COST Action CA16114 RESTORE: REthinking Sustainability TOwards a Regenerative Economy,
Working Group Three Publication: REGENERATIVE CONSTRUCTION AND OPERATION

RESTORE

REthinking Sustainability TOwards a Regenerative Economy

Regenerative Construction and Operation

Bridging the gap between design and construction, following a Life Cycle Approach consisting of practical approaches for procurement, construction, operation and future life.

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IMPRESSUM

RESTORE Working Group Three Report: Regenerative Construction and Operation

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7. SUSTAINABLE REGENERATIVE TOOL – SRT (TRAINING SCHOOL WG3)

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7.3 THE CHALLENGE – AIM AND DESCRIPTION

Regenerative and sustainable buildings throughout their whole life cycle are today one of the highest inspirations for the built environment. However, many factors compromise construction and operation. Thus, adequate guidelines and indicators to help designers, contractors, project management as well as the owners to implement and verify regenerative sustainability goals, are needed.

The challenge of this competition was to develop a tool that can be used to implement regenerative sustainability aspects throughout the building process, namely a Sustainable Regenerative Tool (SRT).

The SRT should aim to be an instrument for professionals of the construction and facility management sector, which supports and guides the delivery of regenerative aspects in construction and monitoring during the operation of the building and any future 'second life'.

The SRT should cover the entire building construction process: procurement/pre-construction, construction, operation and future life and the key themes developed in Working Group WG 1: Place, Energy, Water, Wellbeing, Carbon, Resources, Equity, and Education.

Although related to a specific project, (the NOI Tech Park in Bolzano was used as a case study) the participants were to develop a tool that is scalable to other projects.

The participants could take reference of other tools currently used in a specific stage of the building process. Examples of the such were introduced in the Training School with the Pre-Qualification-Questionnaire (PQQ) used in the procurement stage and the Sustainable Facility Management Index (SFMI). The SRT should integrate the principles of PQQ and SFMI, however, the form, contents and evidence were open and had to be developed by the trainees.

The development of the SRT in teams took place during the first three days of the Training School, combined with lectures given by the trainers with backgrounds in the four disciplines. The trainees were given a timeframe for teamwork which was accompanied by the trainers. Finally, the proposals of each team were translated into an abstract and a public presentation as the closing of the training school.

7.4 REGENERATIVE ROADMAP

WINNING SRT: TEAM 3

Team: Marco DELLI PAOLI, Jonas Manuel GREMMELSPACHER, Louise HAMOT and Virna MONERO FLORES

Team 3 comprised four group members in their mid-twenties from professional and academic backgrounds. Louise enriched the team with various inputs from her background as a Sustainability Consultant. Virna brought insights from the world of sustainable facility management. Marco introduced his knowledge in green building design and circular economy and Jonas shared his understanding of sustainable pre-construction and construction stages based on practical and academic experience.

> *A Regenerative Roadmap. The decision of the jury to award this proposal was because this presentation was intended to be neither critical or a new assessment system, but a way ahead to find or propose solutions for regenerative buildings. It started from vision, and then concentric circles from mission to engagement. The tree system is an original idea, very flexible and which allows further development through collaboration between different sectors of construction. The team enhanced the concept of regeneration of a building in all stages and was giving examples for a second life.*
>
> *We appreciated the interactivity and interconnectivity between different components/tasks involved in all stages of design and construction, which we think is closer to what is happening in actual cases. Also, the flexibility and openness of the suggested system/network.*

INTRODUCTION

THE REGENERATIVE ROADMAP as a Sustainable Regenerative Tool (SRT) is a guide for stakeholders in the built environment to benchmark the performance of their activities during the life cycle of a facility. Overall, it was envisioned for stakeholders to implement the tool at any of the building life cycle phases. Therefore, a strategy stating an overall aim for each of the phases pointing the direction towards regenerative life cycle was crafted. 12 regenerative key themes, each connecting to objectives, tactics, and indicators allowed for benchmarking to determine the regenerativity of measures taken in the four building life stages.

ABSTRACT

The REGENERATIVE ROADMAP provides a guideline towards regenerative and sustainable interventions and is therefore divided into multiple levels. The software is targeted to serve actors involved in all building life cycle stages, regardless of the intensity of the intervention. Actors are represented by Design Team, Builders, Occupants, Investors/Owners, Facility Managers, Municipality and Local Community. The mission for the REGENERATIVE ROADMAP was defined as 'Regenerative Design to Live Symbiotically within Long-lasting Ecosystems'.

In detail, the starting point of the REGENERATIVE ROADMAP are the four building phases. The overall strategy followed in the Pre-Construction stage was defined to be 'Positive and Balanced Interest Group Involvement'. In Construction, the proclaimed most significant strategy was 'Integrated Lean Intervention'. Maintenance and Operation follow the principle of 'Quality and Economic Driven Stewardship'. The Future Life stage was assigned to create a 'Continuous Life Through Adaptability'. In addition to seeing the phases as a process, the tool emphasizes and visualises the four stages as a closed loop. Further, the closed loop approach allows all interest groups/actors, to step in at any point. Thus, the REGENERATIVE ROADMAP can be employed for the analysis of new and existing buildings. Mission and strategies as the significant elements of REGENERATIVE ROADMAP are built the core of the SRT. The five remaining levels of the SRT are placed as shells around the mission and strategy, creating a six-step outline as seen in a schematic diagram in Figure 7.2.

Figure 7.2 - Schematic Diagram of the REGENERATIV ROADMAP

Each of the four building stages composes 12 key themes, which are placed in the next hierarchic shell. The first nine follow the themes developed in Cost RESTORE WG1. The three remaining were added by the team to adequately address economic, social and environmental aspects, represented by Resiliency, Community and Governance.

In the next level, objectives were defined as realistic outcomes, defined for each life cycle stage and key theme. Individual tactics formed the actions, which describe the requirements for regenerative design at the next level. Indicator definitions are used as phrased questions, which help actors to reflect the performance in the respective category. Evidence as input is required in the form of surveys, figures, strategies and plans, used to benchmark. Numerical benchmark is turned into qualitative and quantitative values and further used for comparison.

Creation of the REGENERATIVE ROADMAP required the definition of outcomes to be transformative so that actors get an understanding of the best-case scenario that should be the overall objective for each project. The questions formulated under indicators are targeted to get an understanding, which measures actors

must review in order to improve in respect to the underlying sustainable criteria. To highlight the relevance that interventions cause, the tool shows interconnections between indicators of all life cycle stages. This demonstrates how actions impact the competences of multiple actors and emphasise the importance of all actors to work together. Through a holistic approach, social, environmental and economic aspects can be addressed appropriately, so the key elements of sustainability are balanced. To open REGENERATIVE ROADMAP to all actors with individual preference, the roadmap provides possibilities to follow a top-down as well as an outside-in approach.

Processing the schematic diagrams in Figure 7.2 into a user-friendly interface by keeping the tree structure is shown in Figure 7.3, with the key theme 'Place' and selected objectives, tactics and indicators. Elements in the level's objectives, tactics and indicators are herein only visualised to showcase how interconnected actions in the different life stages are to others.

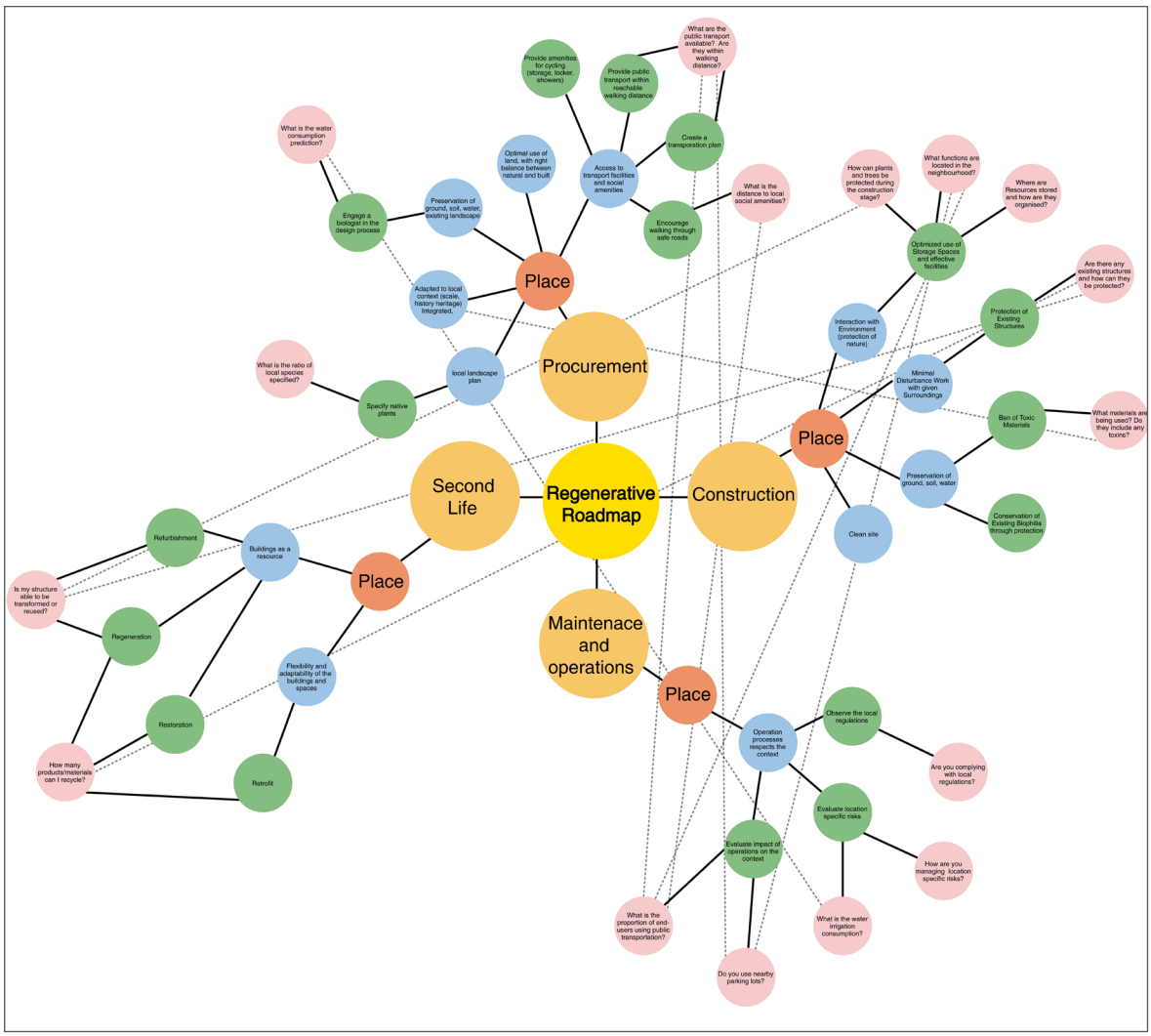

Figure 7.3 - REGENERATIVE ROADMAP outline exemplary for the key theme 'Place' (Readability only for the first three levels)

SG 3 - OPERATION - CONTRIBUTION TRAINING SCHOOL

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works as a researcher in the Sustainability in Construction and Industry Research Group at Universidad Politécnica de Madrid (giSCI-UPM), where she collaborates in other different activities related to research, teaching, and dissemination. She obtained a Bachelor's Degree in Architecture from UPM in 2005 and a Master's Degree in Advanced Architecture and City Project from the Universidad de Alcalá de Henares (UAH) in 2010. After working as an Architect/Designer for over 12 years, she is currently a PhD candidate of innovation in building conservation and deep renovation management of building stock at UPM.

Marco Delli Paoli
is a young architect and a Professional Master Course's candidate in Environmental Technological Design at the Sapienza University of Rome. During his studies he developed a deep interest in the issues of sustainability and Building Information Modeling, intended both as tools and as approaches to design, experimenting their application in many projects, especially in his graduation thesis and in the international competition Solar Decathlon Middle East, in which he participated in 2018. He is going to focus his studies on these two topics, developing them in a research experience with a PhD, to define new strategies about the restorative design.

SG 4 – SECOND LIFE

Indra Purs
combines economics and finances with the creative industry of landscape architecture. She is a DrArch candidate in Landscape Architecture, holds an MSocSc in Business Administration, a professional BLArch and a BEcon in financial management. She is a board member and delegate of several international associations and groups in the Baltic sea area and the owner of Purs consulting Ltd., dealing with landscape architecture and financial and tax consulting. Her past working experience is in the Centrals Statistical Bureau of Latvia and the EY Latvia. Her research interests and publications are in climate, weather, air, water and circular and regenerative economy.

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