

# Proposal: City Lab Initiative Amazonia



Photo: Município de Tefé, Amazonas (Source: Alamy Photos. ID E9563C)

## Synopsis

The *Morgenstadt City Lab Initiative Amazonia* is a project under the Fraunhofer Society (FHG), Europe's largest application-oriented research organization. Its objective is to contribute to transformative urban development in small and medium-sized cities in the Brazilian Amazon region, in partnership with the Amazonia Institute of Technology (AmIT). The initiative understands urban development as one of the preconditions for poverty alleviation and competitive development of Amazonia's standing-forest socio-bioeconomy. It focuses on improving urban infrastructure and nurturing local talent to improve quality of life and stimulate sustainable economic growth in the region. Through a collaborative and participatory approach, the initiative seeks to integrate these Amazonian towns into the Morgenstadt global scientific and economic network, which promotes resilient communities and sustainable development.

## Executive Summary

The *Morgenstadt City Lab Initiative Amazonia*, in partnership with the Fraunhofer Society (FHG), Europe's largest applied research organization, proposes to launch a transformative urban development process for small and medium-sized cities in the Amazon region, in collaboration with the new Amazonia Institute of Technology (AmIT).

A sustainable standing-forests and flowing rivers in Amazonia is intrinsically dependent on significant improvements in quality of life and services in the small and medium size towns. They play a key role in processing and adding value to the primary raw products, and as innovation hubs. A competitive new economy based on the unique biological and water resources of Amazonia depends, among others, on investments and innovations for (a) small and medium bio-industries located in smaller urban centers in close connectivity with rural communities, (b) investments in cutting-edge bio-industrial research & development, and (c) investments in people, who can locally support and operate value-adding processes.

Urban development is part of the front line in the fight against deforestation in the Amazon and forest degradation. It is a precondition for ambitiously moving the economy from low-value exports of raw products into a decentralized, revenue generating bio-industrial development. Unless the utterly unappealing local urban conditions are lifted holistically to new standards, this cannot happen. The main problems, to name a few, are lack of safe water, open untreated sewage and garbage disposal, poor housing, and a high crime rate. A major deterrent to investment and social and economic development is the high cost and unreliability of local energy generation, which is predominantly based on diesel.

The *Morgenstadt City Lab Initiative Amazonia* brings world class experience in participatory community-driven collaborative project developments to the tasks at hand. Its collaborative model is designed to foster a culture of learning, replication, and regional development. The initiative roots in the globally recognized *Morgenstadt Framework* and *City Labs* approach, acclaimed for its emphasis on co-creation, respect for local dynamics, and adaptability across diverse urban landscapes. Our adherence to these methodologies ensures that solutions are not imposed but co-created among local communities and thematically supported by the vast scientific network and expertise of FHG.

We propose to support social and economic growth in four to be selected Amazonian towns, identifying the primary local priorities in collaborative local consultation processes, and linking local demand to innovative technical and organizational solutions. Renewable energy and decentralized sanitation are likely to be highly among local agendas. Initially, two front-running towns will be identified to spearhead project development, setting examples, and sharing insights. From the beginning, a second set of two additional urban centers will actively participate as observers, creating a dynamic environment of mutual learning and growth.

We seek funding, as well as in-kind local support, for a 3-stage approach.

- The funding for the initial stage *Phase I: Learning and Co-Creation* will support the creation of detailed city profiles - identifying targeted sectors and formulating a prioritized list of 10-15 actionable project/program ideas. During this phase, an emphasis will be placed on stakeholder engagement, learning, and partnership to ensure a solid foundation for subsequent phases. This stage sets the groundwork for innovative and sustainable urban development projects, tailored to the unique needs and opportunities of the Amazon cities.
- The Second Stage Financing *Phase II: The Design and Implementation Plan* is critical to developing detailed project designs and implementation plans. This phase focuses on 'twinning' local urban programs with topic-specific experts from the FHG network and/or local expert scientific institutions through collaboration with AmIT; ensuring that each project is meticulously planned with leading specialists in relevant fields such as solar energy, bioenergy, and sustainable water and sanitation solutions. The outcome of this phase includes comprehensive project design documents, feasibility studies, and technical dossiers ready for the practical implementation phase.
- The Third Stage Funding *Phase III: Implementing and Upscaling* will enable the hands-on implementation of the projects designed in Phase II, drawing on the comprehensive technological expertise of FHG and AmIT and the local knowledge and capacity. This phase involves the actual construction, monitoring and evaluation of the projects, ensuring that they deliver tangible and sustainable benefits to the communities. The 'twinning' model continues to play a crucial role, providing ongoing support and ensuring that each project is scientifically robust, sustainable, and adapted to the local context.

The partnership with the Amazonia Institute of Technology (AmIT) is essential in this endeavor. Together, our objective is to contribute to the development of Amazonia's new sustainable socio-bioeconomy. Beyond 'urban', AmIT pursues a

holistic approach that combines 5 fields to support of the sustainable use of unique ecological and cultural resources of Amazonia: (1) Forests and socio-bioeconomy, (2) Water, (3) Urban Amazonia, (4) Sustainable Infrastructure, and (5) restoration of degraded, deforested lands. The AmIT combines Research & Development with learning, teaching, and demonstration projects.

The *Morgenstadt City Lab Initiative Amazonia* will contribute to the quality of local life and resilient communities, setting examples and connecting remote small and medium size towns in Amazonia with the world’s scientific community, programmatically integrating them into the global Morgenstadt network. This network has shared goals and serves as a platform for continuous exchange, learning, and growth. Our commitment extends beyond the completion of the proposed project phases. We are committed to ensuring the sustainability of our interventions and the ongoing development of our partner cities and the AmIT curriculum.

### Excellence for Innovation

The Morgenstadt City Lab Initiative Amazonia represents a distinctive collaboration model, showcased by the cohesive partnership between local cities, the Fraunhofer Society (FHG), and the Amazonia Institute of Technology (AmIT), as illustrated in the partnership network diagram below. This alliance underscores a sustainable urban development approach marked by mutual respect, shared vision, and collaborative empowerment, ensuring that development aligns seamlessly with the intrinsic aspirations and contextual necessities of local environments.

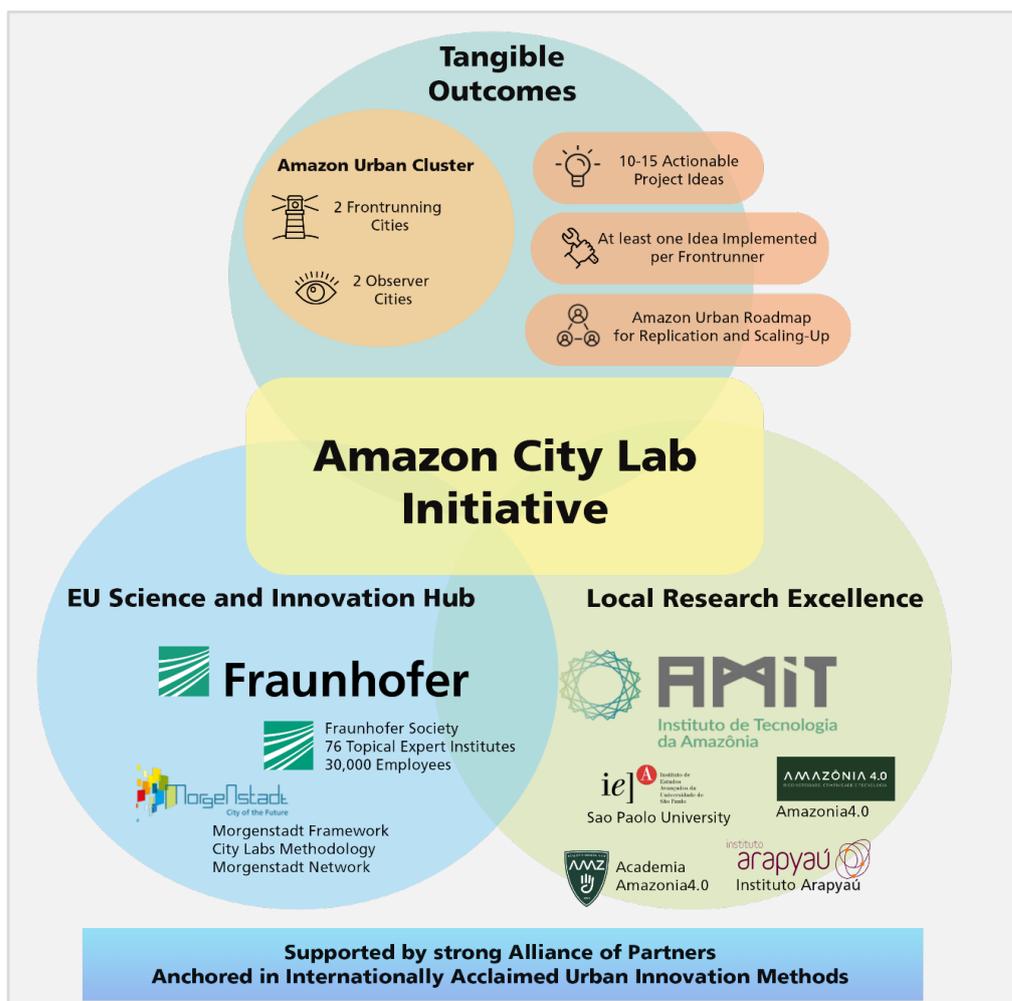


Figure: Partnership Network Ecosystem for the Morgenstadt City Lab Initiative Amazonia

In this collaboration, FHG stands out for its extensive expertise as Europe's largest applied research organization. This ensures that urban development projects are not only innovative but also grounded in cutting-edge science and best industry practices. Similarly, AmIT contributes its focus on harnessing Amazonia's unique ecological resources, fostering an environment where innovation in urban development and sustainable infrastructure thrives, along with a strong emphasis on nurturing and utilizing local talent.

This synergy is not just a gathering of expertise but a testament to an integrated approach that harmoniously blends local understanding with global scientific excellence. The Morgenstadt Initiative is uniquely positioned to create sustainable, innovative solutions, carefully tailored to resonate with Amazon's unique environmental and societal context. It stands as a testament to a collaborative spirit, where empowering local communities is paramount, and the role of FHG and AmIT is to facilitate a sustainable transformation, all within a non-profit framework.

At the heart of this partnership is the principle that local cities are active participants in shaping their developmental narrative. The initiative rejects any top-down imposition, instead adopting a participatory ethos where local visions and needs are the primary drivers of the developmental agenda.

This partnership is not just a collaboration; it is a commitment to nurture the heart of Amazonia, ensuring that its urban development reflects its inherent vibrancy, knowledge, diversity and ecological integrity.

## Phases of the Proposed Innovation Activities

In the Morgenstadt City Lab Amazonia Initiative, we are adopting a phased approach and are currently seeking funding solely for Phase I: Learning and Co-Creation, and Phase II: Design and Implementation Plan. The necessary funding for Phase III: Implementing and Upscaling will be determined based on the insights gathered towards the end of Phase I and the start of Phase II. This strategy ensures a focused allocation of resources and enables adaptive planning for the successful execution of the project's later stages.

### Phase I: Learning and Co-Creation

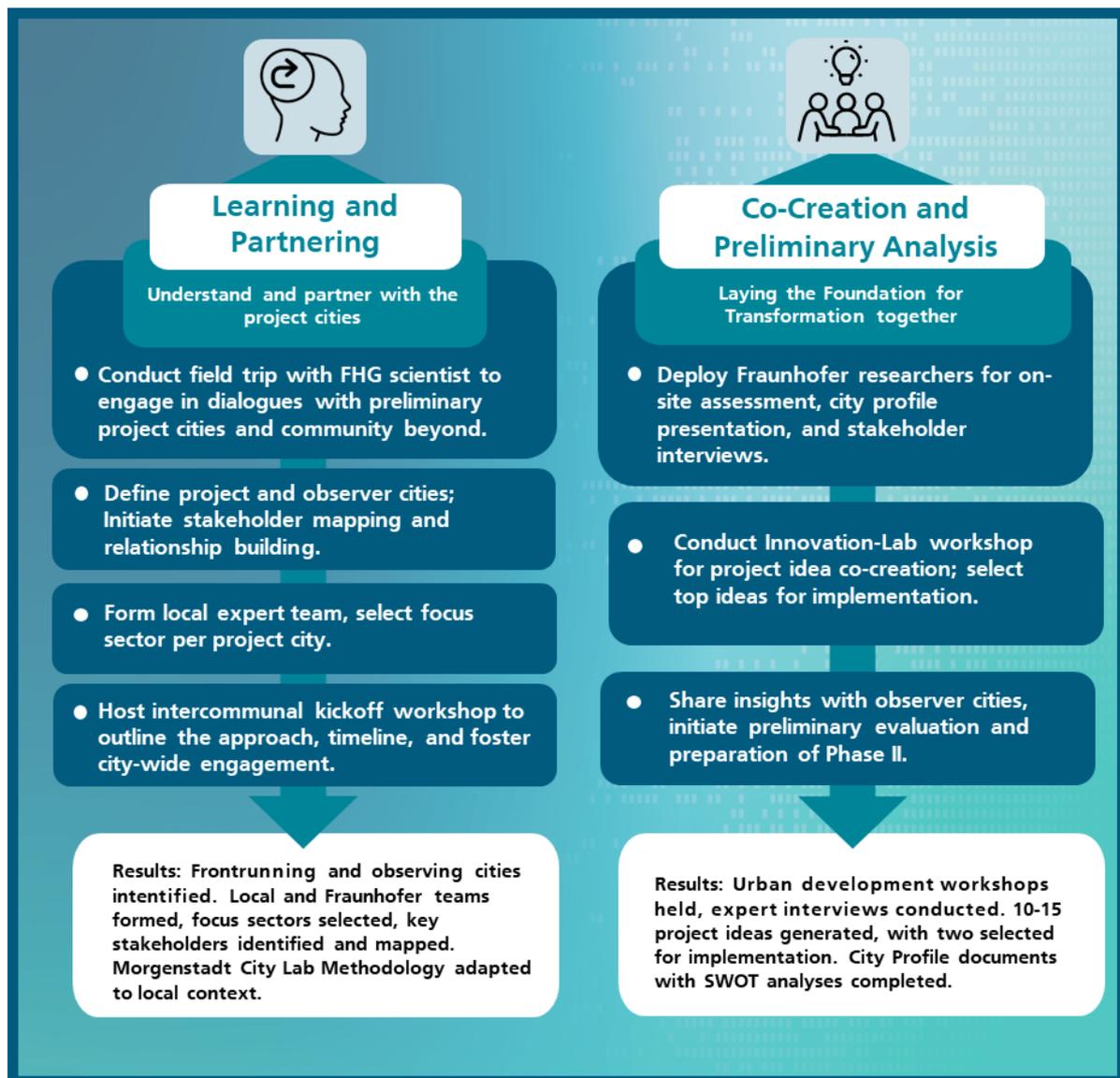


Figure: Phase I of the City Lab: Learning and Partnering and Co-Creation and Preliminary Analysis

During the initial step, a three to four week field trip will be conducted, involving a scientist endorsed by the Amazonia Institute of Technology (AmIT) and one Fraunhofer Society (FHG) scientist visiting the project region. This period is dedicated to establishing an open dialogue with the four preliminary project cities, determining the two cities where projects will be developed, and identifying the two remaining cities that will serve as observers. Key meetings with stakeholders such as non-governmental organizations and the scientific community, coordinated with the assistance of experts from the AmIT, are integral to this phase. The process involves detailed stakeholder mapping, fostering trust

and establishing open communication with key individuals, and setting up the local expert team along with key local individuals responsible for initiating the projects. A crucial task is to select one focus sector per project city, such as Energy or Sanitation.

The conclusion of this field trip marks a significant milestone, an intercommunal kickoff workshop. This event is designed to elucidate the approach, delineate the timeline, and foster engagement and support in the four project cities. It also serves as a platform to facilitate dialogue among key individuals in cities and to establish a schedule for regular meetings between the FHG project team and representatives from all cities involved.

The adaptation is characterized by customizing the Morgenstadt City Lab Methodology to cater to the specific needs of the two frontrunner cities. This involves an in-depth analysis of all relevant existing documents related to these cities and the creation of a comprehensive city profile document for each. These documents, available in both Portuguese and English, provide detailed information on the selected sector, including Strengths, Weaknesses, Opportunities, and Threats (SWOT) analyses.

The outcome includes the formation of both local and FHG project teams, the selection of focus sectors by local stakeholders, the identification of key stakeholders, review of existing relevant documents, and the customization of the research methodology to suit local needs. Additionally, a City Profile document featuring related SWOT analyses is developed for each of the two selected cities.

In the co-creating process, two FHG researchers will be stationed on-site for another stay with a two-week duration. This phase includes the presentation and subsequent discussion of city profiles, coupled with expert interviews involving relevant stakeholders in the sector. An Innovation-Lab workshop is a highlight of this phase, aiming to co-create 10-15 hands-on project ideas with local stakeholders. A follow-up workshop is conducted to pinpoint two practical ideas for realization at the start of the project. In addition, an urban-development workshop is organized to share insights, project ideas, and preliminary results with the two cities that observe. This phase concludes with a preliminary evaluation of the results and the commencement of preparation for Phase II: The Design and Implementation Plan Phase.

The outcome entails the generation of 10-15 hands-on project ideas, the selection of two for implementation, the creation of a detailed city profiles and ambition documents for each selected frontrunning city. These materials, which showcase information collated in the city profiles and the ideation process, are publicly to the observer cities and inside the FHG Morgenstadt network.

## Phase I – Overview of Activities and Outcomes:

### a. Discovering and Understanding

- Three- to four-week field trip involving an FHG scientist to the project region, facilitating open dialogue with all four preliminary project cities.
- Definition of two project cities and two observer cities, with meetings involving key stakeholders such as NGOs and the scientific community, coordinated with AmIT experts.
- Stakeholder mapping, relationship building, and open dialogue with key individuals.
- Formation of the local expert team and designation of key local individuals responsible for the start of the project.
- Selection of a focus sector per project city, such as energy or Sustainable Sanitation.
- An intercommunal kick-off workshop marks the conclusion of the field trip, discusses the approach, timeline, and engagement with all four project cities, establishes dialogue among key individuals, and sets up regular meetings with the FHG project team.

### b. Adapting and Partnering

- Customization of the Morgenstadt City Lab Methodology to the specific needs of the two project cities.
- Analysis of all relevant existing documents pertaining to the cities of the project.
- Creation of a city profile document for each of the two selected cities, detailing the selected sector and related SWOT analyzes in Portuguese and English.

#### Outcome:

- Dialogue was initiated, establishing a foundation for trust and collaboration, aligning project goals with community needs and scientific expertise.
- Formation of local and FHG project teams, selection of focus sectors by local stakeholders, identification of key stakeholders.
- Review of existing relevant documents conducted. Customization of the research methodology to local needs.

### c. Collaborative Innovation

- Three- to four-week extensive on-location collaboration with two FHG and AmIT expert researchers to foster creative idea generation.
- Conduct sector-specific expert interviews to infuse projects with depth and insight.
- Innovation-Lab workshop to co-create 10-15 hands-on project proposals with local stakeholders and highlight two ideas for immediate development.
- Facilitation of a Development Exchange Workshop to circulate ideas and feedback with observer cities, enriching project proposals.
- Evaluation of creative outcomes to seamlessly transition into detailed planning Phase II.

### d. Conceptual Design and Impact Forecast

- Rigorous refinement of conceptual ideas, integrating comprehensive stakeholder feedback.
- Strategic dissemination of conceptual designs to all project cities for a wider input and alignment.
- Finalization of project outlines, ensuring a solid foundation for Phase II's detailed planning stage of Phase II.

#### Outcome:

- Creation of a diverse portfolio of 10-15 hands-on project ideas, with emphasis on two flagship initiatives selected for implementation.
- Compilation of enriched city profiles for the first cities, showcasing detailed environmental, social, and economic landscapes; project ideas, and documenting ideation process.
- Establishment of a preliminary project framework, ready to evolve into concrete plans and implementations.

## Phase II: Design and Implementation Plan



*Figure: Phase II of the City Lab: Development of detailed designs and implementation plans for the selected projects.*

The Phase of the Design and Implementation Plan paves the way for the subsequent execution in Phase III, unfolding through a meticulously structured process. Each project is aligned with the relevant expertise of FHG's specialized institutions and local academic professionals, facilitated by AmIT's support. This partnership conducts a comprehensive evaluation of costs and benefits, along with formulating investment strategies, culminating in a detailed project design document. This pivotal document sets the groundwork for the execution plan, marking the culmination of this phase with a technical dossier that is primed for practical application in real-world settings.

The design document and implementation plan will include:

- 1) A general description of the project including objectives, background information on the project justification, and location;
- 2) An overview of project implementation and action plan;
- 3) Implementation results, expected quantified impacts and other environmental, social, and economic benefits;
- 4) Challenges and potentials and its contribution to sustainable development goals;
- 5) Social inclusion, participation and transformation and replication potential;
- 6) Sustainability strategy after implementation completion;
- 7) Expected constraints and risks related to project implementation;
- 8) Relationship with other existing projects in the city;
- 9) Key information about the project beneficiaries and stakeholders.

Furthermore, the document will be prepared with the corresponding municipality to develop a detailed description of the project technical implementation, including pre-implementation (preparatory) actions (level of project preparation, purchase/lease of land and/or compensation payments for rights of use (if necessary)), a project timeline and Gantt chart, technical details of the actions and their responsible parties (cost of the action, project milestones, deliverables and outputs and indicative details of other stakeholder contracts needed for the project).

For the other project ideas, business models, and possible financing sources will be sought, compiled, and activities with local stakeholders to secure finance of them will be organized.

The monitoring, evaluation and impact assessment concepts including performance baselines are formulated to be implemented together with the implementation in Phase III.

The Design and Implementation Planning phase is marked by robust collaboration between the local municipality, involved partners, FHG's subject-matter experts, and the AmIT, jointly refining the project concepts. Given their deep understanding of local needs and specifications for the technical dossier, the local team will spearhead the organization and execution of this phase, with the FHG team providing essential support.

The outcome of Phase II encompasses the complete preparation of both the implementation plan and the technical dossier, ensuring that implementation can begin immediately in the following phase.

## Phase II: Overview of Activities and Results

### **a. Implementation plan and technical dossier**

- Guided step-by-step process to prepare a project design document and implementation plan.
- Pairing of selected projects with relevant FHG topical expert institutions or local scientific community experts via AmIT, including business models and identification of possible funding sources.
- Conduct feasibility analyses, implementation planning, market consultations, and funding.
- Formulation and execution of monitoring, evaluation and impact assessment plans.
- Hands-on execution of projects by local partners in collaboration with FHG topical experts.
- Organized site visits among the four cities and regular status presentation meetings to ensure broad participation and strengthen ties within the chosen project topic.

### **Financial feasibility from roadmap project ideas**

- Pairing of selected projects with relevant FHG topical expert institutions or local scientific community experts via AmIT, including business models and identification of possible funding sources.

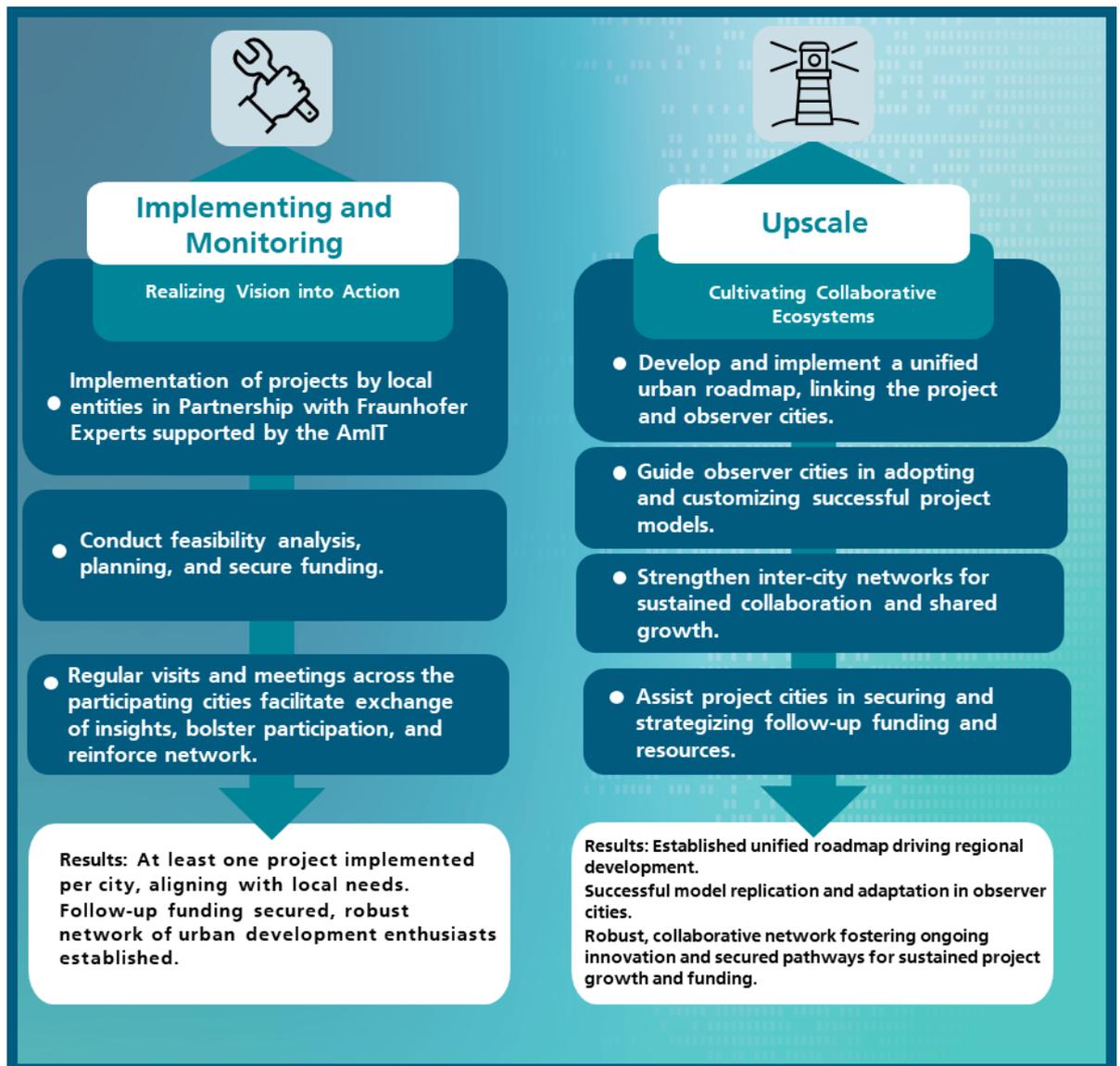
### **Monitoring concept and baseline performance**

- Formulation of a monitoring concept and impact assessment plan, including project performance baselines (for further monitoring during Phase III).
- Workshops with local municipality staff and related stakeholders to build capacity around data gathering for further monitoring activities.

**Outcome:**

- Technical dossier of the implementation design and concrete plan documentation of at least one project per city to be implemented in Phase III.
- Identification and initiation of follow-up funding for other project ideas from the roadmap.
- Impact Monitoring Framework and Guide Documentation for further local data gathering.

**Phase III: Implementing and Upscaling**



*Figure: Phase III – Implementing, Scaling-Up, and Reaching Out*

Phase III marks the critical transition from planning to action, embodying the City Lab Initiative Amazonia's commitment to tangible, sustainable urban development in the Amazon region. This phase leverages the comprehensive groundwork laid in Phases I and II, moving forward with the hands-on execution of the meticulously designed projects.

In this phase, the collaboration between local municipalities, the Fraunhofer Society, the Amazonia Institute of Technology (AmIT), and other key stakeholders intensifies, ensuring the seamless realization of the projects on the ground. The expertise and insights gained from the initial phases are now applied in practical settings, with local partners playing pivotal roles in bringing the projects to life. This collaborative effort underscores the initiative's participatory ethos, ensuring that solutions are not just scientifically sound, but also deeply integrated with the community's fabric.

The implementation process is characterized by a series of carefully coordinated steps that include the construction, monitoring and evaluation of each project. This ensures that each initiative not only aligns with the overarching goals of sustainable urban development but also addresses the specific needs and aspirations of the Amazonian communities involved. The projects aim to deliver measurable improvements in quality of life, economic opportunities, and environmental sustainability, contributing to the broader vision of transforming the Amazon region into a model of innovative and resilient urban development.

To foster a culture of continuous learning and adaptation, Phase III also emphasizes the importance of dissemination, outreach, and replication. Successes, challenges, and lessons learned are shared across the network of participating cities and beyond, encouraging the replication of successful models in other contexts. This phase aims not only to achieve local impact but also to inspire and inform sustainable urban development efforts worldwide.

## Phase III – Overview of Activities and Results:

### a. Implementing and Monitoring of Pilot Projects

- The direct implementation of the projects is carried out by local entities in partnership with FHG experts and supported by the AmIT, ensuring projects are executed with precision and in alignment with local and scientific standards.
- A comprehensive monitoring and evaluation framework is deployed to track progress, gather crucial data, and assess the impacts of projects, ensuring they meet their defined objectives and contribute positively to the community.
- Regularly organized visits and meetings in participating cities facilitate the exchange of information, enhance participation, and reinforce the collaborative network established between the project cities.

### b. Dissemination, Outreach, and Replication.

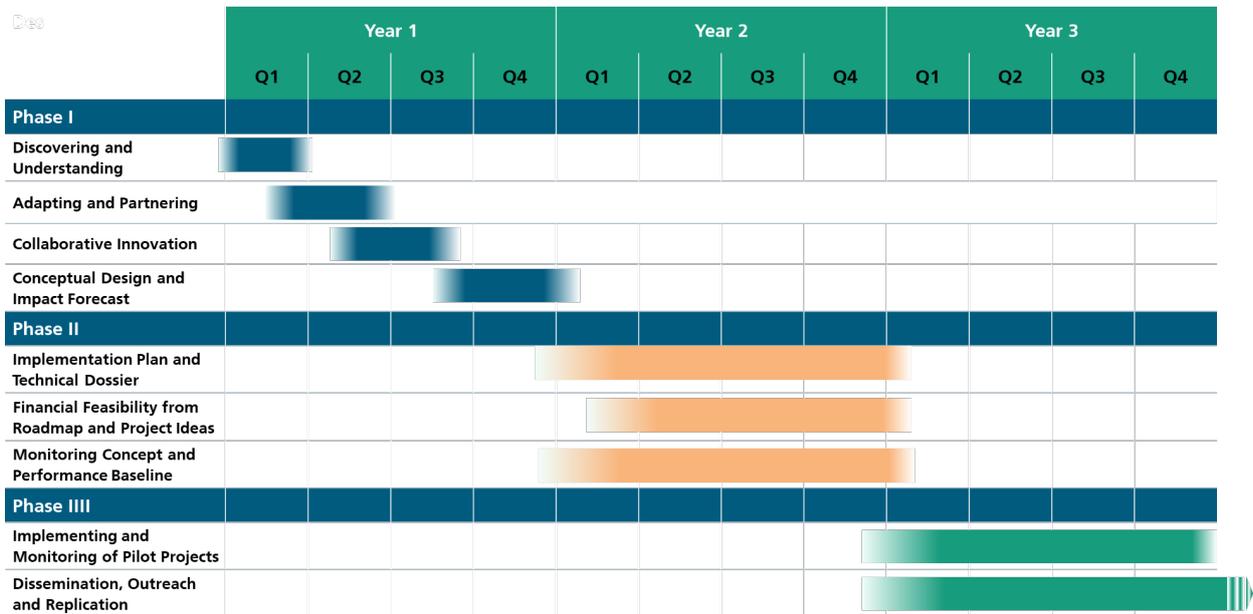
- An urban development blueprint, co-created with stakeholders from the participating cities, aims to weave a cohesive narrative of transformation across the Amazon region, promoting the replication of successful initiatives.
- Observer cities receive customized guidance, drawing from the experiences and lessons learned during the initial phases, to encourage the adoption and adaptation of proven strategies.
- A sustained effort to cultivate a dynamic community of practice among cities, extending regionally and globally, ensures the initiative's longevity and impact. This includes strategic support in identifying and securing additional funding sources to further the reach and depth of the project's impact.

### Outcome:

- The tangible realization of impactful projects in each of the lead cities, demonstrating the initiative's commitment to addressing local needs through innovative urban development solutions.
- The development and implementation of a robust framework for measuring project performance, ensuring that each initiative's outcomes can be evaluated and inform future efforts.
- The establishment of an expansive network of urban development advocates, bridging the gap between scientific research and practical application, fostering a collaborative ecosystem that spans local communities, policymakers, and global experts. This network not only champions the successes of the initiative but also serves as a foundation for scaling and replicating effective models of urban innovation and sustainability.

# Project Timing and Preliminary Budget

## Project Gantt Chart



## Annex 2: Brief Profile of the Proponents

- I. The **Fraunhofer IAO Morgenstadt Initiative and its ‘City Lab’ methodology** is at the forefront of sustainable urban innovation:
- Established by the **Fraunhofer Institute for Industrial Engineering (IAO)**. The City Lab embarks on a transformative journey for each pilot city within the Morgenstadt Global Innovation Network. The process begins with an in-depth analysis of the city, where researchers, through weeks-long stays, employ inspections, discussions, and workshops with key stakeholders to craft a sustainability profile for the city. This profile outlines the strengths, weaknesses, and areas of need of the city, identifying potentials, opportunities, and risks at three analytical levels: performance indicators, action fields, and causative factors.
  - This is achieved through **close international collaboration** with partners from academia, industry, and administration, sharing knowledge and experiences among pilot cities, and using the expertise of the Morgenstadt network.
  - The City Lab process identifies key sectors that require action, develops a data-based strategic roadmap, and, **in collaboration with local stakeholders**, crafts innovative measures and projects. These **initiatives are then set in motion, including their implementation and funding strategies**. An essential aspect of the process is to identify key local stakeholders and integrate the initiative into local policy making.
  - **The Morgenstadt City Lab supports cities in developing urban development strategies**, sustainability roadmaps, and innovation strategies through a holistic and customized approach. It uses the Morgenstadt framework to identify key intervention areas and complements them with a locally adapted solution catalogue. Through innovation partnerships, the Morgenstadt initiative aims to enhance the innovation potential of municipalities, continuously supporting partner cities in funding acquisition and organizational development.
  - The Morgenstadt City Lab embodies a pioneering approach to urban development, integrating **technological innovations, new business models, and socio-ecological premises to create sustainable, intelligent, and livable cities** for the future. Its methodology and results serve as a global model for urban innovation, contributing significantly to the transformative development of urban centers worldwide.
- II. The **Amazonia Institute of Technology (AmIT)** works on technological innovations for sustainable development in Amazonia, in five interlocking fields:
- **Amazonian waters - about 20%** of global fresh waters are the geographical arteries of the pan-Amazonian work of AmIT. Floating research stations are being designed to bring a deeper understanding of water-based biodiversity, sustainable usage, and development potentials.
  - **Sustainable Infrastructure:** Sustainable infrastructure is a prerequisite for the new socio-bioeconomy. Affordable, off-grid renewable energy solutions for communities, small towns, and small commercial and industrial developments are a primary concern. Making towns and river transport independent from diesel is a high priority. Connectivity is essential for more than 5,000 communities within the Amazon and necessary for full implementation of telemedicine.
  - **Urban Amazonia** needs to become fit for people and business. 70% of the population live in Urban Amazonia. Small and medium towns play a critical role in the commerce and transport of raw products. To add value, they must progress as centers for small industries that sell value-added finished products. Today’s towns feature exceedingly unappealing living conditions, with their open sewage and garbage disposals, lack of safe water and energy. They do not attract investors and modern bio-industries. Therefore, AmIT sees integrated urban upgrading with locally adapted technologies as an indispensable backbone for Amazonia’s new economy.
  - **Forests and Socio-biodiversity:** traditional and Indigenous knowledge, in combination with modern research and development of new products and markets generating innovative technologies, are at the

heart of Amazonia's new socio-bioeconomy. The sustainable management of hundreds of known products, as the well as in-depth discovery of ecosystemic characteristics in this continent size, the most 'biodiverse region' of the world are tall tasks. The AmIT hopes to accelerate and deepen collaboration among the larger science community, policy and legislative work, and entrepreneurship.

- **Altered Landscapes** – Deforested, degraded, abandoned landscapes, especially in southern Amazonia - require significant research and development foundations for their recovery significant Research & Development underpinnings. The newly launched recovery programs for millions of acres envision reforestation with native species reforestation, as well as investments in diverse agroforestry schemes. Solutions require a combination of traditional communal and high-tech approaches.