ECOLOPES

ECOlogical building enveLOPES: a game-changing design approach for regenerative urban ecosystems

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Action number 964414

D2.4 Second Dissemination and Exploitation Plan

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Abstract

The aim of the dissemination and exploitation plan is putting in place a process to identify, assess, protect, and exploit or disseminate all relevant project results. This report builds on the first draft which was developed in project year one and focusses on refining and improving the plan by incorporating the feedback of the reviewers after year one as well as lessons learned during the implementation of the strategies since the start of the project. Starting from the methodological basics for an exploitation strategy developed in the first year we here present a comprehensive exploitation strategy developed as a joint effort by the whole consortium.

HISTORY

Version	Date	Reason	Revised by
1	31.07.2023	First draft (Ferdinand Ludwig, Anna-Lena Bauer)	
2	07.08.2023	Updated for internal revision	Maria Canepa, Stefanie Schulz, Tanya Saroglou
3	26.09.2023	Integration of comments	Ferdinand Ludwig

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EXECUTIVE SUMMARY

Deliverable D2.4 – Second Dissemination and Exploitation Plan – is the refined version of the First Dissemination and Exploitation Plan (D2.3) and thereby the updated basis for the development of a common dissemination & exploitation strategy in the project. Since the whole consortium is involved in these activities, this is a document for use of all ECOLOPES partners. The deliverable is essential to keep the dissemination, communication and exploitation strategies of the project and to identify in detail relevant stakeholders, adequate dissemination, communication and exploitation measures and materials. This means that this deliverable is alive and will be progressively modified according to the project needs. The results of the strategies implemented will be complementarily made visible every year through the Report on Dissemination and Communication Activities (M12, M24, M36, M48, respectively). In the second year, the focus of activities was on updating the strategy based on the reviewers' feedback after the first year regarding the website and specifying the targets of the social media channels. Furthermore, a strategy for producing videos for different purposes was elaborated. A substantial methodological basis for exploitation of the results was developed.

ABBREVIATIONS AND ACRONYMS

Abbreviation	Description
AEC sector	Architecture, Engineering and Construction sector
CA	Consortium Agreement
EDM	Exploitation and Dissemination Manager
EC	European Commission
IP	Intellectual Property
IPR	Intellectual Property Rights
GA	Grant Agreement
KGF	Knowledge Graph Framework
KPI	Key Performance Indicator
NGO	Non-Governmental Organization
VR	Virtual Reality
WP	Work Package

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1   INTRODUCTION

This is the report for the second project year regarding the development of a common dissemination, communication and exploitation strategy. It presents the updated results of putting in place a process to identify, assess, protect, and exploit or disseminate project results. This includes the refinement of appropriate dissemination channels to define their best use within the ECOLOPES project, the planning and completion of dissemination activities, and the assessment of the dissemination via KPIs. The aim is to fully exploit the project results from both the academic and commercial/economic perspectives, with special reference to ECOLOPES' key outputs. Therefore, potentially exploitable assets and IP arising from the project according to their potential impact at commercial/academic research levels will be identified and categorized. This includes a roadmap for addressing potential intellectual property (IP) issues (e.g., property and intellectual property rights (IPR) distribution among partners).

TUM is the leader of the WP2 about dissemination, communication and exploitation activities. The actions and processes are coordinated with all members of the consortium through the Exploitation and Dissemination Manager (EDM), conformed by one member of each partner and the support of the Communication/Marketing Departments of each organization. The collaboration among the partners is indispensable to develop a meaningful communication strategy that reaches all target groups at the local, regional, European or global scale.

TUM has nominated an Exploitation and Dissemination Manager (EDM) and a contact person from each partner to coordinate the interaction among the partners, implement and monitor the strategy and act as the main contact of reference for media and journalists.

D2.4 is based on the preliminary version D2.3, refining and updating the strategies according to the feedback after year one by the referees as well as our internal feedback regarding the success of the actions taken so far.

2   DISSEMINATION AND COMMUNICATION STRATEGY

The following aims have been identified as common ground for the dissemination and communication strategy in the first year. These have not changed in the second year.

- raise interest and awareness on the ECOLOPES objectives, methodologies, and outcomes among, researchers, practitioners, companies and the public.
- provide visibility of the overall project concept and approach.
- initiate a debate among professional and researchers in the involved fields.
- inform about main project outcomes.
- communicate key features and benefits for potential users of key outcomes like e.g., the simulation environment.
- showcase the results by demonstrating the immediate applicability of ECOLOPES outcomes as effective working tools for the disruptive design of regenerative buildings.
- nudge the emergence of a new community of designers, ecologists, practitioners and other stakeholders.
- increase acceptance for new strategies for ecological buildings amongst the public

2.1   Agile Development of the Dissemination Strategy

The ECOLOPES consortium pursues an agile development of the dissemination strategy. This means that instead of first developing a complete strategy, an attempt is made to reach out to the public as early as possible so that the strategy can be further developed based on the experience gained along the way. The reason for this is that at the beginning of a research project, there is always the difficulty regarding dissemination that no relevant results have yet been produced and thus no specific visual material is available that could be used to address potential target groups and the media. Without relevant results and convincing visual material, the ability to draw attention and interest of a target audience and the public in general is limited. At the same time, however, it is important to build up a network to be able to reach the targeted recipients in a focused manner as soon as there is something to be shown and communicated. In addition, in highly innovative projects such as the ECOLOPES Future Emerging Technologies project, the target groups cannot be precisely defined at the beginning. In the second project year the potential users and target groups became clearer and the strategies, especially regarding social media channels, have been refined accordingly (see chapter 2.8 and 2.9 as well as D2.5 "Second Report on Dissemination and Communication Activities" chapter 3 and 4).

2.2 **Target Audience and Main Actors**

The identification of target groups of the ECOLOPES project is crucial to tailor the messages and dissemination & communication activities to every different group. Each group of stakeholders have different points of interest and demands regarding the project. According to this strategy, messages must be shaped and delivered in an effective manner.

The following main and supporting actors have been identified before the starting of the project and they will be considered at the global, European, national, and regional level. During the development of the project, the ECOLOPES partners will be asked to report about contacts, networking and activities established with these groups:

- Main actors (practical application of design technology in the AEC sector):
    - Architects, engineers, and students of these disciplines.
    - Corresponding professional organizations (e.g., chamber of architecture etc.)
    - Architectural, engineering and environmental consultancy firms.
    - Building industry professionals and corresponding institutions.

- Key supporting actors (general results, insights and awareness):
    - Landscape architects, urban planners, ecologists, local administrations, and municipalities (to systematically integrate the results in a larger scale planning like urban master plans and landscape plans and to exchange experience about social acceptance and potential throwbacks in increasing those).
    - Associations of architects, urbanists, landscape planners and comparable organizations to disseminate project results e.g., via training courses.
    - Ecologists and NGOs on green building councils (to enable regenerative solutions, contributing to protect and restore biodiversity and ecosystems in line with the potential environmental risks outlined in D8.2 "EPG - Requirement No. 5").
    - Environmental medical doctors and wellbeing advocates groups (discussing and developing awareness strategies to reduce human-health related risks emerging from closer human-nature interactions as outlined in D8.2).

- Supporting actors:
    - Other consortia working on green infrastructures in cities e.g. https://www.regreen-project.eu/ (to exchange knowledge and experience about public awareness and dissemination)
    - Experts in public relations e.g., artists (to translate complex scientific and technical content into creative and comprehensive context) or didactic experts

(to prepare powerful and professional communication materials). In this context ECOLOPES successfully cooperated with Miriam Ferstl, an artist, and the TUM ProLehre Media and Didactics Institute.

The already established measures (ECOLOPES TALKS with newsletter registration, social media networks, etc. (see D2.2 'First Report on Dissemination and Communication Activities') will support this task.

2.2.1 Stakeholder Network

Our outreach activities, and in particular our ECOLOPES TALKS continue to attract a high number of interested stakeholders. We have set up a contact management system, using Google Contacts as platform (Table 2.2.1-1). Tagging contacts according to their role within our network (e.g., "consulting firms", "architects and engineers", "ecologists", fig. 6.3.6.-2) allows efficiently contacting stakeholders and amplifying our reach. Emails incoming to our project's address, as well as participants of the ECOLOPES TALKS are being added to the contact management system, and we plan to identify and add further contacts over the course of the next year. Although approximately one third of the ECOLOPES TALKS participants prefers not to provide detailed information, we have gathered a high number of contacts with identified roles, and more importantly, a high diversity of roles. These include not only students and researchers, but also e.g., environmental lawyers, journalists (both filed under "other") and artists. The expanding stakeholder network allows coordinated engagement of key decision makers and outreach activities (see figure 2.2.1 and table 2.2.1-1).
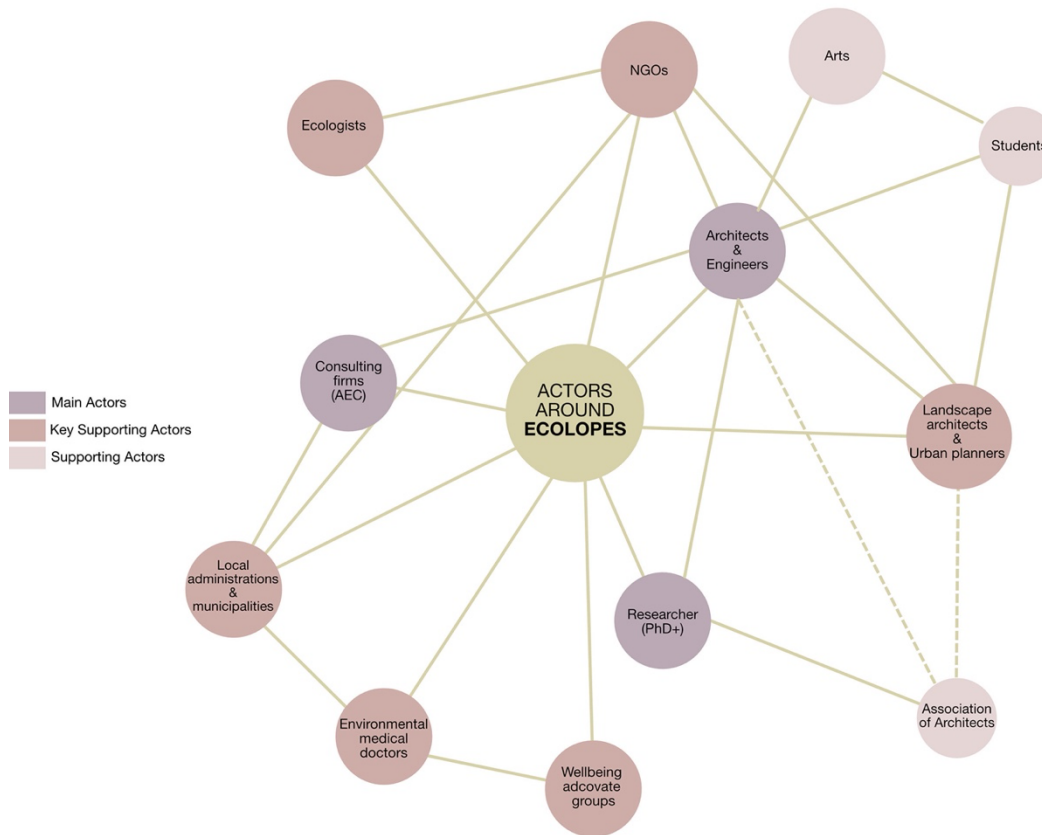
Figure 2.2.1-1. Overview of the stakeholder network. The actors are color-coded according to their role in our network (see deliverable D2.3)

Table 2.2.1-1. List of labels to structure stakeholders in network. Right column: current state of contacts in the corresponding label. Colours correspond to figure 2.2.1-1. (09.2023) Contacts may have multiple roles (e.g., "ecology student"), thus numbers do not add up to 283.

Label	Number
Architects and engineers	69
Researcher (PhD+)	57
Landscape architects	51
Students	47
Ecologists	29
ECOLOPES members	27
Arts	7
Consulting firms	9
Environmental and medical doctors	5

NGOs	2
Other	12
No information provided	96
Total number of contacts	283

2.3 **Dissemination and Communication Policy and Rules and Support of the EU**

The support to the ECOLOPES project by the European Commission must be recognised in all the dissemination and communication tools and materials including the following disclaimer:

This project has received funding from the European Union's Horizon 2020 FET OPEN program under grant agreement number 964414.

Dissemination activities in the ECOLOPES project are deeply connected with the intellectual property (IP) rights protection, which is clearly stated in the grant agreement, article 26 and 27:

- Results are owned by the beneficiary that generates them.
- 'Results' means any (tangible or intangible) output of the action such as data, knowledge or information — whatever its form or nature, whether it can be protected or not — that is generated in the action, as well as any rights attached to it, including intellectual property rights**.**
- Two or more beneficiary's own results jointly if they have jointly generated them and it is not possible to establish the respective contribution of each beneficiary, or separate them for the purpose of applying for, obtaining or maintaining their protection.
- The EU may assume ownership of results to protect them, if a beneficiary intends to disseminate its results without protecting them.
- Each beneficiary must examine the possibility of protecting its results and must adequately protect them if the results can reasonably be expected to be commercially or industrially exploited and protecting them is possible, reasonable and justified.

2.4 Publication Policy

It is expected that ECOLOPES develops a significant amount of research results which will be disseminated to different key scientific communities. It is relevant for the Consortium that research results will be published and exploited, therefore the Consortium agreed on and invites the involvement of all the participants as potential authors and contributors, establishing a publication workflow, to define how to proceed. A detailed data sharing and publication policy is currently being developed.

Any member that plans to publish a paper or contribute to a scientific conference should send an email to all other members to inform them of his/her intention. In this way, the consortium is given the chance to contribute to the work or raise objections. Regarding papers the draft should include an abstract, an author list, the submission deadline, and some additional information using a template developed by the consortium (Paper proposal ECOLOPES.doc, see Annex). Members of the consortium can voice their interest to take part in the paper and negotiate with the original authors their role in the planned paper. If the potential author and the original authors cannot agree, the Data use and publication board will be consulted to mediate a solution. Before submission, the full paper needs to be circulated among the members of the consortium and members should be given at least ten days for any comments they would like to make on the paper.

2.5 Visual Guidelines and Corporate Identity

Visual guidelines and a Corporate Identity have been developed in the first year of the project. The Corporate Identity, including the logo, used colours, fonts etc. are documented in D2.2, "First Report on Dissemination and Communication Activities". In the course of the redesign of the website the guidelines were updated, as reported in D2.5 "Second Report on Dissemination and Communication Activities". Templates for deliverables and presentations have been developed, as already reported in D1.2 "Preliminary Project Management and Risk and Quality Assurance Plan". Their corporate identity and design were further refined throughout the second year with some minor adjustments regarding the font and the halftone raster used for photos as documented in D2.5 "Second Report on Dissemination and Communication Activities". In general, the corporate identity was successfully established within all means of media, leading to a high visual recognizability.

2.6 KPIs and Monitoring

TUM is continuously compiling all the information about the dissemination activities as well as the impacts on media and the distribution of the communication materials in the regular

meetings of WP2, taking place every first Monday of a month. The set dissemination KPIs and the current state are reported in D2.5 "Second Report on Dissemination and Communication Activities".

2.7 Key Dissemination and Communication Channels and Activities

The following list shows the updated dissemination and communication channels and activities that had been refined within the second year of the project:

- Publication in peer-reviewed scientific journals (e.g., Agathon, Anthropocene, Building and Environment, CAD, Cleaner production, Design & Building, Ecological Engineering, Ecological Indicators, Landscape and Urban Planning, Paysage, Urban Forestry & Urban Greening, Urban Ecology, Urban Ecosystems, People & Nature, Science of the Total Environment) to reach the specific academic audience of the involved disciplines.
- Publication in professional journals, books, book series etc. (e.g., Elsevier, Wiley, Springer series, etc.) to reach the wider academic and professional audience.
- Project website with description of project goals in written form and via videos, platform to access project publications, documentation of ECOLOPES TALKS, integration of social media channels and overview of team members for immediate access to a wide audience, informing on project goals and results.
- Social media and networks: Facebook, Instagram, LinkedIn, for outreach to intended users and those interested in our technology from our specific target industry and target regions. (see section 2.9)
- Conferences (e.g., International Congress of Ecology (INTECOL), International Plant Sciences Conference (IPSC), Nature-based Solutions Conference; IFLA Europe, Word Green Infrastructure Conference etc.) to directly engage with academics of the involved fields and to get direct feedback.
- Exhibitions (e.g., Ecobuild, London; Barcelona Building Construmat, Barcelona; World Architecture Festival, Copenhagen Architecture Festival; Remtech EXPO, Ferrara; Architecture Bienniale Venice) to engage with architects, designers, planners, and the real estate business.
- Press releases when major milestones are achieved to inform the general public.
- Workshops for demonstration and testing of ECOLOPES tools among potential target users (professionals, researchers, students).
- Short videos and promotional material (pdf-documents, summaries, digital presentations)
- Public events (lecture series, seminars, fairs, communication and science festivals and exhibition).

In the second year, we refined our focus on the different social media channels. Short videos have been identified as a promising promotional material.

In the following the specific strategies and organization of the different channels are described in more detail.

2.8 Website

The Website was redesigned and relaunched in March 2023 in order to create a more agile and user-responsive web experience. The adaptations are documented in D2.5 "Second Report on Dissemination and Communication".

Withing the scope of the website relaunch, the opportunity was taken to decentralize the Webmaster of the website. Instead of TU Vienna, there is now at least one responsible person with an account in each institution. The main responsible institution for the website is TUM.

To ensure a flawless transition, the website address did not change: www.ecolopes.org

Google Analytics was also set up for the new website so there was no loss of data about user activities on the website. The current state with respective metrics is presented in D2.5. "Second Report on Dissemination and Communication Activities".

The website aims to introduce the project and its various activities, including not only the project itself, but also the profile and motivations of the involved researchers. It allows for a differentiated communication and different levels of detail with the opportunity to convey contents in detail, which is planned to be done with summaries of outcomes as presentations and posters.

2.9 Social Media

TUM is responsible for the management of the ECOLOPES Facebook and Instagram channels. Facebook and Instagram are managed by the meta-business-suite. TU Vienna and UNIGE are responsible for the LinkedIn site. All partners must collaborate by mentioning the respective ECOLOPES sites/channels, sharing/retweeting the messages about the project and sharing publications on LinkedIn.

Based on the key strategy developed in the first year, all partners are actively involved in the dissemination of the content. To maximize the impact of the project on social media channels, images, GIFs and videos are created and shared with all the partners. There is one responsible person in every institution to send content to the project's Social Media Team at TUM, which collects and schedules the posting of the content. Ideally, every institution delivers five pieces of content every month, can range from photos, links, publications and other graphics. The

monthly WP2 Meeting is used to track if all institutions participate sufficiently in the content creation.

In the following, the current state of the strategies and organization of these three channels is summarized. The current state and the activities undertaken so far regarding all channels are presented in D2.5. "Second Report on Dissemination and Communication Activities". To avoid duplication and to keep this report compact, screenshots and examples of posts etc. are only shown in D2.5.

2.9.1   Facebook

As defined in D2.3 "First Dissemination and Exploitation Plan", Facebook is a platform that allows to share different kinds of media in varying levels of depths. Since this platform relies on fast-paced consumption, posts with a lower level of depth are more suitable. The main objective has thus been further defined as vast and non-specialized media strategy to raise awareness on ECOLOPES' holistic approach, a non-anthropocentric view and new ways of living. The audience is therefore rather broad, ranging from common people to targeted pages and groups, mainly reached via ECOLOPES-related groups. Posts include events, lectures, activities, publications; thereby focusing on visual inputs.

The Facebook address is: www.facebook.com/ECOLOPES.ORG

2.9.2   Instagram

Since the launch of the project's Instagram channel, great emphasis has been laid on a coherent visual appearance to build a strong visual character linked to the project. Similar to Facebook, media input should rather be on a lower level of depth. The strategy for Instagram hence follows the same main objective as Facebook, with the addition of a closer communication with the artistic and visual disciplines, ultimately leading to synergies. The target audience therefore comprises besides common people also editors, museums, universities, event planners and opinion leaders. Only visual content about events, members, lectures and activities is shared as a post, while links or publications are shared as an Instagram story.

The Instagram address is: www.instagram.com/eco_lopes/

2.9.3   Twitter

Since Twitter was undergoing substantial organizational issues and was not reliable as a dissemination channel we decided – as already announced in the report of year 2 - to cancel our twitter account.

2.9.4 LinkedIn

While LinkedIn is suited for both visual and written content, the objective of the platform is more tightly defined since it specifically aims to connect people in a professional context. The project therefore aims to reach a specialized and professional audience with a targeted communication that helps to create synergies with researchers, companies and other projects. In particular, LinkedIn is used to raise awareness of the project's novel technology of ecological modelling in architectural design. The professional audience targeted via LinkedIn are i.e., practitioners, researchers, educators, municipal planners and Rhino users in architecture, landscape architecture and urban design.

2.9.5 Dissemination Objectives across social media Channels

Table 2.9.5-1: Overview of social media strategy for every channel

|	Facebook	Instagram	LinkedIn	Website
Goals & objectives	reach a vast and even non-specialized public to raise awareness of ECOLOPES' main topics	reach a vast and even non-specialized public, with communication close to the artistic and visual disciplines	reach a specialized and professional audience, with targeted communication, creating synergies with researches, companies and activities; spread the message of ecological modelling for architectural design	detailed introduction of the ECOLOPES project and its various activities, including not only the project itself, but also the profile and motivations of the involved researchers; differentiated communication and different levels of detail with possibility to convey contents in detail
Audience	common people, targeted pages, targeted groups	common people, firms, companies, research groups, editors, museums, universities, events planners, opinion leaders	professionals, researchers and educators in the AEC sector; governance and municipal planners; Rhino users AEC	a general and specialized audience: AEC, researchers, ecologists, developers, students, municipalities, decision-makers, representatives from neighborhood initiatives, public conservation agencies
Message	holistic approach, non-anthropocentric view, new way of living	holistic approach, non-anthropocentric view, innovative visions and design in technology, urban planning	Consideration of the novel concept/technology in urban planning/design	Presentation of all aspects of the project including people involved, institutions, publications, lectures, developments, also public deliverables and events
Content	events, lectures, activities, disseminations	events, people involved, lectures, activities, disseminations, design		

2.10 Communicating Materials

Videos featuring the team have been identified as a key medium to transmit the project's objectives and methods. We have conceptualized three types of videos tailored for students and PhDs, PostDocs and institutions, ranging from semi-formal to formal and professional.

We encourage the students and PhDs to use the semi-formal format to produce quick and effective videos for publishing online. This involves preparing a personal video focused on individual and group engagement with the project and experience, featuring researcher(s)/PhDs, student(s), team(s), work item(s) and event(s) in their chosen workplace. The video can be about individuals or groups and can feature events, experiments, meetings, studio presentations of interest and can document lab work. It can be executed as an interview. As described in D2.5 two videos have been produced and two are currently in production.
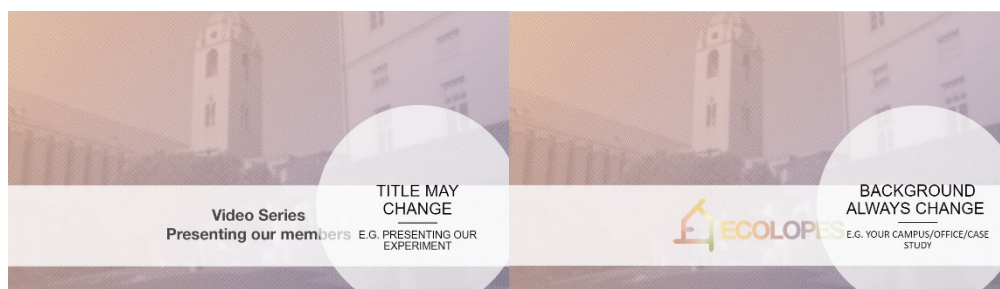
Figure 2.10: Screenshot of the repeating elements of the short videos

The formal and professional format is conceptualized to feature the overall project team, general concept, aim and results. As described in D2.5 this format was used to produce the video "About ECOLOPES" at the general meeting in Genua.

The concept for further communication material (short presentations, leaflets etc.) is currently under development. The aim is to provide digital material for download on our website that summarized the scientific findings for a general audience.

2.11 Public Events and Exhibitions

The aim of ECOLOPES public events and exhibitions is to showcase our research results to a broader audience and to foster interdisciplinary networking amongst all relevant disciplines. To start a dialogue with our stakeholders, we decided to develop the ECOLOPES TALKS series as a platform for presentation exchange and discussion. This is planned to pave the way for developing further activities like exhibitions in the field of architecture and ecology (see D2.5 "Second Report on Dissemination and Communication Activities").

3 EXPLOITATION STRATEGY

The exploitation strategy of ECOLOPES provides the basis for a future exploitation of the generated results. Main guidelines for the exploitation and the handling of intellectual

property (IP) are documented in the Consortium Agreement and the Grant Agreement. A very important general rule is that no IP will be disclosed to the public before undergoing formal exploitation and protection assessment.

According to article 28 of the Grant Agreement (GA) each beneficiary must take measures aiming to ensure 'exploitation' of its results by

- using them in further research activities (outside the action).
- developing, creating or marketing a product or process.
- creating and providing a service.
- using them in standardization activities.

Regarding IPR policies for knowledge protection we build on the following procedures and principles which have been implemented at the General Assembly in Genoa 2023:

- WP leaders periodically identify and monitor the protectable project outcomes within their WP by analyzing all results with potential commercial application, including their ownership and IP rights, and planned actions for protection and commercial exploitation.
- WP leaders periodically report these findings to the EDM.
- Based on this, the consortium elaborates in yearly workshops taking place at the general Assembly an overall IP Strategy.
- From this the consortium determines the potential for innovations and subsequent market exploitation potential.
- Together with the representatives of the partner institutions the EDM constantly monitors the status of the exploitation of the results.

3.1 Exploitation Methods and Systematic

Exploitation is a specific term for the H2020 Programme, and it means "to make use of the results produced in an EU project in further activities (other than those covered by the project, e.g., in other research activities; in developing, creating and marketing a product, process or service; in standardisation activities)." (European Commission 2018) Within the project, an exploitation strategy will be developed by all partners to identify the potentials for exploitation and application of the results in different societal fields for different users. In order to achieve this, the exploitation potentials in different social fields are first explored and defined. The exploitable key results are blended with the potentials, positioned in the social fields and thus sharpened. With the help of this blending, the relevant stakeholder groups can be precisely identified according to the exploitable key results. (cf. iSCAPE 2019).

An Exploitation Workshop was held at the General Assembly 2023 to identify the exploitable key results and position them in the societal fields and to identify relevant stakeholder groups

accordingly. The workshop is documented in detail in the annex (chapter 6.2). The exploitation strategy is structured as shown in Figure 6.4-1. In the following we report on the current state of the strategy in regard to commercial, political, scientific, educational and societal assets.
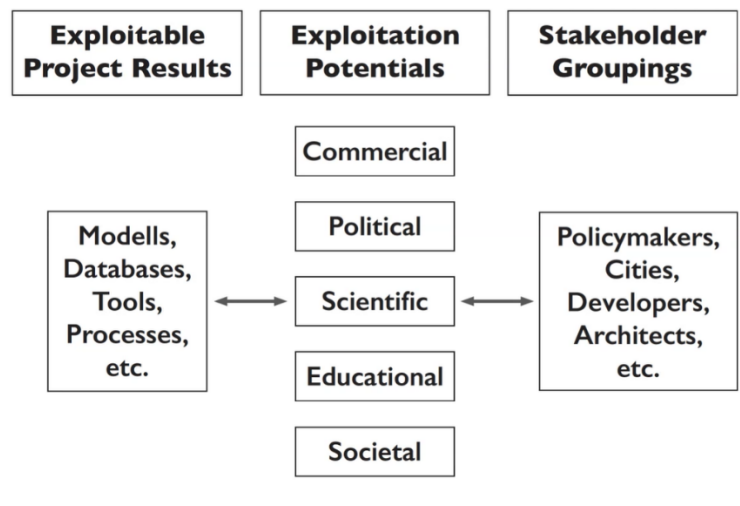

Figure 6.4-1 Structure of the Exploitation Strategy (cf. iSCAPE 2019)

3.1.1 Commercial Exploitation Potentials

For a potential commercial exploitation four fields of actions were identified by the consortium while processing the EC Innovation Radar:

A. ECOLOPES Multispecies Design Workflow for regenerative urban ecosystems
The ECOLOPES Multispecies Design Workflow makes it possible to integrate non-human stakeholders (plants, animals, microbiota) and their interaction with each other and with the built environment of humans in planning and design processes of architecture. Architectural design processes are thereby expanded from an anthropocentric to a multispecies perspective. The new design workflow enables and organizes the cooperation of the disciplines to be able to take a multispecies perspective when planning architecture: architecture, biology and landscape planning. The new design workflow creates the procedural framework for linking the various methods, ways of acting and technical language of the disciplines into a common routine that can be offered as a methodically stringent planning service and as a novel contribution to the field of ecology-led design. The new Design Workflow is closely linked to existing planning processes and design workflows in architecture, so that the change to a multispecies perspective can be completed without major procedural breaks in architecture.

B. ECOLOPES Urban Landform Framework for Interdisciplinary Trans-scalar Urban Planning and Architectural Design. The conceptual and methodological framework links planning and design scales and associated interdisciplinary datasets with particular focus city-nature and architecture-ecology relations. It enables shifting from the current understanding of urban form (urban morphology) as a set of discrete systems (i.e., infrastructure) and objects (i.e., buildings) that foreground divisions to an understanding urban form as landform, as continuous terrain with distinct features that serves connectivity analysis, planning and design on multiple scales and long-term accumulative changes of the city fabric and its consequences for urban environments and urban ecology. It makes it possible to develop a "topographic pattern" (extension and adaptation of the "geomorphon" approach presented by Jasiewicz and Stepinski 2013) and a computational algorithmic toolset for modelling urban landform in a CAD environment to facilitate analysis, simulation and evaluation of diverse city-nature and architecture-ecology relations.

C. ECOLOPES Design Platform and front-end toolset (stand-alone/or plug-in) The design platform translates the conceptual framework into a computational framework and integrates the knowledge generation framework to enable a knowledge driven design process for the development of urban building envelopes. It is an open access design platform for generating, analysing and optimizing building envelopes that are developed based on combined knowledge from ecology and architecture. It integrates ecological modelling into a 3D CAD environment. The cloud-based platform integrates all technical components such as open and expert datasets, the Ecological Model, the Knowledge Base, an Ontology, KPIs, as well as algorithms for Design Generation and Optimization. The Front-end is a ECOLOPES Grasshopper plugin developed by McNeel that allows designers to base their design decisions on ecological analysis results and the sustainability rating system (see D3.3. 'Interim ECOLOPES Platform Architecture').

D. ECOLOPES Sustainability Rating System. The ECOLOPES Sustainability Rating System allows to evaluate building projects from a nonhuman perspective. It evaluates the positive and negative impacts of a project for human and non-human stakeholders (plants, animals, microbiota), considering their relation to each other, e.g., human-nature interaction. Thus, it allows to rate projects from a multi species perspective. It is a novel tool for decision makers involved in the design, planning and implementation of buildings, specially building envelopes. It can be closely linked to existing rating systems and opens new applications for those (such as e.g., LEED, DGNB, living building challenge).

During the exploitation strategy workshop in Genova, participants delved deeper into the potential exploitation opportunities for ECOLOPES within various commercial sectors. The focus of this exploration centred on identifying fields for commercial utilization and elucidating the key results that can be capitalized upon. The overarching goal of commercial exploitation is to facilitate the seamless integration of ECOLOPES into architectural and planning practices, construction industries, commercial research initiatives, and professional

education and training programs. Presented below are the identified fields and their respective associated outcomes.

Four distinct fields of commercial exploitation have been identified:

Open-Source Software for Architecture and Planning

- The development of an open-source ECOLOPES Grasshopper plugin, allowing real-time ecological analysis in CAD software.
- A Knowledge Graph (KG) dataset, adhering to FAIR principles, fostering collaboration and innovation.

Architectural Engineering and Construction

- The introduction of an ECOLOPES Façade System designed to reduce energy consumption and provide habitats while promoting building efficiency.

Commercial Research

- An ecological model in C++ for use within CAD systems, enabling architects and engineers to optimize designs.
- The development of an open-access design decision-making tool, providing practical and theoretical knowledge.

Professional Education Training

- The establishment of an ecological-focused curriculum, offering interdisciplinary courses and workshops.
- The development of a workshop series, targeting citizens and decision-makers to increase environmental awareness and ecological education.

The identified projects have varying timelines for implementation:

- Short-term projects include the Grasshopper plugin and the KG dataset.
- Mid-term projects encompass the ecological model and the ECOLOPES Façade System.
- Long-term initiatives involve the development of the design-making decision tool.

Key Clients

Key clients for these products and services include architectural firms, engineering companies, research institutions, and professional education providers. Architects, engineers, researchers, and students will benefit from the enhanced ecological design capabilities offered by ECOLOPES.

3.1.2 Political Exploitation Potentials

In the pursuit of promoting the ECOLOPES city scheme, the political domain, which closely intersects with the social realm, presents unique challenges and opportunities. This endeavour requires addressing various facets of urban life, including the urban landform, the empowerment of citizen stakeholders, and the introduction of urban natural welfare packages. The overarching aim is to weave ECOLOPES seamlessly into the fabric of urban governance and policymaking, despite the constraints of short electoral terms.

In the exploitation strategy workshop in Genoa three key political objectives, each with a different time horizon, that the Consortium envisions as attainable through the implementation of ECOLOPES results were identified.

Short-term

- New Knowledge Propagation: propagate innovative multidisciplinary knowledge and methodologies.
- New Approach Adoption: introduce a novel approach to urban planning and development.
- Decision-Making Tools: develop and provide decision-making tools for urban planning.

Mid-term

- Interdisciplinary Emphasis: foster a culture of interdisciplinarity in urban planning.
- Evaluation Framework: establish appropriate evaluation and classification systems.
- Public Awareness: illustrate to the electorate the tangible benefits of the ECOLOPES concept, including its positive impact on local climate and urban planning.

Long-term

- Ecolopisation Index: develop an urban "ecolopisation index" that showcases the interaction between geodiversity and biodiversity.
- Extended Training and Tools: provide additional training and tools to support the long-term integration of ECOLOPES.

Key decision-makers

Key decision-makers in this context encompass policy advisors with a longer-term perspective, various administrative levels (European, national, municipal), non-governmental organizations, associations, local communities, and neighbourhood groups. The strategy for promoting the ECOLOPES concept involves a combination of bottom-up and top-down approaches to ensure its longevity beyond short electoral terms.

In a dialogue with political decision-makers, questions arose concerning the normative and legal aspects, the initial steps for implementing *ecolopes* in a city, the proposed urban ecolopisation index, and the financial considerations. The discussion emphasized the potential

for normative shifts, highlighting examples such as rivers being granted legal personhood and ecosystem rights being incorporated into constitutions. Additionally, it emphasized the importance of demonstrating the benefits of ECOLOPES to citizens and local leaders, considering both cost-effective and more expensive solutions.

3.1.3   Scientific Exploitation Potentials

In the exploitation strategy workshop in Genoa three distinct projects focusing on ecological modelling, the integration of ecology and architecture, and the long-term effects of biodiversity on human health in urban environments for a future research agenda for ECOLOPES were identified. These projects offer valuable scientific insights and interdisciplinary collaboration opportunities. Funding will be pursued through various programs and agencies, and key stakeholders include research teams from different departments and external funding bodies.

Research Agenda for ECOLOPES

Ecological Model (Short Term)

The ECOLOPES research project aims to develop a ground-breaking ecological model that integrates biodiversity across various trophic levels. This unique model can be applied to diverse ecosystems, such as urban and tropical environments, offering new insights. It serves as a platform for interdisciplinary collaboration with physicists and computer scientists to enhance the model's accuracy. Funding for further research can be pursued through national basic research agencies. Key partner: Physics and Computer Science Departments.

Linking Ecology and Architecture (Medium Term)

Our project presents a distinctive opportunity to bridge ecology and architecture. We plan to expand upon this by developing an ontology and generative design tools, potentially incorporating AI for an advanced Knowledge Generation Framework (KGF) in ecological decision-making. This research holds significant importance for urban planning and economics. Additional funding will be sought from programs like FET+. Key partner: Architecture and AI Research Teams.

Human Health and Biodiversity (Long Term)

In our long-term research project, we will explore the relationship between improved biodiversity in urban environments and human health. This investigation will require a minimum of 20 years to assess the effects properly. We will consider the socioeconomic benefits, including reduced healthcare costs for issues like allergies or circulatory diseases. Collaboration with epidemiologists, computer scientists, medical professionals, and biologists is crucial. Funding opportunities include Horizon and RIA. Key partner: Medical and Biological Research Teams.

Key Funding Providers

- National Basic Research Agencies
- FET+ Program
- Horizon Program
- RIA Program

3.1.4 Educational Exploitation Potentials

The exploitation of educational potential was a key focus of the consortium since its inception. All university partners make excessive use of the possibilities to test preliminary results and to explore potentials of the ECOLOPES conceptual approach and tools in different teaching formats. In the exploitation strategy workshop in Genoa, the consortium identified following educational exploitation potentials: The prospective educational approach is dedicated to cultivating environmental awareness and nurturing interdisciplinary collaboration. Their progressive course offerings will evolve over time, accommodating the development of educational content. This initiative targets a diverse audience, including students, citizens, practitioners, and decision-makers, with a primary focus on advancing cohabitation principles and ECOLOPES concepts. The organization also commits to integrating vital elements of environmental stewardship and ethical considerations into its educational approach, aligning seamlessly with the overarching goal of fostering sustainable living within harmonious coexistence.

Teaching Vision

The educational approach and program aim to foster environmental awareness across various sectors, promoting interdisciplinary communication among students from diverse disciplines. It seeks to bridge the gap between research and design by involving practitioners, providing practical and theoretical knowledge. A global network of universities will collaborate on research and practice. Three approaches were developed for the teaching program in the workshop.

Course 1 – "Ecolopia" (Short Term)

A multidisciplinary course catalogue encompassing ecology, business, and design, with bridging courses connecting different disciplines. Initial implementation within participating faculties, with potential expansion to other universities later.

Course 2 – "Go Eco Workshop Series" (Medium to Long Term)

Workshops targeting citizens and decision-makers, offering tools to understand concepts like circular economy and multi-species cohabitation. Gradual inclusion of in-person workshops, field trips, and involvement of decision-makers and consultants in the long term.

Course 3 – "Protolopes" (Long Term)

Interdisciplinary summer school bridging practitioners and academia. Encouraging practitioners to engage with scientific content and researchers with practical applications. Students earn ECTS credits.

Key Audiences

- Students and teachers from primary, secondary, and higher education.
- Citizens with varying backgrounds and levels of environmental education.
- Residents of *ecolope* buildings needing management and utilization knowledge.
- Practitioners.
- Decision-makers, including consultative roles in parliaments.

3.1.5 Societal Exploitation Potentials

In the exploitation strategy workshop in Genoa, the consortium identified following societal exploitation potentials: In a proactive endeavour to extend the influence of the ECOLOPES project, it would be helpful to foster the creation of an NGO. The primary goal of this potential initiative would be to inspire architects to incorporate ECOLOPES into their building designs. The envisioned initiative holds a broader, long-term vision of cultivating a widespread ECOLOPES movement, uniting individuals who share a common aspiration for harmonious coexistence among humans, animals, and plants through seamless integration into architectural structures.

Key Exploitable Project Results

The initiative benefits from the ECOLOPES project's outcomes, notably 3D simulations of *ecolopes* in both virtual reality (VR) and physical models, along with informative building blocks. These tools serve to illustrate which plant and animal functional groups can potentially inhabit specific building structures. The data utilized in these tools is drawn from the Knowledge Graph Framework (KGF), enhancing public awareness of the organisms suitable for habitation. Additionally, the initiative employs various media, such as models, plans, mock-ups, and engaging discussions, to foster the growth of a thriving *ecolope* community over time.

Demands for Urban Development/Architecture

Short Term: The initiative advocates for the immediate integration of *ecolopes* into new urban designs, with an emphasis on promoting plant diversity for aesthetic enhancement.

Medium Term: There is a call for retrofitting existing buildings with *ecolopes*, focusing on urban biodiversity enhancement and improved air quality.

Long Term: The initiative seeks to influence the formulation of citywide policies mandating *ecolope* inclusion in all construction projects, ensuring a harmonious coexistence between nature and urban environments.

Key Target Groups

The potential initiative is poised to engage a diverse audience, encompassing citizens of all age groups, regardless of their political affiliations or family statuses. To effectively connect with the public, a range of formats is envisioned, including exhibitions featuring *ecolopes*, the development of a user-friendly app for *ecolope* design around existing structures, complete with KPI insights, dynamic social media campaigns, market stands, urban biodiversity walks, and more. Collaboration with the biophilic city movement and other ecological architecture and design communities, including those led by Timothy Beatley, would be instrumental in extending the initiative's outreach. Together, they aspire to drive the transformation towards more sustainable, biodiverse, and harmonious urban environments.

4 CONCLUSION AND OUTLOOK

By jointly working on the dissemination and exploitation strategy in the first two year of the project, we were able to

- Provide a foundation for the successful launch and establishment of our social media channels
- Redesigned and restructured our website after the first year
- Identified important target groups and procedures for dissemination.
- Started to set up a stakeholder network with contacts of key and supporting actors.
- Structured and elaborated an exploitation strategy.

As important next steps in the second project year

- Refining the exploitation strategy and adjust it to project outcomes
- Constantly documenting exploitation potentials
- Scaling up the stakeholder network

5 REFERENCES

Garayoa, S., Sala, C., Casado, L. (2020): Namia Dissemination, Communication and Exploitation Plan (EU Grant Agreement Nº 875629)

6 ANNEX

6.1 Paper Proposal Template

Paper proposal
by: Maria Canepa, Wolfgang W. Weisser *02.01.2022*
Title of paper
please put here a title of the paper
Authors
please list all people that will be authors
Journal
please list the journal for which the paper is intended
Submission date
please list the likely submission date
Abstract

please write the abstract

Data used
please name the data that will be used

Methods used
please describe the approaches/software/analyses methods that will be used in the paper

| **Results** |

please list expected results
Figures
please give a preliminary or expected figure
Call for paper
If the paper is written in response to a particular call for papers, please note the link to this call

6.2 Documentation of the Exploitation Workshop

The workshop took place on April 18, 2023, as part of the General Meeting in Genoa. It was organized and moderated by Thomas E. Hauck (SAAD). The workshop's objective was to explore the potential for utilizing the results of ECOLOPES in the five identified societal sectors: Economy, Politics, Science, Civil Society, and Education. This was done through group work, with five separate groups corresponding to the societal sectors. Representatives from the consortium partners were included in each group whenever possible. Members of the two SMEs were assigned to the Commercial Exploitation Potentials group. The five groups had 40 minutes to discuss three questions and prepare their presentations. Each presentation, including some follow-up questions, was allocated 10 minutes. The groups discussed the questions, and the results were subsequently presented in the plenary session. The presentations and discussions were concluded with a brief summary of the results by the moderator.

Workshop Results

3.2.1 Commercial Exploitation Potential
Presented by Verena Vogler
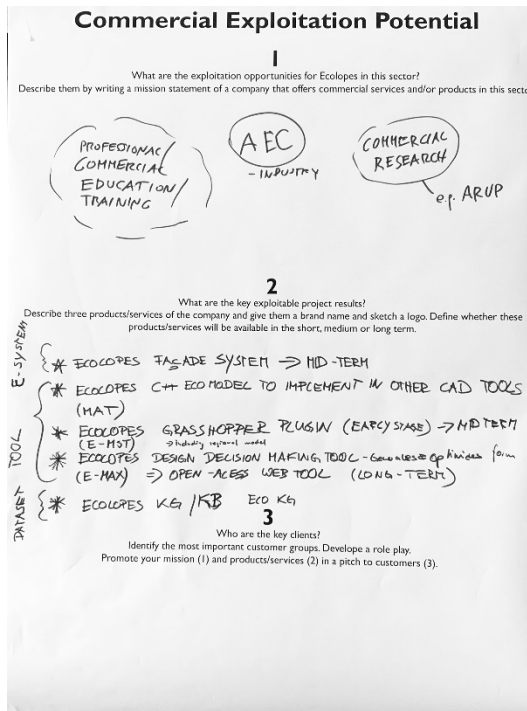
1. What are the exploitation opportunities for ECOLOPES in this sector? Describe them by writing a mission statement for a company that offers commercial services and/or products in this sector.

    Several fields of commercial exploitation potentials were identified:

- open-source software products for the commercial field of architecture and planning
- architectural engineering constructing industry (AEC)
- commercial research that is like our own
- professional commercial education training industry (Professional training for employees of companies and authorities)

2. What are the key exploitable project results? Describe three products/services of the company and give them a brand name and sketch a logo. Define whether these products/services will be available in the short, medium or long term.

    4 product groups were identified:

- Short-term:
o Ecolopes Grasshopper plugin in the app store (Food4Rhino) that makes ecological analysis available in CAD. Every design can be checked for its impact on the ecological community.
o Ecolopes knowledge base as a dataset. Name: eco KB
o Knowledge graph (GraphDB) that will be improved. It includes the interactions between species, land-use, and architecture. Data is produced following the FAIR principles. Others can build on top of our knowledge graph and add information.

- Mid-term: Stand-alone ecological model in C++ that can be included in other CAD systems – name: E-MAT.
- Mid-term: Ecolopes façade system that reduces energy consumption, that provides habitats for animals, that reduces heat within the building, etc.
- Long-term: an open-access web-based easy-to-use design decision making tool. Includes design and optimization processes. As an open-access web tool with a user-friendly surface. Overlap with the societal sector. Name – E-MAX

3. Who are the key clients? Identify the most important customer groups. Developa role play. Promote your mission (1) and products/services (2) in a pitch to customers (3). See 1.

Questions and Answers

Q: What products can we sell to environmentally conscious consumers?

A: Our stakeholders are the industries, not the end consumer. Our exploitation potential nevertheless works as a business case. The architectural engineering construction sector is under pressure due to its currently very high climate impact. At the moment, the tools are missing to address this issue, but the industry wants to change their image. We are providing a tool that helps to reduce the environmental impact of the sector. We try to make the ecological development of buildings a business case.

Q: I work for a small consultancy firm called SAAD. How much will it cost us to use your software products?

A: The software will be open-source and free.

Q: Will I be able to use the software on my computer with normal computational power? So, are your open-source products really accessible?

A: The design-decision webtool is accessible without learning software and low local computation power. It serves as a viewer for design. The earlier stages of the software products are less accessible.

Q: I have a small architectural practice. How can we learn to use your tools? Do you sell training, or do I need to train my employees?

A: We do not sell training. You can become an expert by using our tools yourself. The idea is that some people learn to use our tools and then sell the consultancy.

3.2.2 Political Exploitation Potential
Presented by Michael Hensel
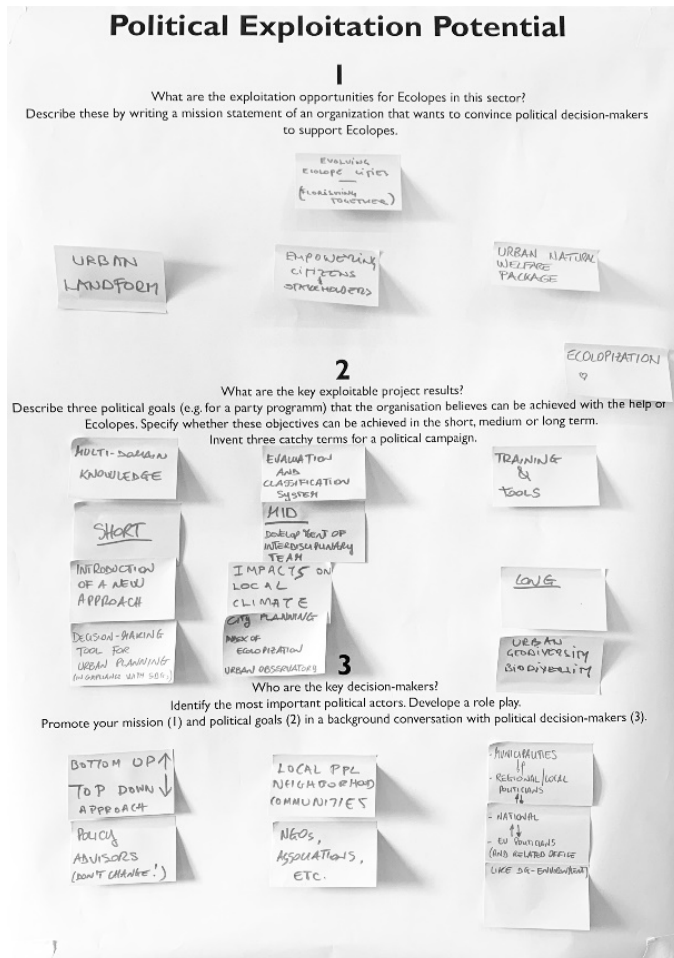
1. What are the exploitation opportunities for ECOLOPES in this sector? Describe these by writing a mission statement of an organization that wants to convince political decision-makers to support ECOLOPES.

   The political domain has a strong overlap with the social one. A difficult issue is how to address a long-term political objective when you have short elective terms. Our goal is to promote the ECOLOPES city scheme.
   A political ECOLOPES strategy has to address different aspects of the city:
   - urban landform
   - empowerment of citizen stakeholder
   - urban natural welfare packages

2. What are the key exploitable project results? Describe three political goals (e.g., for a party program) that the organization believes can be achieved with the help of ECOLOPES. Specify whether these objectives can be achieved in the short, medium or long term. Invent three catchy terms for a political campaign.

Short term:

- offer multi-domain knowledge that is new and that can be brought forward.
- Introduction of a new approach
- train and provide decision-making tools for urban planning

Mid-term:

- develop theme of interdisciplinarity
- address appropriate evaluation and classification systems
- Show the electorate how progress is made, like showing the positive impact of the ECOLOPES concept on local climate.
- Show positive effect of "ecolopisation" on urban planning

Long-term:

- develop urban "ecolopisation index". Show the interaction of geodiversity index and biodiversity
- provide more training and tools

3. Who are the key decision-makers? Identify the most important political actors. Develop a role play. Promote your mission (1) and political goals (2) in a background conversation with political decision-makers (3).

Key decision-makers are: policy advisors that are less dependent on short-term elective terms; Administration on different levels (European, national, municipality …); NGOs, associations, etc.; local people, neighborhoods, communities. For the promotion of the ECOLOPES concept, bottom-up and to-down approaches are necessary because political terms are short and the pressure to follow this concept should be longer than the elective term. Support for the ECOLOPES concept from the different administrative levels and an exchange between the departments.

Questions and Answers

Q: When I presented at a conference, a lot of feedback from the audience was normatively driven and not technically. Is there a way to foster the political movement as lawyers for ECOLOPES?

A: Something like this is already happening – for example in New Zealand where a river received personal rights. Or like putting ecosystem rights in the constitutions or the right to ground to multi-stakeholders. There are increasingly more EU directives on the subject that we could relate to.

Q: I am mayor of the Berlin and I want an *ecolope* in Berlin. What should happen first?

A: We should first make an inventory of the buildings that will be replaced soon and where we could build the first *ecolopes*. Then we will create evidence for the importance of our approach by showing how this benefits the citizens. That will then help you to be re-elected.

Q: What about this urban ecolopisation index?

A: We can soon have that index.

Q: Where do we get the necessary amount of money?

A: It is possible to have a low-cost solution. However, it might be better for you if you would like to be re-elected to consider the more expensive solution because the feedback of the electorate will be very positive, and the re-election is more probable.

3.2.3 Scientific Exploitation Potential
Presented by Michael Schloter

1. What are the exploitation opportunities for ECOLOPES in this sector? Describe this by writing the research agenda of a university that wants to convince funding bodies to fund further research on ECOLOPES.
   See 2.

2. What are the key exploitable project results? Describe three research projects that the university intends to submit for follow-up funding based on the results of ECOLOPES. Indicate whether these research projects can start in the short, medium or long term. Identify relevant project partners. Invent three catchy project titles (including acronyms) for the research proposals.

- Ecological model: basic science. first model that combines biodiversity on different trophic models. There are no other models like this
o model can be applied to different ecosystems, e.g., urban or tropical ecosystems to understand them better
o a showcase for other research in life sciences and applicable to other scientific projects
o contact to physics and computer sciences to improve the model
o further research based on the ecological model could be funded by basic research funding like national funding agencies
o better understanding of urban ecosystems
o water model

- Link between ecology and architecture: this is unique to our project
o Our project is a showcase for linking ecology and architecture
o Further development of ontology and generative design
o Can be further developed by using AI and have a more advanced stages of KGF for ecological decision-making
o It is very important for urban planning and economists
o Apply for additional funding, e.g., FET+

- Human health: expectation that improving biodiversity improves human health in urban environments
o only measured on the long term – minimum over 10 years
o *Ecolopes* have further socioeconomic profit and costs – like reduced health costs for allergies
o For this research, computer scientists, doctors, and biologists are needed
o Investigating long-term general effects means to extrapolate to obtain this information
o funding possible through Horizon or RIA

3. Who are the most important funding providers? Identify the most important stakeholders. Develop a role play. Promote your research agenda (1) and project ideas (2) in a discussion with a scientific commission (3).
See 2.

3.2.4 Educational Exploitation Potential

Presented by Tina Selami

1. What are the exploitation opportunities for ECOLOPES in this sector? Describe this by writing the teaching vision of an educational organization that wants to convince people to learn about ECOLOPES.

- promote environmental awareness in all sectors that were mentioned before
- introducing interdisciplinary communication and peer-to-peer communication between students from different disciplines
- bring together research and design, include more practitioners
- provide practical and theoretical knowledge
- create a cross pollination network with universities from all the world to work together in research and practice

2. What are the key exploitable project results? Describe three courses offered by the educational organization based on the results of ECOLOPES. Indicate whether this teaching can start in the short, medium or long term. Invent three catchy titles and formats for promotional material about the ECOLOPES educational offers.

- Course 1 – "Ecolopia": multidisciplinary course catalogue that includes courses from ecology, business, design, but also bridging courses to link the courses from different disciplines
o Example: similar course at UNIGE that the ECOLOPES team from UNIGE is part of
o On short term, this course could be realized by the faculties that are already in the ECOLOPES project. Later this course could include other universities and faculties.

- Course 2 – "Go eco workshop series": addresses citizens and decision-makers
o Workshops on tools to provide knowledge on concepts like circular economy and multi-species cohabitation
o Could align with the social ECOLOPES movement
o First step could be to add in-person workshops and field trips to ECOLOPES talks
o On long term, invite decision-makers and consultants to the workshops

- Course 3 – "Protolopes": designing prototypes as interdisciplinary field between practitioners and academia.
o address practitioners and academia in the same course program
o Could be a summer school
o The idea is to interest practitioners in the scientific content and researchers to its applications
o Students get ECTS

3. Who are the most important audiences for the educational offer? Develop a role play. Promote your teaching vision (1) and courses (2) in an information event about ECOLOPES 's educational offers (3).

- Students and teachers from primary, secondary, and higher education
- Citizens: with different backgrounds, environmental education and awareness
- Citizens that live in an *ecolope* need to know how to manage it and how to deal with it
- Practitioners
- Decision-makers: by consulting parties. Have consultancy in parliaments.

Questions and Answers

> Q: Very interesting teaching and course concept. How to make the link to social and political potential? Do we also teach environmental stewardship? Do people also need to learn the ethical dimension of stewardship?

> A: Yes. That is part of the environmental awareness that should be taught on all courses. But also, the citizens need to know how to handle their *ecolopes*. Maybe create ethical guidelines on how to manage an *ecolope*. The entire course concept includes aspects like sustainable way of living.

3.2.5 Societal Exploitation Potential
Presented by Victoria Culshaw

1. What are the exploitation opportunities for ECOLOPES in this sector? Describe this by writing the mission statement of a citizens' initiative to spread ECOLOPES.

   Mission of a citizen's initiative: ask architects for a building with an *ecolope*. The long-term mission is to create an ECOLOPES movement that promotes the proliferation of the ECOLOPES concept and brings like-minded people together. The social vision is to

enable cohabitation between people, animals, and plants by integrating them into the design of buildings.

2. What are the key exploitable project results? Describe three demands for urban development/architecture, etc. made by the initiative based on the results of ECOLOPES. Indicate whether these demands could be met in the short, medium or long term. Phrase three appealing core sentences for these demands (e.g., for a protest sign).

   Exploitable project results are 3D simulations of an *ecolope* (VR and model) and building blocks, that make it clear to the public which plant and animal functional groups could inhabit which building – show which organisms will settle on it (information from KGF). Through the descriptive presentation of ECOLOPES in models, plans and mock-ups and the ECOLOPES talks, an ECOLOPES community could develop in the longer term.

3. Who are the key target groups that could be activated to engage with ECOLOPES? Develop a role play. Announce your social vision (e.g., cohabitation) (1) and demands (2) at a rally targeting your key audiences (3).
   Target groups are citizens regardless of age, political preference, family status. ECOLOPES initiatives can reach the public with the following formats: Exhibition that shows an *ecolope*; App/web application where one can upload a façade and the app designs an *ecolope* around it and calculates the KPIs to demonstrate the advantages of the *ecolope*; social media; stands on markets; walks or other formats to show the urban biodiversity and how to find them in the city. To increase the reach of the ECOLOPES initiative a cooperation with biophilic city movement (Timothy Beatley) and other ecological architecture and design movements is necessary.