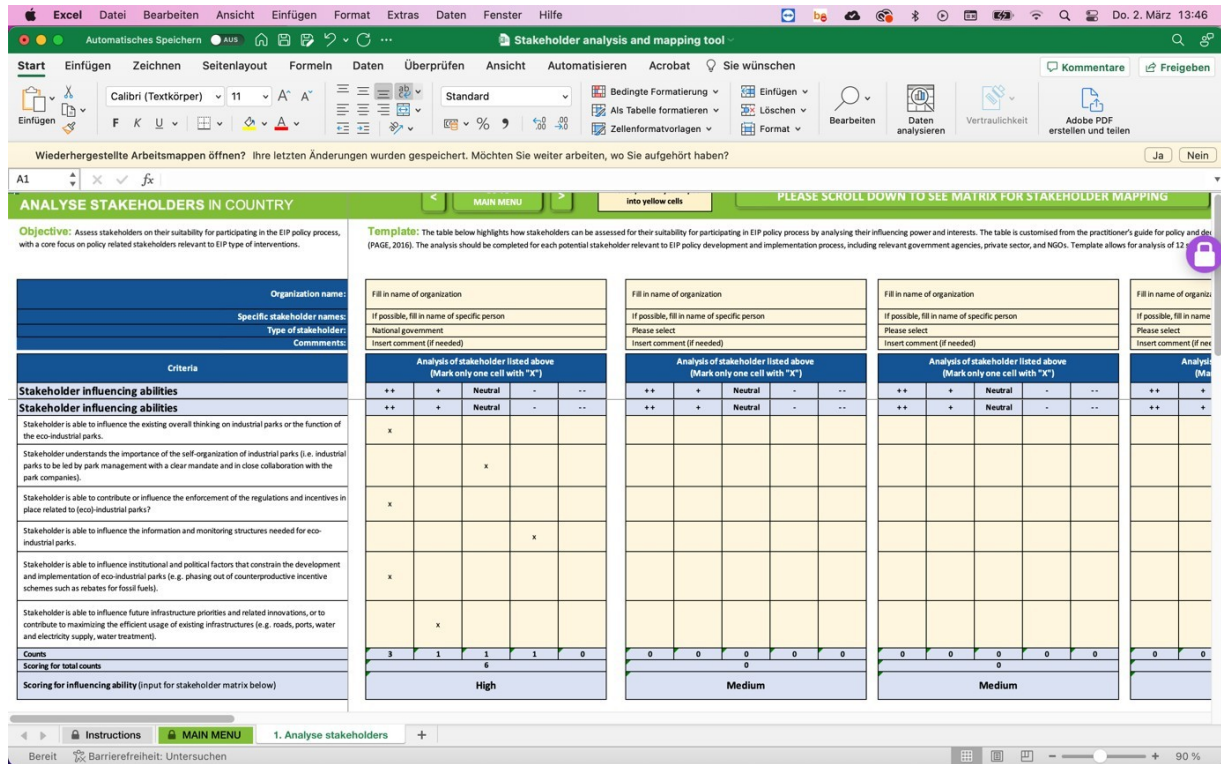
The tool/template maps the degree of influence and the level of interest based on various criteria, which can be adapted to the specific case, if needed:

- **Stakeholder influencing abilities**:
  - Stakeholder is able to influence the existing overall thinking on industrial parks or the function of the eco-industrial parks.
  - Stakeholder understands the importance of the self-organization of industrial parks (i.e. industrial parks to be led by park management with a clear mandate and in close collaboration with the park companies).
  - Stakeholder is able to contribute or influence the enforcement of the regulations and incentives in place related to (eco)-industrial parks.
  - Stakeholder is able to influence the information and monitoring structures needed for eco-industrial parks.
  - Stakeholder is able to influence institutional and political factors that constrain the development and implementation of eco-industrial parks (e.g., phasing out of counterproductive incentive schemes such as rebates for fossil fuels).
  - Stakeholder is able to influence future infrastructure priorities and related innovations, or to contribute to maximizing the efficient usage of existing infrastructures (e.g., roads, ports, water and electricity supply, water treatment).
- **Organizational and motivational interests:**
  - Stakeholder is interested in EIP concepts, opportunities, and benefits.
  - Stakeholder is open to new ideas and adjust his/her organization to new challenges and opportunities in relation to eco-industrial parks.

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- Stakeholder sticks to agreements and is interested in participating in the EIP project.
- Stakeholder actively informs partners of industrial park related activities, exchanges information and responds swiftly.
- Stakeholder actively informs others of intentions, aims and expectations.

Another level at which stakeholders should be mapped is **based on their relationships to each other**. It is important to understand *whether and in which way stakeholders already collaborate with each other, and whether the existing collaboration/engagement is supporting or not* (i.e., fostering or hindering collaboration).

Such a map could take the form of the canvas example in Figure 4 below, defining the existence of a relationship between specific stakeholders and the nature of such a relationship (e.g., trust, finance, information, expert knowledge, policies, services). The position within the circles would be determined on whether the stakeholder is from within the EIP (e.g., park operator, tenant firm) (in this template indicated by circle A), or from the regional/local level (located in circle B), national level (circle C) or international (in this case the individualized template can be expanded to include a circle D). These relationships could be further qualified into positive vs. negative or neutral type of relationships to hint to any difficulties in further strengthening such relationship or to any already existing positive exchange that could be leveraged for scaling up actions. At this stage, such an assessment would be preliminary, to be explored in much more details through interviews or a questionnaire, as will be explained in Section 4.

Figure 4: Inter-stakeholder dynamics map

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The result of such an exercise could look like the example presented below in Figure 5.

Figure 5: Example of an inter-stakeholder dynamics map
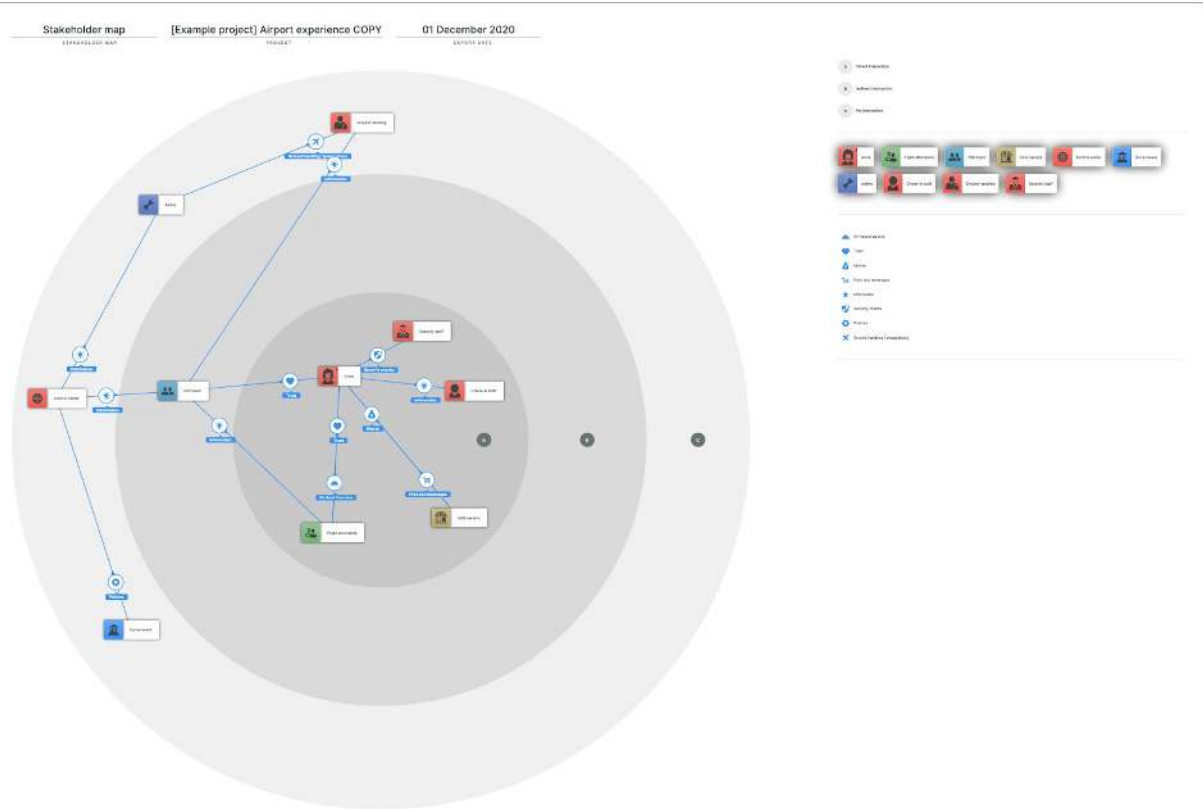
3.4. Prioritize stakeholders

Once the landscape of stakeholders, their interest and influence/power, as well as the nature of relationships between them is clearly understood, the last step is to prioritize the stakeholders (ideally along different stages of project implementation and for different types of actions) and, with that, create a roadmap for action (i.e., a plan on how to engage with them to drive transformation towards EIPs).

To prioritize stakeholders, the following mapping of the interest/influence matrix could be considered (see Figure 6, similar to Figure 2). The results of this mapping allows decisionmakers to identify which stakeholders are critical and should therefore be managed closely (top right quadrant), especially to get the project going, or which ones may have a low priority at a certain point in time because of the low interest in the project and low influence in the decision making process, which should be monitoring but with a minimum effort. In addition, one will also be able to identify that may see low interest in the project but have strong power influencing the implementation or decision-making process (top left quadrant). These stakeholders should be

"handled with care" and should be won on the side of the project through different measures. Lastly, stakeholders that may see various benefits from the projects but may have little influence at the decision table (e.g., local communities, NGOs), may need support to be integrated in the decision-making process. Keeping them informed throughout the project is there key.

Figure 6: Categorization of stakeholders based on level of interest and power
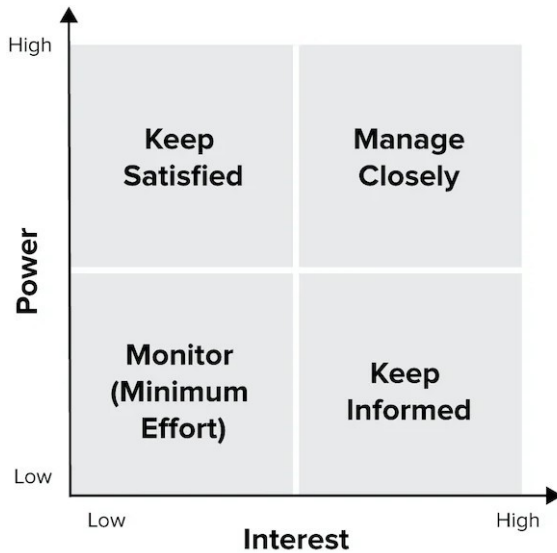
Source: mindtools (n.d.)

Results of this mapping should be corroborated with the inter-stakeholder dynamics presented in Figures 4 & 5, offering more insight into stakeholder dynamics. For example, the analyst would be able to identify not only which stakeholders have a stronger interest in supporting initiatives to integrate circularity in the industrial park; it would also allow one to better understand which stakeholders engage and collaborate with each other and what kind of relationships exist between them. Therefore, prioritization of stakeholders could be based on a more comprehensive assessment of inter-stakeholder dynamics identified in step 3 above, considering actions/measures that may lead to alignment of interest, conflict reduction, and opportunities for boosting co- benefits associated with EIP interventions.

4. Assess the level of stakeholder engagement within the EIP

Drawing on the overall stakeholder analysis, mapping, and prioritization exercise described in section 3, in this section we stress the importance of delving deeper into assessing the level of stakeholder engagement with the industrial park. To be able to design a new model of stakeholder engagement within the EIP and with neighbouring communities, this detailed assessment is critical. This is especially important for industrial parks already in operations, which already have developed established dynamics across stakeholders, perhaps even entrenched, path-dependent relations that must change to drive transformation towards EIPs. The assessment is, however, also critical for greenfield projects, in the context of which stakeholder relations are explorative, at first, but which need to evolve into deeper engagement to ensure support (regulatory and financial) and drive interest and commitment

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(e.g., from potential tenants and from communities).

Such an assessment allows one to identify potential missing communication / coordination / engagement links between relevant stakeholders, and/or already existing basis for engagement that could be further enhanced.

A semi-structured questionnaire could be used to perform this assessment, as per the draft template provided in Table 2. This template can be expanded to additional categories and with additional questions that may be relevant to the specific industrial park or project.

Table 2: Draft template for assessment questionnaire

Information category	Assessment category	Sample questions
Institutional & organisational capacity	Understand decision-making processes relevant to EIP, as well as the legitimacy and coordination capacity of institutions involved	• Is there a significant lack of coordination among stakeholders, which could impede the operation of EIP projects? If "yes", in what way and between which stakeholders? If "no", what works particularly well? • Is there general lack of trust in key public/private sector institutions and/or with urban/rural communities? If "yes" why do you think this is the case? If "not", what could be done better what is the source of that problem?
	Review institutional support and stakeholders' capacities to conduct public-private dialogue	• Is there general support for EIPs? • Are there any existing successful dialogue initiatives or process on relevant topics that can be leveraged (e.g., climate change, industrial competitiveness, energy, clean production)? • Are stakeholders experienced in making evidence-based decisions? • Do private sector stakeholders have capacities to contribute to the design and implementation of EIPs? If "yes", in what way? If "no" why not? • How do relevant public institutions coordinate with each other? Do institutions have overlapping mandates regarding the development of EIP projects? • Are there feedback loop mechanisms? • Which are the institutions that have capacity and credibility to support and lead EIP-related dialogues? • Which existing dialogues can be anchored to initiate a public-private dialogue on EIP? • Who has a mandate or ability to convene stakeholders? • Do any key groups lack in terms of capacity to participate in EIP related public-private dialogue? • …
	Examine perceptions and awareness on EIP	• Are the high-level objectives and benefits clean to stakeholders? • Are there any knowledge gaps? If so, what are

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		• What perceptions do stakeholders have of EIP and each other within the scope of EIP design and implementation? • Are stakeholders adequately sensitized and aware of the objectives of EIPs? • Is information/knowledge equally accessible to stakeholders? Where are the knowledge gaps? What would be potential strategies to close the knowledge gaps regarding EIP? • …
	…	…
Inclusiveness of EIP development process	Ensure the inclusiveness of decision-making processes by engaging all affected parties, citizens and beneficiaries.	• Are the beneficiaries consulted or engaged? If "yes", in what way? • Are there stakeholders who are marginalized but should have been involved? • Are adjacent communities engaged on resource/material exchange, information exchange, skills development, employability, resettlement, environmental issues, etc? If "yes" how? If "not" are there plans to engage them? • Where and how do stakeholders/beneficiaries get the information/news? • Is information/knowledge accessible to all stakeholders?
	…	…
Resource & information exchange	Ensure platforms for information exchange critical for EIPs.	• How are information on potential sources of materials/resource exchange shared? • Are there any digital information platforms for communication between communities and private and public actors in use? If yes, which ones? • …
	…	…
Political economy of EIP development	Understand political economy and power dynamics that could affect EIP development processes.	• What is the level of the private sector's influence on EIP decisions and on policy decisions more generally? • What does the ecosystem of identified EIP stakeholders look like? Are there centres of power/influence/networks? • Who are the potential champions, allies and adversaries that can help achieve or hinder the implementation of EIP? Is there a risk of agenda capture? • …
…	…	…

Source: Based on World Bank, UNIDO and GIZ (2019)

Together with the steps elaborated in section 3, the information gathered in this detailed assessment allows decisionmakers to achieve a deeper understanding of the role played by different stakeholders. As a result, not only can be stakeholders be better prioritized; also, the actions required along the policy cycle can be better planned and linked to specific stakeholders in order to strengthen important but weak ones, or to leverage fully synergistic

relationships.

5. Model synthesis

A systemic thinking community model (STCM) is meant to leverage synergies for urban/rural- industrial symbiosis in industrial parks, enable the deep integration of the circular economy solutions in the products and services that derive from industrial park tenants, and extend the EIP benefits beyond the EIP to the surrounding communities and network of suppliers. Such relations across diverse stakeholders are highly complex, require a systemic approach to structure interactions, and systemic thinking to make sense of this complexity into implementable solutions.

In this section we synthetize the STCM that critically depends on the information gathered through the steps and tools explained in sections 3 and 4. The guiding questions for setting up a structured STCM process are:

- Who should be engaged?
- How should they be engaged?
- How often and for what purpose?
- What platforms could be used to ensure systemic engagement? (e.g., ICT network for data exchange, events platform)

The "**Who**" question is first one to answer for the model set-up. The stakeholder identification process allows one to identify the full spectrum of entities that are important for the effective implementation of the EIP throughout the policy cycle.

The "**How**" question can be answered once the stakeholder analysis and mapping has been performed in detail. To determine how to best engage stakeholders, it is important to also keep in mind the different degrees of stakeholder engagement (see figure 7), ranging from simple information sharing to consulting for knowledge upgrading, or involving in consultations and decision-making processes, to collaboration projects, and deeper empowerment actions. How to engage stakeholders closely depends on the roles they play, position in the mapping matrix, and prioritization exercise. Engagement can be achieved through different means, depending on the degree of necessary engagement, such as:

- *For information*: newsletters, seminars (online, in-person), policy-briefs, etc.
- *For consultation*: roundtables, seminars, focus groups, peer-exchange, etc.
- *For involvement*: co-creation workshops, seminars, joint policy-papers/briefs, etc.
- *For collaboration*: joint projects, pilot initiatives, joint co-creation workshops, joint applied research projects, etc.
- *For empowerment*: special features in media articles, awards, targeted capacity building initiatives, etc.

Figure 7: Degrees of stakeholder engagement

Source: emm2.0 (n.d.)

Further, the "**How often and for what purpose**" question can be best answered following results from the detailed assessment of stakeholders. The inter-stakeholder dynamics, type and nature of relationships between stakeholders, and the level of engagement at the start of the project will define the intensity and focus of those engagements.

Various platforms could be used to ensure systematic engagement. These could be in the form of regular events, informational briefs, consultation processes. More importantly, however, especially given the high importance of collecting detailed data on resource streams and needs across stakeholders and regular monitoring and evaluation of performance, digital platforms play an important role to achieve urban/rural-industrial symbiosis (see deliverable D1.3.2 on examples and relevant uses for such tools). Such platforms can be used for information, communication, or collaboration purposes. But more importantly, they can be used for collecting and analysing data, and for monitoring and evaluating progress towards set goals.

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