

REthinking Sustainability TOwards a Regenerative Economy

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BOOK OF EXTENDED ABSTRACTS

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REthinking Sustainability TOwards a Regenerative Economy

RETHINKING SUSTAINABILITY TOWARDS A REGENERATIVE ECONOMY RESTORE READY CONFERENCE IN BELGRADE

BOOK OF EXTENDED ABSTRACTS

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Book of Extended Abstracts

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- Martin Brown (Fairsnape United Kingdom) / Vice-Chair, WG1 Leader.
- Roberto Lollini (EURAC Research, Institute for Renewable Energy Italy) / Grant Holder Scientific Representative, WG4 Leader.
- Daniel Friedrich (Duale Hochschule Baden-Württemberg, DHBW Germany) / Science Communications Coordinator (since January 2019).
- Jelena Brajković (University of Belgrade, Faculty of Architecture Serbia) / WG5 Vice-Leader (since May 2020), STSM Coordinator (since January 2020), ITC Conference Manager and Open Access Publication Grants Manager.
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- Wilmer Pasut (Ca' Foscari University of Venice Italy) / WG4 Vice-Leader.
- Andras Reith (ABUD Hungary) / WG5 Leader.



THE RESTORE ACTION

The **RESTORE** Action aims to bring about a paradigm shift in the construction industry towards restorative sustainability that promotes future-oriented thinking and multidisciplinary application of knowledge in the building scope.

The **RESTORE Action** advocates and mentors for a regenerative built environment, through working groups, training schools (including learning design competitions) and Short Term Scientific Missions (STSMs). Also, to facilitate communication and dissemination of results, our Action offers conference grants and open access publication grants.





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REthinking Sustainability TOwards a Regenerative Economy

restore ready conference in belgrade београд 09.04. 2021

https://www.eurestore.eu/event/ restore-ready-conference-belgrade/

Extended Abstracts

REthinking Sustainability TOwards a Regenerative Economy – COST RESTORE Action

Jelena Brajković (University of Belgrade, Faculty of Architecture, Belgrade – Serbia) Tatjana Kosić (UB – Faculty of Mechanical Engineering, IC; UNT – FGM – Department of Architecture)

COST

COST (European Cooperation in Science and Technology) is a funding organization supporting collaborative research across Europe. It connects scientists and innovators through research networks known as "COST Actions," fostering interdisciplinary cooperation and advancing knowledge in various fields. COST provides a platform for researchers, policymakers, and industries to engage in joint initiatives, encouraging innovation and tackling global challenges. Through its broad network, COST enhances Europe's scientific leadership and drives progress by facilitating knowledge exchange and creating opportunities for young researchers.

COST offers a unique platform for researchers to develop new ideas and collaborative initiatives across all scientific fields, including social sciences and humanities. Established in 1971, it bridges the gap between science, policy, and society across Europe. COST complements EU Framework Programmes and facilitates networking, particularly with researchers from Inclusiveness Target Countries (ITCs). It also promotes the mobility of researchers, driving scientific excellence and fostering the growth of multidisciplinary research within the European Research Area (ERA).

COST operates on a bottom-up approach, allowing researchers to form networks based on their interests by submitting proposals to the COST Open Call. These proposals can cover any scientific field and promote interdisciplinary collaboration. COST Actions are dynamic and inclusive, involving multiple stakeholders, including the private sector and policymakers. Since 1971, COST has been funded by the EU under the various Research and Innovation Framework Programmes, such as Horizon 2020 and Horizon Europe.

RESTORE proposal (Carlo Battisti, Martin Brown)¹

- Drafted between Carlo Battisti, Martin Brown and Emanuele Naboni.
- (OC-2016-1) COST positively approved the proposal, with a global rating of 62/65 points (95%), subdivided into 24/25 points for the 'soundness of the challenge', 19/20 points on 'impact' and 19/20 points on implementation.

Scientific Scope

- Areas of Expertise: Sustainable engineering, adaptation to long-term environmental changes; Sustainability; Environmental impact, Life-Cycle Assessment.
- Keywords: restorative sustainability; restorative design processes-methods-tools; climate change; health and well-being; sustainable urban development.

¹ Battisti, C., Brown, M. et al. (2021). RESTORY. Managing a COST Action as a Project. COST Action CA16114 RESTORE, printed by Eurac Research (Bolzano, IT). p. 19

COST Action CA16114 RESTORE

Sustainable buildings are essential for shaping a future that is socially just, ecologically restorative, and economically viable in the face of climate change. While progress has been made over the past decade, sustainability efforts in the built environment have not fully addressed these pressing issues. The sector can no longer settle for incremental improvements but must adopt a net-positive, restorative sustainability approach that aims to do "more good" rather than just reducing harm.

A significant shift is underway in the built environment, moving beyond a narrow focus on energy efficiency and environmental impact minimization. The new framework emphasizes a holistic approach that nurtures places, people, ecology, culture, and climate at the core of design. Health and well-being benefits are particularly emphasized, recognizing that true sustainability must create spaces that support both the environment and human flourishing. The current understanding of building sustainability, while valuable, falls short of meeting the challenges posed by future architectural design.

The RESTORE Action is leading this paradigm shift towards restorative sustainability for both new and existing buildings across Europe. By promoting forward-thinking, multidisciplinary knowledge, the initiative fosters solutions that enhance creativity in design while improving users' comfort, health, and well-being. RESTORE's focus on harmonizing buildings with urban and natural ecosystems encourages a deeper connection between people and nature.

The RESTORE Action advocates, mentors and influences for a restorative built environment sustainability through working groups, training schools (including learning design competitions) and Short Term Scientific Missions (STSMs). To facilitate communication and spread results, RESTORE provides conferences grants and open access publications, ensuring that key findings are shared within the scientific community and beyond.²



² Battisti, C., Brown, M. et al. (2021). RESTORY. Managing a COST Action as a Project. COST Action CA16114 RESTORE, printed by Eurac Research (Bolzano, IT).

Action Details

MoU - 113/16 CSO Approval date - 24/10/2016 Start date - 09/03/2017 End date - 30/04/2021

37 Management Committee Members Countries

Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye, United Kingdom



1 COST Near Neighbour Countries Kosovo



Working Group Zero and Core Group / Participants

- 3
- Carlo Battisti (EURAC Research, Institute for Renewable Energy Italy) / Chair.
- Martin Brown (Fairsnape United Kingdom) / Vice-Chair, WG1 Leader.
- Ilaria Alberti (EURAC Research, Institute for Renewable Energy Italy) / Grant Holder Manager.
- Dorin Beu (Romania Green Building Council Romania) / Training School Coordinator
- Jelena Brajković (University of Belgrade, Faculty of Architecture Serbia) / WG5 Vice-Leader (since May 2020), STSM Coordinator (since January 2020), ITC Conference Manager and Open Access Publication Grants Manager.
- Michael Burnard (University of Primorska Slovenia) / STSM Coordinator (up until January 2020).
- Carsten Druhmann (Zurich University of Applied Sciences, ZHAW Switzerland) / WG3 Vice-Leader.
- Daniel Friedrich (Duale Hochschule Baden-Württemberg, DHBW Germany) / Science Communications Manager (since January 2019).
- Aránzazu Galán González (Université Libre de Bruxelles, ULB Belgium) / WG0 Vice-Leader.
- Edeltraud Haselsteiner (Alpen-Adria Universität, Faculty for Architecture and Planning Austria) / WG1Vice-Leader.
- Lisanne Havinga (TU Eindhoven The Netherlands) / WG2 Vice-Leader.
- Krzysztof Herman (Warsaw University of Life Sciences Poland) / WG5 Vice-Leader (up until May 2020).
- Roberto Lollini (EURAC Research, Institute for Renewable Energy Italy) / WG4 Leader, Grant Holder Scientific Representative.
- Emanuele Naboni (KADK Denmark) / WG2 Leader
- Wilmer Pasut (Ca' Foscari University of Venice Italy) / WG4 Vice-Leader.
- Giulia Peretti (Werner Sobek Green Technologies Germany) / WG3 Leader
- Andras Reith (ABUD Hungary) / WG5 Leader.
- Bartosz Zajaczkowski (Wroclaw University of Science and Technology Poland) / Science Communications Officer and ITC Conference Manager (up until January 2019).



³ Battisti, C., Brown, M. et al. (2021). RESTORY. Managing a COST Action as a Project. COST Action CA16114 RESTORE, printed by Eurac Research (Bolzano, IT). Illustration p. 24

RESTORE Working Groups Overview

Each working group of RESTORE had structured methodological approach to achieving main goals and objectives through deliverables: management committe and core groups meetings, training schools, workshops, conference grants and dissimination, scientific publications and final working group books.

WORKING GROUPS

WG 1: RESTORATIVE SUSTAINABILITY

Re-defining sustainability for a future regenerative built environment economy.

WG2: RESTORATIVE DESIGN PROCESS

Defining Processes, Methods and Tools for regenerative built environment Design.

WG 3: RESTORATIVE BUILDING AND OPERATIONS

Solutions and implementation strategies for a paradigm shift for the construction and operation of regenerative buildings.

WG4: RETHINKING TECHNOLOGY

Impact and influence of technologies for a regenerative built environment sector.

WG 5: SCALE JUMPING

Thinking beyond the building, identifying scale jumping potentials to a neighbourhood and city level regenerative sustainability.

Finally the RESTORE Action Working Groups close with an "Atlas of Solutions".



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WG0. PROJECT COORDINATION AND COMMUNICATION

4

The general coordination, administration and communications activities of the project. It includes the Management Committee (MC) members. See the following work plan for the main tasks and their schedules.

Objectives	Project coordination and communication. Development and coordination of information database and communication channels.	
Methods	Coordination, administration and funding, communication, and dissemination.	
Activities	Project management, project administration and finance, fundraising, project communication, project dissemination.	
List of major deliverables	Short term: Project management reports (progress reports, <i>etc.</i>), accounting reports (Interme- ciate Financial Report, <i>etc.</i>), grant application, website, mid-programme conference, collated output, and results from restorative sustainability STSM, decision to end the RESTORE Action, definition of final report content.	
	Long term: Curation of the "Atlas of Solutions" (described in section 2.2.2), a catalogue of solu- tions that facilitate the creation of restorative buildings. Development and promotion of final conference, reports and booklet.	
Topics include:	Coordination, Communication, Output Management and Wrapping Up.	

WG1. RESTORATIVE SUSTAINABILITY

The Evolving Agenda of Restorative Design introduces a kaleidoscope of paradigms, design challenges, opportunities, and perspectives for sustainable architecture and urban design. It discusses the knowledge, skills and competence that should inform and orient the shift in practice required by an approach to architecture informed by restorative sustainability.

Objectives	Define the influence of the built environment as a contributory cause/factor and potential solution to address climate change.
Methods	Analysis of the state-of-the-art, increasing awareness, mentoring of practitioners and profession- als and dissemination.
Activities	New paradigm definition + gap analysis, short-term scientific missions, training school, events, and papers.
List of major deliverables	Short term: State of the art + new paradigm report, STSM reports, design competition, conference presentations and articles.
	Long term: Produce training materials, contribute to the "Atlas of Solutions" (described under 2.2.2), a catalogue of solutions that facilitate the creation of restorative buildings, University curricula (Undergraduate/Postgraduate/Masters/Doctorates).
Topics include:	Ecology (soils, carbon, nature), Place, Bio-Climate, Health, Energy, Water, Equity and Education.

⁴ Battisti, C., Brown, M. et al. (2021). RESTORY. Managing a COST Action as a Project. COST Action CA16114 RESTORE, printed by Eurac Research (Bolzano, IT). P. 26

WG2. RESTORATIVE DESIGN PROCESS

Processes, Methods and Tools for Restorative Design. Primarily based on case studies derived from workshops, it constitutes the core of the action and is intended to provide "hands-on" guidance for restorative design practice.

Objectives	Design process analysis, solutions, and implementation.	
Methods	Analysis of the state-of-the-art, increasing awareness, mentoring of practitioners and profession- als, dissemination, Review of existing standards and networks in respect of restorative sustaina- bility approaches and development, Gap analysis, short-term scientific missions, training school, events, and papers.	
Activities	New paradigm definition + gap analysis, short-term scientific missions, training school, events, and papers.	
	Short term: State of the art + new paradigm report, Short-Term Scientific Mission (STSM) reports, design competition, conference presentations, and articles.	
deliverables	Long term: Produce training materials, contribute to the "Atlas of Solutions" (described under 2.2.2), a catalogue of solutions that facilitate the creation of restorative buildings, University curricula (Undergraduates/Postgraduates/Masters/Doctorates).	
Topics include:	Biophilic Design, Bio-Climate Design, Cradle-to-Cradle, Design for Deconstruction, Circular Economy.	

WG3. RESTORATIVE BUILDING AND OPERATIONS

Impact and innovations for a restorative approach to construction and operations (facilities management).

Objectives	Regenerative building analysis, solutions, and implementation.	
Methods	Analysis of the state-of-the-art, existing, and former network efforts, Review of existing standards in respect of restorative sustainability approaches and development.	
Activities	New paradigm definition + gap analysis, STSMs, training schools, events and papers.	
	Short term: State of the art + new paradigm report, STSM reports, design competition, conference presentations and articles.	
deliverables	Long term: Produce training materials, contribute to the "Atlas of Solutions" (described in section 2.2.2), a catalogue of solutions that facilitate the creation of restorative buildings. University curricula (Undergraduates/Postgraduates/Masters/Doctorates).	
Topics include:	Lean construction, Zero Waste, Material Conservation, Modern Methods of Construction.	

⁵ Battisti, C., Brown, M. et al. (2021). RESTORY. Managing a COST Action as a Project. COST Action CA16114 RESTORE, printed by Eurac Research (Bolzano, IT). P. 27

WG4. RETHINKING TECHNOLOGY

e

Impact and influence of built-environment technologies for a restorative sector.

Objectives	This working group will explore the potential for further implementation of such interactive sys- tems and technologies in new and existing buildings.	
Methods	Analysis of the state-of-the-art, increasing awareness, mentoring of practitioners and profession- als, dissemination.	
Activities	New paradigm definition + gap analysis, short-term scientific missions, training school, events, papers	
List of maior	Short term: State of the art + new paradigm report, short-term scientific missions, training school, events, and papers.	
deliverables	Long term: Produce training materials, contribute to the "Atlas of Solutions" (described in section 2.2.2), a catalogue of solutions that facilitate the creation of restorative buildings.	
Topics include:	Information Management, Digital, Smart (Buildings, Cities), Production (3D), Nanotechnology, Transportation, Communications and Social Media (restorative education and learning).	

WG5. SCALE JUMPING		
Thinking beyond the	e building, identifying scale jumping potentials to neighbourhood and city level sustainability.	
Objectives	This working group will explore scale-jumping potentials including analysis, solutions, and imple- mentation.	
Methods	Analysis of the state-of-the-art, increasing awareness, mentoring of practitioners and profession- als, dissemination.	
Activities	New paradigm definition + gap analysis, short-term scientific missions, training school, events, and papers.	
List of major	Short term: State of the art + new paradigm report, short-term scientific missions, training school, events, and papers.	
deliverables	Long term: Produce training materials, contribute to the "Atlas of Solutions" (described in section 2.2.2), a catalogue of solutions that facilitate the creation of restorative buildings.	
Topics include:	Building as Clusters, Buildings as nodes in Nano and Micro Grids (energy, water, transport, communications), Neighbourhoods, Smart and Eco Cities.	

⁶ Battisti, C., Brown, M. et al. (2021). RESTORY. Managing a COST Action as a Project. COST Action CA16114 RESTORE, printed by Eurac Research (Bolzano, IT). P. 28

Key RESTORE Publications

https://www.eurestore.eu/publications-and-articles/

2021	RESTORY Managing a COST Action as a Project	Editors: Carlo Battisti and Martin Brown (Eds.)
		Co-editors: Daniel Friedrich, Lisanne Havinga
2021	RESTORD 2030 A Regenerative Guide for Educators Students and	Editors: Martin Brown and Carlo Battisti (Eds.)
	Practitioners	Co-editors: Ann Vanner, Alison Watson, Blerta Vula, Giulia Sonetti, Ivan Šulc, Jelena Brajković, Zvi Weinstein
2021	RESTORE Final Book Rethinking Sustainability Towards a Regenerative Economy	Editors: Andreucci, M.B., Marvuglia, A., Baltov, M., Hansen, P. (Eds.)
2021	SCALE JUMPING >>> Regenerative Systems Thinking within the Built Environment	Editors: András Reith, Jelena Brajković (Eds.)
2020	REGENERATIVE TECHNOLOGIES FOR THE INDOOR ENVIRONMENT Inspirational guidelines for practitioners	Editors: Roberto Lollini, Wilmer Passut (Eds.)
2019	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	Editors: Giulia Peretti, Carsten K. Druhmann (Eds.)
2019	REGENERATIVE DESIGN IN DIGITAL PRACTICE A Handbook for the Built Environment	Editors: Emanuele Naboni, Lisanne Havinga (Eds.)
2018	SUSTAINABILITY, RESTORATIVE TO REGENERATIVE An exploration in progressing a paradigm shift in built environment thinking, from sustainability to restorative sustainability and on to regenerative sustainability	Editors: Martin Brown, Edeltraud Haselsteiner (Eds.)







"We are on the cusp of something regeneratively wonderful or something irreversibly disastrous. Use of the word 'regenerative' has seen a welcome resurgence, seemingly applied to everything, from farming to leadership, fashion, culture, economics and the built environment. RESTORE has addressed the two last-mentioned areas- Rethinking Sustainability towards a Regenerative Economy, in the context of the built environment. It is not that regenerative thinking is new – it has been at the core of ecological thinking for decades, traced back to acclaimed and influential writers on nature and ecology such as Aldo Leopold, Rachel Carson and many others. Importantly, it has likewise been the foundation of many indigenous cultures since time immemorial."

Editors: Martin Brown and Carlo Battisti

"This publication has a two-fold aim: to summarize the main results from the COST Action CA16114 REthinking Sustainability TOwards a Regenerative Economy (RESTORE, 2017-2021); and, to provide some insight into the project management strategies that are in place for our team, thereby ensuring that the Action will be properly and successfully developed. COST is the longest-running European framework supporting trans-national cooperation between researchers, engineers, and scholars throughout Europe. The RESTORE Action is working for a paradigm shift towards restorative sustainability for new and existing buildings and space design across Europe, through active lobbying and mentoring, as well as through working groups, training schools and Short-Term Scientific Missions (STSMs), advancing the sustainability of restorative builtenvironment sustainability."

Editors: Carlo Battisti and Martin Brown

Keywords: COST / RESTORE / Rethinking / Sustainability / Regenerative Economy

Source of figures and data: https://www.eurestore.eu/ and Battisti, C., Brown, M. et al. (2021). RESTORY. Managing a COST Action as a Project. COST Action CA16114 RESTORE.

REstore Action Dissemination Yield - RESTORE READY Conferences

Jelena Brajković (University of Belgrade, Faculty of Architecture, Belgrade – Serbia)

READY (REstore Action Dissemination Yield) conferences have the aim to disseminate the results from the Action at a macro-regional level in Europe, opening the discussion on a regenerative approach to sustainability, and creating the conditions to do 'more good' for the built environment.

Their focus is on promoting a regenerative approach to sustainability, and through them the RESTORE project seeks to ignite an open and dynamic conversation about how the transition can be made toward more sustainable and regenerative practices in architecture, urban development, and other sectors impacting the environment.

Objectives and Goals

The main objective of the RESTORE READY events is to disseminate the findings and key outcomes of the RESTORE project to a wider audience, engaging participants in dialogues on how these results can be applied in local contexts across Europe. The goal is to catalyze action, share best practices, and explore ways in which the RESTORE guidelines can be integrated into existing practices and future initiatives. Through these conferences, RESTORE hopes to encourage the adoption of regenerative sustainability principles—a shift beyond traditional sustainability measures toward solutions that actively restore and improve ecosystems, social systems, and urban environments.

READY Conferences aim at fostering:

1. Inclusive Discussion:

The READY conferences create a platform where local experts, stakeholders, and RESTORE speakers exchange knowledge and experiences. By comparing local best practices with the research and guidelines developed through the RESTORE action, they foster collaboration and the sharing of insights that can improve regional practices and policies related to sustainability in the built environment.

2. Wide Geographical Reach

RESTORE READY conferences are international conferences aimed at a wide European audience, academics, professionals and practitioners involved in sustainable design, regenerative practices and implementation, urban development, policy-making, and research. The conferences are structured to attract multinational participation,

fostering cross-border dialogues on sustainable development challenges and opportunities. Conferences are typically held in hybrid mode, both in-person and remotely, and due to COVID-19 pandemic restrictions, limited to a one day program. The hybrid model ensured that the conferences are accessible to a global audience, with participants able to attend from their own countries or regions.



Fig. 1. RESTORE Ready Conference in Belgrade

3. Engagement with Local Contexts

RESTORE READY conferences are including the participation of RESTORE speakers and local experts, with the intent to ignite a conversation to compare local best practices with the guidelines and findings from RESTORE.

Each conference is conceptualised not just as a series of lectures, but as a dialogue between local realities and scientific insights and guidelines. Local experts bring in their context-specific knowledge, enriching the discussions with practical examples and challenges. This focus on local expertise ensures that the recommendations and guidelines presented by RESTORE are relevant and adaptable to the specific conditions of different European regions.

RESTORE READY conferences were held across Europe in March and April 2021.⁷

100+ participants from 40 countries attended physically and online.

Greece	Athens	12.03.2021.
Poland	Warsaw	16.03.2021
France	Paris	19.03.2021.
Spain	Madrid	26.03.2021.
Serbia	Belgrade	09.04.2021.
Sweden	Malmo	16.04. 2021.
UK	Sabden	20.04.2021.



Impact and Vision

The main vision behind RESTORE READY conferences is to create an ongoing platform for engagement, knowledge exchange, and action on sustainability in the built environment. These conferences served as dissemination events for RESTORE project's outcomes to reach a broad audience and are implemented effectively across Europe. By fostering collaboration and highlighting successful examples from different regions, the READY conferences contribute to the wider objective of accelerating the adoption of restorative and regenerative sustainability in both urban planning and construction practices, in variable contexts.

The events not only aim to share research findings, but also to build a community of practitioners and researchers committed to advancing sustainability in the built environment. The discussions and collaborations sparked at these conferences are intended to create synergies and partnerships at an international and macro-regional level in Europe, that can lead to new initiatives, projects, innovations in sustainable urban development and regenerative economy.

⁷ https://www.eurestore.eu/restore-ready/



Event Programme – Restore Athens

- 10:00-10:15 Welcome and introduction | Claudia Carydis-Benopoulou (The American College of Greece, Vice President of Public Affairs)
- 10:15-10:30 RESTORE: REthinking Sustainability TOwards a Regenerative Economy | Alex Galatoulas (LF Collaborative Greece Facilitator XYZ Design/Build Director, LFA)
- 10:30-10:50 Restorative Sustainability | Edeltraud Haselsteiner (Alpen-Adria Universität, Faculty for Architecture and Planning, Klagenfurt, Austria) / WG1
- 10:50-11:10 Break / Q&A Sections
- 11:10-11:30 Restorative Design Process | Emanuele Naboni (The Royal Danish Academy of Fine Arts Schools of Architecture, Design and Conservation (KADK) Copenhagen, Denmark) / WG2
- 11:30-11:50 Restorative Building and Operations | Giulia Peretti (WSGreenTechnologies GmbH, Stuttgart, Germany)
 / WG3
- 11:50-12:10 Rethinking Technology | Wilmer Pasut (Ca' Foscari University of Venice, Italy) / WG4
- 12:10-12:30 Scale jumping | Jelena Brajkovic (University of Belgrade Faculty of Architecture, Serbia) / WG5
- 12:30-13:30 Lunch break & case studies
- 13:30-14:15 Introduction to Living Building Challenge and Declare | Alex Galatoulas (LF Collaborative Greece Facilitator XYZ Design/Build Director, LFA)
- 14:15-15:00 Crosswalk PHI vs Zero Energy | Aggeliki Stathopoulou (Director of Net Zero, Certified Passive House Designer, LF Ambassador)
- 15:00-15:30 Policies and Financing tools | Alice Corovessi (Founder of INZEB)
- 15:30-16:00 Panelist discussion Restore Targets and Reality in Athens Part 1 | Alice Corovessi (Founder of INZEB), Yannis Daskalakis (MD at Daskalakis & Associates, MRICS), Aggeliki Stathopoulou (Director of Net Zero, Certified Passive House Designer, LF Ambassador), Stella Apostolaki (The American College of Greece, Chair of Academic Advisory Board, Center of Excellence for Sustainability)
- 16:00-16:20 Break / Q&A Sections
- 16:20-17:00 Panelist discussion Restore Targets, Reality in Athens Part 2 | Alice Corovessi (Founder of INZEB), Yannis Daskalakis (MD at Daskalakis & Associates, MRICS), Nondas Galatoulas (XYZ Real Estate Director, Rev), Stella Apostolaki (The American College of Greece, Chair of Academic Advisory Board, Center of Excellence for Sustainability)
- 17:00-17:15 RESTORE and beyond: materials for dissemination | Jelena Bleiziffer (Faculty of Civil Engineering, University of Zagreb, Croatia)
- 17:15-17:30 Concluding remarks | Alex Galatoulas (LF Collaborative Greece Facilitator XYZ Design/Build Director, LFA)

Organization: COST RESTORE, Eurac Research, (xyz) Design/Construction/Real Estate, Daskalakis & Associates, Living Future Collaborative Greece, INZEB Institute of Zero Energy Buildings, NetZERO Energy Buildings, The American College of Greece.

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RESTORE READY Conference in Warsaw

March 16, 2021







- 10:00-10:15 Welcome and introduction | OW SARP, Architekci dla Klimatu
- 10:15-10:30 RESTORE: REthinking Sustainability TOwards a Regenerative Economy | Carlo Battisti (EURAC Research, Institute for Renewable Energy, Bolzano, Italy)
- ◆ 10:30-10:50 Restorative Sustainability | Blerta Vula (Kolegji UBT, Pristina, Kosovo) / RESTORE WG1
- 10:50-11:10 Coffee break
- 11:10-11:30 Restorative Design Process | Lisanne Havinga (Eindhoven University of Technology, The Netherlands) / WG2
- 11:30-11:50 Restorative Building and Operations | Carsten Druhmann (ZHAW, Institute of Facility Management, W\u00e4denswil, Switzerland) / WG3
- 11:50-12:10 Rethinking Technology | Roberto Lollini (EURAC Research, Institute for Renewable Energy, Bolzano, Italy) / WG4
- ◆ 12:10-12:30 Scale jumping | Jelena Brajkovic (University of Belgrade Faculty of Architecture, Serbia) / WG5
- 12:30-13:30 Lunch break
- 13:30-13:45 #Architekci dla klimatu and more | Jan Dowgiałło (OW SARP)
- * 13:45-14:00 Circular Design architecture, tools and incentives in Denmark | Urszula Kożmińska (OW SARP)
- 14:00-14:15 Natural Building case studies | Anna Zawadzka-Sobieraj (OW SARP)
- 14:15-14:30 Artificial Intelligence for Regenerative Design | Mateusz Płoszaj-Mazurek (Warsaw University of Technology – Faculty of Architecture, OW SARP)
- 14:30-14:40 Living Building Challenge. Introduction and perspectives in Poland | Katarzyna Wojda (LF Ambassador)
- 14:40-15:30 Gap analisys discussion how far the local situation is from the RESTORE goals and practices | Piotr Jurkiewicz (OW SARP), Urszula Kożmińska (OW SARP), Anna Zawadzka-Sobieraj (OW SARP), Katarzyna Wojda (LF Ambassador), Mateusz Płoszaj-Mazurek (Warsaw University of Technology Faculty of Architecture, OW SARP), Jacek Kisiel (Clean Air and Climate Policy Department of City of Warsaw)
- 15:30-15:45 RESTORE and beyond: materials for dissemination | Jelena Bleiziffer (Faculty of Civil Engineering, University of Zagreb, Croatia)
- 15:45-16:00 Closing remarks | Piotr Jurkiewicz (OW SARP)

Organization: COST RESTORE, Eurac Research, Oddział Warszawski Stowarzyszenia Architektów Polskich – Warsaw Branch of the Association of Polish Architects.

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RESTORE READY Conference in Paris

March 19, 2021






- 10:00-10:15 Welcome and introduction | Eduardo Blanco , Estelle Cruz , Laura Magro (CEEBIOS)
- 10:15-10:30 RESTORE: REthinking Sustainability TOwards a Regenerative Economy | Eduardo Blanco (CEEBIOS)
- 10:30-10:50 Restorative Sustainability | Edeltraud Haselsteiner (Alpen-Adria Universität, Faculty for Architecture and Planning, Klagenfurt, Austria) / WG1
- 10:50-11:10 Coffee break
- 11:10-11:30 Restorative Design Process | Emanuele Naboni (The Royal Danish Academy of Fine Arts Schools of Architecture, Design and Conservation (KADK) Copenhagen, Denmark) / WG2
- 11:30-11:50 Restorative Building and Operations | Indra Purs (Latvia Association of Landscape Architecture, Riga, Latvia) / WG3
- ◆ 11:50-12:10 Rethinking Technology | Wilmer Pasut (Ca' Foscari University of Venice, Italy) / WG4
- 12:10-12:30 Scale jumping | Jelena Brajkovic (University of Belgrade Faculty of Architecture, Serbia) / WG5
- 12:30-13:30 Lunch break
- 13:30-14:00 Biomimicry in French regenerative urban projects: trends and perspectives from the practice | Eduardo Blanco, Estelle Cruz (CEEBIOS)
- 14:00-14:30 Case presentation: Regenerating through biodiversity School of Sciences and Biodiversity in Boulogne Billancourt | Frédéric Chartier (Chartier Dalix)
- 14:30-15:00 Case Presentation: ArtBuild | Steven Ware (Art Build)
- * 15:00-15:30 Regenerative product innovation and biomimicry: Interface | Laetitia Boucher (Interface France)
- 15:30-15:45 Coffee break
- 15:45-16:45 Gap analisys discussion how far the local situation is from the RESTORE goals and practices | Oscar Hernandez (LF France Collaborative), Olivier Scheffer (CEEBIOS), Marc Barra (Institut Paris Region), Steven Ware (ArtBuild)
- 16:45-17:00 RESTORE and beyond: materials for dissemination | Jelena Bleiziffer (Faculty of Civil Engineering, University of Zagreb, Croatia)
- 17:00-17:15 Closing remarks | Eduardo Blanco, Estelle Cruz (CEEBIOS)

Organization: COST RESTORE, Eurac Research, Ceebios - Center for studies and expertise in biomimicry.

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RESTORE READY Conference in Madrid

March 26







- 10:30-10:40 Welcome and introduction to RESTORE | Paola Villoria Sáez (Universidad Politécnica de Madrid Spain)
- 10:40-11:00 Restorative Sustainability | Blerta Vula (University for Business and Technology Kosovo) / WG1
- 11:00-11:20 Restorative Design Process | Lisanne Havinga (Eindhoven University of Technology Netherlands) / WG2
- 11:20-11:40 Restorative Building and Operations | Giulia Peretti (Werner Sobek Green Technologies Germany) / WG3
- 11:40-12:00 Coffee break
- 12:00-12:20 Rethinking Technology | Roberto Lollini (EURAC Research, Institute for Renewable Energy Italy) / WG4
- 12:20-12:40 Scale jumping | Jelena Brajkovic (University of Belgrade Faculty of Architecture, Serbia) / WG5
- 12:40-14:00 Lunch break
- 14:00-14:20 Circular bioeconomy for a smart and sustainable future in the construction sector / Natalia González
 Pericot (COAATM)
- 14:20-14:40 The LIFE-REPOLYUSE to reduce the effects of the planet's climate change on human beings | Sara Gutierrez González (Universidad de Burgos)
- 14:40-15:00 Skills and business strategies to face the challenge ot efficient Construction and Demolition Waste (CDW) management and the circular economy in the construction industry | Clara García Ballesteros (Fundación Laboral de la Construcción), Marta Ruiz Sagaseta de Ilúrdoz (Fundación Laboral de la Construcción de Navarra)
- 15:00-15:20 Passivehouse technologies to improve the indoor environment. A case study in Spain | Sara Velázquez Arizmendi (V Arquitectos)
- 15:20-15:40 Gap analisys discussion how far the local situation is from the RESTORE goals and practices | Natalia González Pericot, Sara Gutierrez González, Sara Velázquez Arizmendi, Clara García Ballesteros and Marta Ruiz Sagaseta de Ilúrdoz
- 15:40-16:00 RESTORE and beyond: materials for dissemination | Daniel Friedrich (Baden-Württemberg Cooperative State University in Mosbach – Germany)
- * 16:00-16:10 Closing remarks | Paola Villoria Sáez (Universidad Politécnica de Madrid Spain)

Organization: COST RESTORE, Eurac Research, International Conference on Technological Innovation in Building (CITE2021) – Madrid, Spain. Building Technology and Environment Research Group (TEMA) – Madrid, Spain





- 10:00-10:10 Welcome and introduction to RESTORE | Tatjana Kosic, Jelena Brajkovic (University of Belgrade)
- ◆ 10:10-10:30 Restorative Sustainability | Martin Brown (Fairsnape, Lancashire UK) / WG1
- 10:30-10:50 Restorative Design Process | Emanuele Naboni (KADK, Faculty of Architecture, Copenhagen Denmark) / WG2
- 10:50-11:10 Restorative Building and Operations | Blerta Vula (University for Business and Technology, Pristina Kosovo) / WG3
- 11:10-11:30 Coffee break
- 11:30-11:50 Rethinking Technology | Roberto Lollini (EURAC Research, Institute for Renewable Energy, Bolzano – Italy) / WG4
- 11:50-12:10 Scale jumping | Jelena Brajkovic (University of Belgrade, Faculty of Architecture Serbia) / WG5
- 12:10-13:30 Lunch break
- 13:30-13:50 SerbiaGBC and sustainable building projects in Serbia: An Overview / Martin Elezovic (Association Serbia Green Building Council)
- 13:50-14:10 Living future green to improve the building environment. A case study in Serbia | Jovan Mitrovic (Association Serbia Green Building Council)
- 14:10-14:30 Creating a resilient urban ecosystem using euPolis approach: starting with green roofs | Filip Stanic (University of Belgrade, Faculty of Civil Engineering)
- 14:30-14:50 Regenerative solutions for city development | Darko Sutanovac (Office of Belgrade city chief urban planner)
- 14:50-15:10 The Line park Zone 8, Urban space transformation as a challenge for young talents | Ivana Korica, Una Korica (Association Serbia Green Building Council)
- 15:10-15:30 Gap analisys discussion how far the local situation is from the RESTORE goals and practices Martin Elezovic, Jovan Mitrovic, Filip Stanic, Darko Sutanovac, <u>Ivana Korica</u> and Una Korica
- 15:30-15:50 RESTORE and beyond: materials for dissemination | Jelena Bleiziffer (Faculty of Civil Engineering, University of Zagreb, Croatia)
- 15:50-16:00 Closing remarks | Tatjana Kosic, Jelena Brajkovic (University of Belgrade)

Organization: COST RESTORE, Eurac Research, Innovation Center, Faculty of Mechanical Engineering - University of Belgrade, Faculty of Architecture - University of Belgrade.

RESTORE READY Conference in Malmö

April 16, 2021







- * 10:00-10:10 Welcome and introduction to RESTORE | Jonas Gremmelspacher (Solenco, Malmö Sweden)
- ◆ 10:10-10:30 Restorative Sustainability | Martin Brown (Fairsnape, Lancashire UK) / WG1
- 10:30-10:50 Restorative Design Process | Emanuele Naboni (KADK, Faculty of Architecture, Copenhagen Denmark) / WG2
- 10:50-11:10 Restorative Building and Operations | Indra Purs (Latvia Association of Landscape Architecture, Riga – Latvia) / WG3
- 11:10-11:30 Coffee break
- ◆ 11:30-11:50 Rethinking Technology | Wilmer Pasut (Ca' Foscari University of Venice Italy) / WG4
- 11:50-12:10 Scale jumping | Jelena Brajkovic (University of Belgrade, Faculty of Architecture Serbia) / WG5
- 12:10-13:30 Lunch break
- 13:30-13:45 Circularity is the new gravity | Marwa Dabaieh (Malmö University Sweden)
- 13:45-14:00 Introduction to the International Living Future Institute's programmes | Jonas
 Gremmelspacher (Solenco, Malmö Sweden)
- 14:00-14:15 NollCO₂ for net-zero buildings in Sweden | Pia Stoll (Sweden Green Building Council, Stockholm Sweden)
- 14:15-14:30 LCA as a step towards regenerative design current trends in research and practice | Alexander
 Hollberg (Chalmers University of Technology, Gothenburg Sweden)
- 14:30-14:45 Initiative of the building industry in Malmö LFM30 Local roadmap Malmö 2030 | Andreas
 Eggertsen Teder (WHITE Arkitekter, Malmö Sweden)
- 14:45-15:00 Architectural design of Zero Emission Buildings. A reflection on process and tools. / Luca
 Finocchiaro (Norwegian University of Science and Technology, Trondheim Norway)
- 15:00-15:30 Gap analisys discussion how far the local situation is from the RESTORE goals and practices | Jonas Gremmelspacher (Solenco), Alexander Hollberg (Chalmers University of Technology), Andreas Eggertsen Teder (WHITE Arkitekter), Pia Stoll (Sweden Green Building Council), Marwa Dabaieh (Malmö University), Luca Finocchiaro (Norwegian University of Science and Technology)
- 15:30-15:50 RESTORE and beyond: materials for dissemination | Daniel Friedrich (Baden-Württemberg Cooperative State University in Mosbach – Germany)
- 15:50-16:00 Closing remarks | Jonas Gremmelspacher (Solenco, Malmö Sweden)

Organization: COST RESTORE, Eurac Research, Solenco AB Solid Engineering Consulting.





RESTORE Event Programme – Restore Sabden

- 14:00-14:05 Host Welcome | Alison Watson (Class of Your Own UK)
- 14:05-14:15 Introduction to RESTORE | Martin Brown (Fairsnape, Lancashire UK)
- 14:15-14:35 Restorative Sustainability | Blerta Vula (University for Business and Technology Kosovo) / WG1
- ◆ 14:35-15:05 Restorative Design Process | Lisanne Havinga (Eindhoven University of Technology -Netherlands) / WG2
- 15:05-15:15 Coffee break
- 15:15-15:35 Restorative Building and Operations | Indra Purs (Latvia Association of Landscape Architecture, Riga – Latvia) / WG3
- ◆ 15:35-15:55 Rethinking Technology | Roberto Lollini (EURAC Research, Institute for Renewable Energy Italy) / WG4
- 15:55-16:15 Scale jumping | Jelena Brajkovic (University of Belgrade Faculty of Architecture, Serbia)
- 16:15-16:30 Coffee break
- ◆ 16:30-16:50 Biodiversity in the Heart of Clitheroe | Richard Stephenson (YUDU UK)
- 16:50-17:10 COP26 COYO Challenge | Alison Watson (Class of Your Own UK)
- 17:10-17:30 "We banned the word sustainability" / Ann Vanner (University of Central Lancashire, UCLan UK)
- 17:30-17:40 Coffee break
- 17:40-18:00 Gap analisys discussion how far the local situation is from the RESTORE goals and practices
- 18:00-18:20 RESTORE and beyond: materials for dissemination | Jelena Bleiziffer (Faculty of Civil Engineering, University of Zagreb, Croatia)
- 18:20-18:30 It's a Wrap And a New Beginning | All
- 18:30-19:00 Dinner break

Organization: COST RESTORE, Eurac Research, Class of Your Own: Educating the future of construction.

www.eurestore.eu

Keywords: RESTORE / Ready / Dissemination / Conferences / Europe / Macro-regional Level / Local Experts



restore ready conference in belgrade београд 09.04. 2021

https://www.eurestore.eu/event/ restore-ready-conference-belgrade/ AI IT BE DE BA LV PT BG LT RO HR LU **RS** CY MT SK CZ MD SE DK ME SL EE NL CH FI MK TR FR NO UK PL IL USA



Regenerative Readiness in Serbia and WB Region – RESTORE READY Conference in Belgrade

Tatjana Kosić (University of Belgrade, Faculty of Mechanical Engineering, Innovation Center; University Union Nikola Tesla, Faculty of Construction Management, Department of Architecture)

Four years after the start of the project COST Action RESTORE: REthinking Sustainability TOwards a Regenerative Economy, the city of Belgrade hosted the Cost RESTORE READY Conference, held on April 9, 2021. The conference in Belgrade aimed synthesizing the results of four years of research and collaboration around regenerative design conducted by COST RESTORE and it is a unique opportunity to compare and discuss the regenerative design practice in Serbia and Europe, through cases presentations and roundtables. The local organizers and hosts of the conference (Dr Brajkovic and Dr Kosic) are very proud of such event been held in the capital of Serbia with the idea of contributing to European community for Built Environment education consultancy dedicated to Restorative and Regenerative Sustainability.

A Belgrade welcome

Belgrade, as theb host city, the capital of Serbia and one of the oldest cities in Europe, has since ancient times been an important focal point for traffic, an intersection of the roads of Eastern and Western Europe. As well, Belgrade is the capital of Serbian culture, education, science and economy. It is situated in South-Eastern Europe, on the Balkan Peninsula, at the confluence of the Sava and Danube rivers. By the Belgrade regulation plan, development of the street network was started in the 19th century (1867). Today, Belgrade is spread across territory of 10 City municipalities and in the inner area of the city there are over 5,500 streets, 16 open spaces and 32 squares. Belgrade has for centuries

been home to many nationalities, while Serbs of Orthodox Christian religion make up the majority of the population. Belgrade Fortress Kalemegdan, the former historical and urban center of Belgrade, high above the Sava and Danube confluence opens the view of Novi Beograd, Zemun and wide plains of Pannonia. The most recognisable building in Belgrade, landmark and one of the largest Eastern Orthodox churches, the Temple of Saint Sava threatens that would symbolically replace the Hagia Sophia, after which it was modelled. Other important places are: Knez Mihailova Street, National Museum, National Theathre, Palace of the Assembly of Serbia, White Palace.



Fig. 1. Landscapes of Belgrade (Source: courtesy of Jelena Brajkovic)



The conference hall of Faculty of Civil Engineering in the Building of Technical Faculties, play host for the Cost RESTORE READY Conference. The building, that itself is a cultural monument, was built in the period 1925-1931. As one of the most significant works of the academic style with a significant architectural and urban values and cultural, geographical and historical importance of place, it is recognized as a place for action – for the conference about regenerative future.

Fig. 2. Conference venue place - Building of Technical Faculties (Source: Stanoje Radulovic)

RESTORE READY Conference Lectures

Seies of READY (REstore Action Dissemination Yield) events and conferences (Sabden, Athens, Warsaw, Paris, Mardrid, Belgrade and Malmö, have the aim to disseminate the results from the Action at a macro-regional level in Europe, opening the discussion on a regenerative approach to sustainability, and creating the conditions to do 'more good' for the built environment. It is an opportunity to understand how consistent the local best practices are with the guidelines and findings from RESTORE.

The conference in Belgrade has included the participation of RESTORE speakers and local experts, fostering the networking of researchers, thereby increasing the impact of research on policy makers, regulatory bodies and national decision makers, as well as the private sector. For these reasons, the event attracted the public attention, especially the target group representatives: academics, architects, engineers, manufacturers, constructors, urban planners, sustainability practitioners, researchers, journalists, policy makers, public officers, community managers, confirmed by the participation of about 80 participants present in person or remotely connected from the region. The conference has been held typically in a hybrid format (due to Covid-19 safety measures); the participation is open to attendees participating in person or connected online from the region (the city of Belgrade hosting the event, and the surroundings and bordering countries).



Fig. 3. Conference poster

RESTORE speakers are representatives of RESTORE working groups:

- Martin Brown (WG1) Provocateur at Fairsnape. VC RESTORE VP Living Future Europe. A connector of ideas, people and movements. A commentator and communicator of sustainability, regenerative and the built environment. Author FutuREstorative and many sustainability papers and articles. Blog at www.fairsnape.com
- Emanuele Naboni (WG2) is Associate Professor of Sustainable Design at KADK. He is involved in several European and International funded projects. He is a visiting professor at EPFL in Lausanne. Previously, he was for years researchers at the Lawrence Berkeley National Laboratory. He was Skidmore Owings and Merrill

Performative Design Studio Leader in San Francisco. With his studio e3lab, he has consultant foremost architectural international offices for the implementation of Sustainable Design strategies.

- Blerta Vula Rizvanolli (WG3) is an architect and researcher who works at the Department of Architecture in the University for Business and Technology in Pristina, Kosovo and as a CEO at Anarch Company. She is also a consultant for the World Bank and EU projects with a special focus on Construction and Energy Management. She holds a Master of Science Degree in Architecture and Project Management and MBA from the University of Sheffield. She is certified by the International Project Management Association.
- Roberto Lollini (WG4) is responsible for the research group "Energy Efficient Buildings" within the Institute for Renewable Energy at EURAC Research in Bolzano/Italy, with a background in methodological approaches for the assessment of building performance, building stocks management and definition of renovation strategies.
- Jelena Brajkovic (WG5) Researcher, General Manager, Architect and Designer. Specialising in new media architecture and environments – expanded boundaries of architecture at the intersection of technology, science and art. Interested in application of nature-inspired solutions and biophilic principles in designing new media spaces, environments and landscapes – merging of biophilic and new media design. Awarded prizes for design achievements.
- Jelena Bleiziffer (RESTORE Communications) is Assistant Professor in the Structural Engineering Department at the University of Zagreb, Faculty of Civil Engineering. Her main research interests include maintenance management and sustainability of structures and bridges. She has published over 100 papers. She is the coauthor of Guidelines for Green Concrete Structures.

Martin Brown set out RESTORE to affect a paradigm shift in sustainability thinking in practice, academia and education moving from business as usual to one that is regenerative. Regenerative thinking, the SEVA mindset promoted through RESTORE, is focused on developing capacity and capability for systems evolution. It is not about sustainability that maintains what is, by only reducing impacts. Rather, it is about creating systems (places, buildings, communities, organizations) that can evolve toward states of health that thrive over time.

Emanuele Naboni presents the main outcomes of Working Group 2, and introduces the key contributors and their expertise. It implies the fundamental design principles and pillars (Climate & Energy, Carbon & Ecology and Human Health & Well-Being) of regenerative design and demonstrates the potential and the need to integrate science, big data and digital tools and processes that can be adopted to achieve regenerative design targets.

Blerta Vula addressed the primary challenge of determining how buildings can be constructed, operated, and maintained in a truly regenerative manner. Regenerative construction focuses on, not just minimizing the environmental impact of building activities, but actively reversing damage caused by traditional construction practices. This approach incorporates strategies that enhance the health, quality of life, and productivity of building occupants, while also restoring ecosystems and reducing carbon footprints. Through innovative materials, renewable energy integration, and sustainable design practices, regenerative construction seeks to create buildings that contribute positively to both the environment and society.

Roberto Lollini explanes technology solutions can contribute to the achievement of a regenerative indoor environment, thereby ensuring occupant wellbeing and health. Their effects must be evaluated through measurement and verification, including standardised approaches for post occupancy evaluation. The best introduction of advanced

technologies for regenerative indoor environments will need a deep integration of acters in the value chain, ensuring a continuous commitment throughout the whole life cycle of building. Finally, key technologies can promote a paradigmatic shift in building design from "less bad" to "more regenerative".

Jelena Brajkovic emphisizes Working Group Five explored the scale jumping potentials for neighbourhood and societywide level regenerative sustainability with a focus on Interactions, Tools, Platforms and Metrics. Scale jumping from product, to building to city is vital for a regenerative future. However, to scale jump without an understanding of systems thinking, of where to initiate interventions within the city eco system, will not be effective. Facing the climate and ecological crisis as we do, we should place the nature, human, built environment nexus at the centre of all we do, constantly asking the question: Are we part of the problem or part of the solution?

Jelena Bleiziffer talks about important information, data and key outcomes of the RESTORE Action. Over four years, over 160 members from over 40 countries, through 5 working groups, have produced a significant volume of publications, papers, articles, newsletters, videos, presentations and dissemination events. Dissemination had a special significance within the RESTORE Action, because the Working Groups started chronologically and sequentially with the topics, so the focus of the Action was thus increasingly shifted from the general to the specific. All publications are available through the RESTORE website at https://www.eurestore.eu/publications-and-articles.

Local experts are represented by relevant stakeholders in the field of sustainable practice and implementation:

- Martin Elezovic is a mechanical engineer and Executive Director at Atrium Consulting. He is a member of the board of directors of Serbian Green Building Council and Serbian ambassador of the EuroFM/OneFM association. Has a license for BREEAM and DGNB certification systems. He is a member of the technical working group at the Ministry of Construction, Transport and Infrastructure and the team leader for preparation of Cost-optimal analysis for Serbian future regulations according to the EU directive requirements.
- Jovan Mitrovic is one of the most influential architects of contemporary Serbian architecture; Executive
 Director at Architectural Studio LFG (Living Future Green). Awarded prizes for numerous international and
 domestic architectural and urban planning competitions, among which are: four Grand-Prix Salon of
 Architecture, Award of City of Belgrade, Annual Award of SAS, Borba Award for Architecture, Award of the
 Chamber of Commerce of City of Belgrade, Award Chamber of Commerce of Yugoslavia, Two Ranko Radovic
 Annual Awards. Special interest focuses on environmental and economic sustainability in architecture, on a
 responsible approach to nature and the environment.
- Filip Stanic is a research associate at the Faculty of Civil Engineering, University of Belgrade. He received his doctorate in 2020 at École des Ponts ParisTech in France, where he dealt with the hydrological aspects of green roofs, making a special contribution in experimental and theoretical research regarding water flow in unsaturated porous medium. He works within the international HORIZON2020 project euPOLIS dealing with methodology of urban planning with nature-inspired systems for improving health and well-being of the citizens.
- Darko Sutanovac is a Head of Departmant for public spaces and architectural design, Department of City Architect of the City of Belgrade. He has experience in public buildings design, control of the construction of public buildings and arrangements of public areas.
- Ivana & Una Korica Ivana is Junior researcher at the Faculty of Architecture, University of Belgrade and student of doctoral academic studies of Architecture and Urbanism, Faculty of Architecture. As well, she is an

Associate member of SerbiaGBC. Una is student of Master academic studies of Architecture, Faculty of Architecture and Associate member of SerbiaGBC.

Martin Elezovic presented state-of-the-art of green building certification in Serbia. As a non-profit, non-governmental, member-based organization with the focus to raise awareness about "green buildings" and promote measures to reduce impact on environment and natural resources consumption, SerbiaGBC (Serbian Green Building Council) was established in 2010. However, it is important to note that exemplary buildings using current best practice measures to reduce overall environmental impact are still far away from the concept of nearly zero carbon building (expected gap in range of 65-80%), not to mention net zero carbon, restorative or regenerative buildings.

Jovan Mitrovic discusses about increasing number of incentives for architects and members of related professions in Serbia to think about green, sustainable architecture, and not only as a trend, but primarily as an essential need of society and its responsibility towards people, nature and the city. Through examples, it is shown the new holistic approach that goes beyond sustainability and sets a new standard for ecological performance.

Filip Stanic talks about Nature-Based Solutions (NBS), which role is to use natural ecosystems in urban areas to provide biodiversity benefits. This exactly is the topic of the ongoing H2020 project euPOLIS that is, besides the innovative technical cognitions, and promoting participatory co-design, expected to evaluate the impact of NBSs, among them green roofs, on the public health and wellbeing.

Darko Sutanovac has presented state-of-the-art and future strategic, urban and action concepts of development and protection of the city of Belgrade. The most important is Urban Plan of Belgrade 2041 which defines the strategic development of the city as a European metropolis, the centre of administration, culture, business and commerce. The others in context of sustainable development are: Urban Plan of General Regulation of Green Areas, defines principles of connecting green areas. City of Belgrade is currently developing a Green City Action Plan, the vision for 2030.

Ivana and Una Korica have presented one (Zone 8) of the 10 awarded projects from the national architecture and urban design competition for Belgrade Linear Park 2020, which is located in the area south of the Port of Belgrade. The competition was conducted for young architects and their interdisciplinary teams. The final project design is the product of interdisciplinary cocreation between young architects, planners, designers, biologist and landscape architect, allowing for knowledge expansion and problem solving on different levels and disciplines.



Fig. 4. Hosts of the RESTORE READY Conference with the guest from Brasil and during the Session

RESTORE carbon neutral/reducing strategy



In line with the RESTORE ambition to be carbon neutral, the RESTORE Ready Conference in Belgrade adopt the ARRO approach (To Avoid, Reduce or Replace and then to Offset) to ensure that not only the event is carbon neutral but through offsetting more than emitted to be carbon positive. Approved offsetting possible through Gold Standard is (https://www.goldstandard.org). Project is supported by Vichada Climate Reforestation, Colombia. Some of the benefits made possible through the project are: Creation of regional job opportunities and reduced migration, Focus on building a diverse and multicultural team with equal rights for all participants,

Fig. 5. RESTORE promotion

Integrated capacity building and environmental education programs for local communities, Forest conservation creates natural corridors and ensures the connectivity of regional native ecosystems.

Conclusion

Looking back, the hosts are proud to see that COST Action RESTORE: Rethinking Sustainability Towards a Regenerative Economy succeeded to create a very active, open European specialist network – an ongoing platform for engagement, knowledge exchange, and action on Restorative and Regenerative Sustainability, which is a major general achievement. As well, conference has initiated a conversation of RESTORE speakers and local experts on comparing local best practices with RESTORE's guidelines and findings. Local experts brought their context-specific knowledge. This focus on local expertise ensures that the recommendations and guidelines presented by RESTORE are relevant and adaptable to the specific conditions. On the other side, local experts agree that some exemplary buildings using current best practice measures to reduce overall environmental impact are still far away from some concepts (nearly zero carbon building, not to mention net zero carbon), restorative or regenerative buildings. Nevertheless, RESTORE READY Conference in Belgrade has managed to encourage the local stakeholders for adoption of regenerative sustainability principles—a shift beyond traditional sustainability measures toward solutions that actively restore and improve ecosystems, social systems, and urban environments to ensure a regenerative future for all in Serbia.

Acknowledgements

The conference hosts gratefully want to acknowledge the support and possibility to host RESTORE READY Conference in Belgrade, as well as excellent networking opportunities provided by COST Action RESTORE: Rethinking Sustainability Towards a Regenerative Economy. In particular, they want to thank Eurac Research and Carlo Batisti, Chair of the Action, Martin Brown, Vice Chair of the Action, but also all Action WG Leaders and Members. Finally, deep gratitude to University of Belgrade - Faculty of Mechanical Engineering, Innovation Center; Faculty of Architecture and Faculty of Civil Engineering - University of Belgrade for their organizational support.

Move Away from Sustainability

Martin Brown (Fairsnape, Lancashire – UK) / WG1

Emerging from working group 1 (Restorative sustainability), the two most essential and vital outcomes were: a) awareness and need for a regenerative mindset, and b) the power and influence that the language for sustainability has.

Language

Confucius: 'Calling things by their proper name is the beginning of wisdom'.



The Language of Sustainability

SUSTAINABILITY: Limiting impact. The balancing point where WE GIVE BACK AS MUCH AS WE TAKE

RESTORATIVE SUSTAINABILITY: Restoring social and ecological systems TO A HEALTHY STATE

REGENERATIVE SUSTAINABILITY: Enabling social and ecological systems to MAINTAIN A HEALTHY STATE AND TO THRIVE Language and definitions can inspire. Yet as academics, researchers, writers, the words of sustainability that we use are contributing to the climate and ecological crisis. They provide a mask and give harbour to climate 'greenwashing', or in the least, slows down progress towards meeting targets such as the Paris agreement.

Fig. 1. Language of Sustainability

We are seeing a plethora of organisations and businesses, that on important climate aspects such as net-zero carbon and offsetting, feign compliance with whichever definition suits their needs, and through accounting trickery, continue with degenerative practices that contribute to the climate emergency.

We must stop using the word sustainability and all its derivatives. This also includes the use 'eco' as a preface. We can articulate so much better, through a positive, living and regenerative language with clear and consistent definitions. Despite 30 years plus of sustainability research and practice, we have failed in moving the built environment sustainability needle. Indeed, all indicators, carbon, temperature, biodiversity, are all heading in the wrong direction.

As we look at charts and forecasts of where we need to be in the next 5, 10, 30 years we have in front of us a steep decline to navigate, a halving of carbon emissions by 2030, and then a further reduction of 50% by 2050.

Yet our progress to date shows we are currently on track for only a 0.5%⁸ cut in global emissions from 2010 levels by 2030 when a 45% drop is needed to avoid climate catastrophe. And this in spite or maybe because of our misguided and confusing sustainability efforts.

Seva



Regenerative thinking, the SEVA mindset promoted through RESTORE, is focused on developing capacity and capability for systems evolution. It is not about sustainability that maintains what is or that seeks to restore something to what it once was, by only reducing impacts. Rather, it is about creating systems (places, buildings, communities, organizations) that can evolve toward states of health that thrive over time.

Fig. 2. Ego, Eco, Seva. Ilustrating the shift in mindset to address the next decade. Martin Brown, Fairsnape

Regenerative sustainability is framed within the Ego-Eco-SEVA concept:

Ego. From the industrial revolution, as humans, we assumed 'man's tyrannical dominion' over the earth's resources and life forms, founded on a linear take-make-dump mentality. We have moved on from a 'dump' approach to our unwanted products, waste and buildings to a more considered 'dispose of', still as yet a linear mentality that persists within built environment thinking.

Eco. The current and dominant sustainable design and construction discourse was triggered and reinforced by the Brundtland definition (of doing nothing today to compromise tomorrow's generation). This is a promise that we are failing to keep. We have compromised today's generation and, unless meaningful changes to current practices are implemented, we will continue to compromise future generations through, for example, human-made climate change, increasing carbon emissions, poor air quality and the worsening health of those who work, live, learn and play in our buildings.

⁸ The climate crisis can't be solved by carbon accounting tricks. Simon Lewis Guardian https://www.theguardian.com/commentisfree/2021/mar/03/climate-crisis-carbon-accounting-tricks-big-finance 3 March 2021

SEVA. Representing a regenerative worldview in which we embrace living systems of the planet with love and care. SEVA (service) translates into actions we take when tuned into nature, where we see ourselves as a part of, not apart from nature and in which we add more than we subtract from living systems. In practice, this approach means a dedication to healing the future, through repairing the damage that has been caused by our previous designs, which exceed the boundaries of planetary resilience.

Seva is a role that can only be performed with a relationship of love and humility to all entities in the environment. Not an attempt to be the master of matter and biology but as a servant of beauty, kindness, love and charm. It is the inner mood of the practitioner, the inner intention is the all-important, differentiating factor.

Seva means giving more than you take, the attitude needed to create a sustainable culture, that nourishes and cares for the earth we live upon.

Isha Black 2012⁹

The ancient Sanskrit word 'Seva' (\overline{dal}) is commonly translated as 'service' in the sense of 'being in service to a larger whole' and 'giving more than one takes'. It is in our enlightened self-interest to work regeneratively in service to all life as a constantly transforming and evolving planetary process that enables the emergence of health and wellbeing at local, regional and global scales.

Daniel Wahl 2020¹⁰

Combining the necessary change in mindset and language gives us cause to reflect on what a regenerative future, a regenerative built environment, economy & business will look like and then, to work to bring it about through research, writings, practice, advocacy and action.



Fig. 3. Triggers for the regenerative future

⁹ Isha Black, GlanceSideways. 2012

¹⁰ Daniel Wahl, SEVA: Regeneration in Service to Life. Medium, 2020

Carol Sanford¹¹, writing in Trim Tab sums up:

Regenerative business thinks about systems, in how it does business, working to create a greater capacity for all living beings (...) that means a regenerative business works:

- ... With each life form as a living whole, not broken into parts,
- ... From potential not ideals,
- ... Recognising reciprocity is natural and does not foster competition,
- ... Realising each being has a singular essence, not categorised where it fits with others,
- ... With living systems as nested one in another, not as parts.



Fig. 4. Doing 'more good' towards regenerative sustainability vs. doing 'less bad' only by reducing impact

In summary, it is the golden thread of connectivity with nature, explored and defined in WG1, that has run through all working groups, papers, publications and events. Concluding, with the RESTORD 2030 publication, based on the city RESTORD, set ten years into the future that adopted and applied thinking from the RESTORE regenerative Body of Knowledge. In 2030 success of RESTORD has been accredited to:

- DECARBONISING EVERYTHING
- **HEALING THE FUTURE** repair past damage and enable living systems to thrive through a connection with nature and the SEVA mindset,
- **CLIMATE + ECOLOGY LITERACY** improve awareness and knowledge of climate and ecology throughout all aspects and sectors of the built environment, with language that has clarity and inspires.

Keywords: Sustainability / Restorative Sustainibility / Regenerative Sustainibility / Seva / Decarbonisation / Healing the Future

¹¹ Carol Sanford, Trim Tab. ILFI, Edition 29

Restorative Design Process

Emanuele Naboni (KADK, Faculty of Architecture, Copenhagen - Denmark) / WG2 (Conference Speaker) Abstract edited by editors¹²

"Processes, Methods and Tools for Restorative Design. Primarily based on case studies derived from workshops, it constitutes the core of the action and intends to provide "hands-on" guidance to the practice of restorative design.

A vast majority of sustainable architecture within the field has become overrun with the need to tick certification and awards boxes, promoting cities, buildings and spaces which often deal with sustainability on limited dimensions. The need of regenerative design challenges the Status Quo of the Built Environment Industry.

Designing new urban environments, sustainable buildings and improving existing buildings, requires a paradigm shift. The challenge is to operate at scales that are greater and smaller than that of the city and the buildings, requiring a deeper the understanding of ecosystems and the human. This requires new processes, and new tools emerging from scientific research.

Targeted primarily to impact practitioners, the WG aim is to define guidance and "hands-on" guidance for interdisciplinary design processes, and test old and new guidelines and tools, analogue and computational, that support regenerative, creative and innovative solutions.

A number of subgroups are proposed to launch the dialogue:

- WG2.a Guidelines and Tools for the implementation of Big Data in Ecosystem Focused Design.
- WG2.b Processes and Tools to Adapt to Urban Climate Change.
- WG2.c Processes and Tools for Circular Economy in Design and Construction.
- WG2.d Processes and Tools for Healthy-Human Centric Design"¹³
- •

¹² Texts retrived from www.eurestore.eu, and Naboni, E & Havinga, L. C. (2019) Regenerative Design in Digital Practice: A Handbook for the Built Environment. Bolzano, IT: Eurac

¹³ Text retrived from the WG2 page at https://www.eurestore.eu/working-groups/wg2-restorative-design/

"This book explores how the concept of regeneration can be – and is starting to be - explicitly applied to the design of cities and building. A 'proactive' design approach is proposed which seeks to integrate regenerative design principles into the concepts and workflows of practitioners, researchers and students. A regenerative design process considers the key positive interactions between the built, human and natural systems. By promoting these positive interactions, which range from supporting local ecosystems to employing construction techniques that promote a circular use ofbuilding components, the designer blends creativity and science.

Regenerative design necessitates an understanding of the local dynamics of a project and the interactions with the local climate and living natural Which in turn necessitates systems. understanding of the layered network of (among others) climate, geology, ecology (mineral and other deposits, soil, vegetation, water and wildlife, etc.), and human health, and its complex interactions. Therefore, designers need to be able to operate beyond conventional construction practice; they have to be trained to adopt interdisciplinary and multifaceted systems thinking. To achieve regenerative design, in addition to measuring numerous environmental, social and economic impacts, design practitioners of the built environment need to focus on understanding and mapping their relationships.

This book aims to fill a gap in existing literature by introducing the fundamental design principles of regenerative design practice by acknowledging the potential and the need to integrate science, big data and digital tools in the design process. The book serves as a guide to the implementation of regenerative design and the digital tools that can be adopted to achieve it."

(Eds.) Emanuele Naboni KADK Copenhagen, Denmark Lisanne Havinga (TU/e), the Netherlands



REGENERATIVE DESIGN

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WG2. RESTORATIVE DESIGN PROCESS

Processes, Methods and Tools for Restorative Design. Primarily based on case studies derived from workshops, it constitutes the core of the action and is intended to provide "hands-on" guidance for restorative design practice.

Objectives	Design process analysis, solutions, and implementation.
Methods	Analysis of the state-of-the-art, increasing awareness, mentoring of practitioners and profession- als, dissemination, Review of existing standards and networks in respect of restorative sustaina- bility approaches and development, Gap analysis, short-term scientific missions, training school, events, and papers.
Activities	New paradigm definition + gap analysis, short-term scientific missions, training school, events, and papers.
List of major	Short term: State of the art + new paradigm report, Short-Term Scientific Mission (STSM) reports, design competition, conference presentations, and articles.
deliverables	Long term: Produce training materials, contribute to the "Atlas of Solutions" (described under 2.2.2), a catalogue of solutions that facilitate the creation of restorative buildings, University curricula (Undergraduates/Postgraduates/Masters/Doctorates).
Topics include:	Biophilic Design, Bio-Climate Design, Cradle-to-Cradle, Design for Deconstruction, Circular Economy.

"The conception of this book originated in 2017 when the activities of working group 2 of the RESTORE Cost Action began. We understood that regenerative design was mainly a theoretical concept, and that it was disconnected from the digital innovation that is taking place in science and in practice. We identified the scientific areas of concern and started an intense dialogue with the associated key players. In late 2018, we organized a conference and training school in Malaga where we were able to meet and elevate the discussions to a higher level. A community was created based on the activities in Malaga, and this community was extended to include other key international players, each bringing a unique perspective to and expertise in regenerative design...

The contributors:

- range from the United States to Denmark and from Singapore to Italy
- range from well-known international architectural offices to young engineering consultancy firms
- range from established professors to PhD researchers
- range from the discipline of human metabolism to architectural design and from ecology to urban physics..."

(Eds.) Emanuele Naboni KADK Copenhagen, Denmark Lisanne Havinga Eindhoven University of Technology (TU/e), the Netherlands

Naboni, E & Havinga, L. C. (2019) Regenerative Design in Digital Practice: A Handbook for the Built Environment. Bolzano, IT: Eurac

Keywords: Restorative / Design / Process

Restorative Building and Operations

Blerta Vula (University for Business and Technology, Pristina - Kosovo) / WG3

Regenerative Construction and Operation Is a publication made within the COST Restore project which aims to highlight the bridges the gap between design and construction by adopting a comprehensive Building Life Cycle Approach that encompasses procurement, construction, operation, and future life stages.

It serves as a summary of the activities of COST Action RESTORE's Working Group Three, focusing on the practical application of regenerative concepts and design methodologies developed by Working Groups One and Two within the building sector.

The primary challenge addressed by this publication was determining how buildings can be constructed, operated, and maintained in a truly regenerative manner. Numerous barriers hinder the shift from the conventional "business as usual" approach to a regenerative economy, complicating the realization of regenerative projects.



The need for robust strategies to facilitate this transition is critical, guiding the shift from traditional construction processes towards practices that embrace regenerative values.

This publication compiles the insights and strategies, offering practical solutions for advancing the paradigm shift. It addresses the entire building life cycle, from procurement and construction to operation, maintenance, and future life considerations, ensuring a sustainable and regenerative approach to the built environment.

During the course of this research, a critical issue was the accurate interpretation and consistent understanding of terminology, particularly as it pertains to sustainability and regenerative practices. The diverse and evolving nature of sustainability concepts often leads to variations in how key terms are defined and applied across disciplines. To address this challenge, a sustainability dictionary was developed. This resource served as a standardized reference tool, ensuring that all stakeholders—researchers, practitioners, and policymakers—shared a common understanding of essential terms. By establishing a clear and consistent vocabulary, the dictionary facilitated more effective communication and collaboration throughout the project, thereby supporting the successful implementation of regenerative design principles.

Based on this initiative, the Regenerative Sustainable PROCUREMENT is defined as: the process of adopting procurement strategies and making decisions in a way that delivers added or co-benefits with respect to social, ecological, economic and cultural factors.

The Regenerative CONSTRUCTION MATERIALS are considered the ones that aim to restore the built environment to a healthy state. Examples of restorative materials include self-healing materials; materials improving the indoor or outdoor air quality.

Regenerative OPERATION / Facility Management aims to achieve healthy state of people's environment in short and long term by pushing solutions and resources beyond sustainability.

Building's SECOND LIFE means a sustainable design objective which ensures minimization of waste, reduction in consumption of resources by repurposing the building/product or its constituent resources after their designated life cycle to serve same or different functions.

Regenerative Procurement – State of the Art

In the construction industry, nearly all services, consultancy, and products—close to 100%—are outsourced from the client or design team to the sector's supply chain. This extensive reliance on external providers emphasizes the importance of sustainable procurement as the critical link between the vision of sustainable design and its actual implementation. Sustainable procurement ensures that the values and principles of sustainability are not only integrated into the design phase but are also carried through into the construction and operational phases.

To guide this process, several international standards and frameworks have been established. These include ISO 20400, which provides guidelines for sustainable procurement, and ISO 26000, which focuses on social responsibility. Additionally, certifications such as BREEAM, LEED, and DNGB offer structured frameworks for measuring and ensuring sustainability in building practices. Environmental management standards, such as ISO 14001, and regenerative frameworks like the Living Building Challenge further support the realization of sustainable and regenerative projects by embedding environmental and social responsibility into procurement practices.

Regenerative Procurement – Vision

The procurement vision for sustainable construction emphasizes collaboration and innovation to ensure that regenerative principles are integrated into every stage of the project. Early Contractor Involvement (ECI) is critical, fostering collaboration between contractors and design teams from the outset to align goals and optimize outcomes. This approach is supported by procuring to collaborate, where partnerships are built on shared sustainability goals. Sustainable value management and value engineering are essential strategies for maximizing sustainable outcomes while managing costs effectively. The bidding process incorporates a regenerative sustainability cost model, ensuring that financial evaluations account for long-term environmental and social benefits. Additionally, procurement for a circular economy prioritizes the reuse and recycling of materials, aiming to minimize waste and extend the life cycle of resources.

A Pre-Qualification Questionnaire (PQQ) has been developed to assess and select suppliers and contractors based on their commitment to these sustainable practices including main topics such as:

Place, Energy, Water, Wellbeing, Carbon, Resoucers (materials and waste), Equity, Education and Economis.

THEMES	Questions	Minimum Response	Good Response	Excellence Response
2 ENERGY: Reference: • RESTORE Sustainability: Restorative to Regenerative	Please provide evidence of your approach to • regenerative renewable energy • constructing without fossil fuel- based energy	Limited Understanding Has limited experience of delivery.	Good Understanding with experience. Provides evidence of at least 1 past project to illustrate approach to use of renewables during the construction phase	Good Understanding with Extensive experience, Has a case study in the public domain. Experience of project with appropriate sustainability certification standard
WATER: Reference: RESTORE Sustainability: Redcrative to Regenerative Living Building Challenge	Please provide evidence of • Understanding ecological water cycles, and water flows in relation to the construction and operational phases of the building.	Limited Understanding Has limited experience of delivery.	Good Understanding with experience. Provides evidence of at least 1 past project to illustrate approach to water ecology during the construction phase.	Good Understanding with Extensive experience. Has a case study in the public domain. Experience of project with an appropriate sustainability certification standard
4a WELLBEING: (The Construction Working Environment)	Please provide evidence of • How have you provided, enabled or factered a working environment that improves the health and welloeing of construction, manufacture and operational personnel, (refer to the WHO definition of health that goes beyond physical health)	Limited Understanding Has limited experience of delivery.	Good Understanding with experience. Provides evidence of at least 1 past project to illustrate approach to improving health and wellbeing during the construction phase	Good Understanding with Extensive experience Has a case study in the public domain Experience of project with an appropriate sustainability certification standard

Construction - State of the Art

Regenerative construction focuses on not just minimizing the environmental impact of building activities, but actively reversing damage caused by traditional construction practices. This approach incorporates strategies that enhance the health, quality of life, and productivity of building occupants, while also restoring ecosystems and reducing carbon footprints. Through innovative materials, renewable energy integration, and sustainable design practices, regenerative construction seeks to create buildings that contribute positively to both the environment and society.

Based one the questionaired developed between different construction companies in Europe, it can be percieved most of the companies use the emerging materials expecially when constructing Commercial Buildings, while 51,4% of the companies do not use them to construct Facades, but instead to construct internal building partitions. They claimed that these materials are not being used mostly due to the lack of training withing the construction sector and du to higher costs of the materials.



Respondents who have used emerging/innovative MATERIALS in any stage of a newly built construction



In which of the six stages do you think it is easier to apply Emerging/Innovative TECHNOLOGIES?







Construction – Vision

Regenerative sustainability remains under-implemented in Europe due to limited knowledge, training, and the perceived higher costs of regenerative materials, technologies, and tools. To promote regenerative sustainability in the construction phase, it is essential to raise awareness among construction professionals about the availability and benefits of regenerative practices. Developing comprehensive guidelines, manuals, and specific regulations to encourage regenerative building practices is critical. Additionally, implementing efficient economic incentives can help offset higher costs and stimulate the adoption of regenerative materials and technologies, thereby improving societal well-being and environmental health.

Operation - State of the Art

Facility Management (FM) plays a crucial role in establishing a sustainable interdependency among the built environment, the natural ecosystem, and organizational business practices. Effective decision-making in FM is structured across three key management levels: strategic, tactical, and operational. FM is primarily employed to optimize ecological construction technologies, aiming to reduce energy consumption, water usage, and waste generation during the daily operation of buildings. By improving resource utilization and implementing sustainable FM processes and products, FM directly contributes to sustainable development. Additionally, it influences broader economic, social, and ecological environments, enhancing overall sustainability outcomes across multiple dimensions.

Operation – Vision

The vision for sustainable operation encompasses social, ecological, and economic targets aimed at creating a balanced and regenerative built environment. Socially, the focus is on providing a balanced supply of buildings that cater to both work and life, promoting mixed-use and hybrid facilities that enhance physical and psycho-social well-being. This vision emphasizes the importance of identifying and integrating diverse social groups and their impacts while effectively communicating regenerative values to users.

Ecologically, the objectives include reducing resource consumption through a circular economy framework, utilizing recyclable building materials, and ensuring materials can be easily separated for reuse. Additionally, there is a commitment to reducing energy consumption, prioritizing renewable energy sources, minimizing space requirements, and ensuring buildings are designed for maintainability and deconstruction while preventing the use of harmful materials. Economically, the vision aims to optimize building space for efficient usage through digital technologies like Building Information Modeling (BIM) and to enhance building life-cycle cost management. This includes employing innovative management methods, such as lean practices, and leveraging financial tools like green bonds to support sustainable financial management.

Future Use of the Built Environment - State of the Art

Understanding human cognitive patterns is vital for transitioning towards a healthy regenerative future, particularly in demystifying the concept of creativity. This approach emphasizes the importance of recognizing and addressing how individuals and communities engage with their environment. By adopting a holistic perspective that considers both the handprint (the positive impact individuals and organizations can have) and the footprint (the negative environmental impacts), this framework seeks to balance ecological, economic, and social dimensions. The integration of these elements fosters a comprehensive understanding of sustainability, promoting innovative solutions that enhance well-being and resilience in the face of global challenges.



Future Use of the Built Environment - Vision

In a circular built environment, costs can be significantly reduced by reusing buildings and materials while prioritizing designs that facilitate disassembly. The principles of the Circular Economy, as articulated by the Ellen MacArthur Foundation, underpin this vision: eliminating waste and pollution, keeping products and materials in active use, and regenerating natural systems. Achieving this vision involves addressing three major challenges and transformations within the construction and real estate industry. First, there is a need to shift from degenerative construction strategies

to those that achieve a positive net environmental impact. Second, the focus must evolve from traditional facilities management within a single building to urban facilities management, which encompasses broader community and environmental considerations. Lastly, the approach to sustainability should extend beyond new constructions to incorporate regenerative principles within historic and existing building stock, fostering a more inclusive and sustainable built environment.

In conclusion, the "Regenerative Construction and Operation" publication serves as a vital resource within the COST Restore project, illuminating the pathways towards a sustainable built environment through a comprehensive Building Life Cycle Approach. By addressing the critical stages of procurement, construction, operation, and future use, the publication outlines the necessary strategies to transition from traditional construction methods to practices that genuinely embody regenerative principles.

Central to this transition is the establishment of a common language through the creation of a sustainability dictionary, which mitigates misunderstandings and enhances collaboration among stakeholders. This effort is crucial for overcoming the barriers that have historically hindered the implementation of regenerative practices in the construction industry. Ultimately, this publication not only contributes to the ongoing discourse on sustainability but also offers practical insights and methodologies that can facilitate a significant paradigm shift towards a regenerative future in the built environment.

Keywords: Regenerative Construction / Life Cycle Approach / Procurement / Construction / Operation / Future Life

Rethinking Technology

Roberto Lollini (EURAC Research, Institute for Renewable Energy, Bolzano – Italy) / WG4

Proper technology solution-sets can enable a regenerative indoor environment for building users and for the planet, thereby ensuring occupant wellbeing and health. Several aspects are considered for high indoor environmental quality, such as hygro-thermal comfort, visual comfort, indoor soundscape, indoor air quality and a pleasant ambiance. Regenerative indoor environmental quality must be achieved, through the minimization of environmental and social impacts linked to the solutions, while making optimal use of resources throughout the entire set of life cycles.



Fig. 1. Regenerative design process

The activities of Working Group Four of the COST Action RESTORE were undertaken with the aim of defining the aspects that determine a regenerative indoor environment, so that all the technologies and their characteristics that provide this "regenerativeness" may be defined.

Regenerative design is built on the awareness that humans and the built environment exist together within natural systems. As such, Regenerative Design is aimed at reversing the damage that has been done, restoring ecosystems, so that they will thrive and evolve. As regards the design of spaces, regenerative design places occupant wellbeing centre stage.

The approach used towards preparing a list of KPIs consisted neither of nullifying nor of erasing the regulatory requirements. Instead, it was intended as a step towards the achievement of a better indoor environment and reconnection with natural elements. Key Performance Indicators (KPIs) related to the design of indoor environment, aimed at:

- support a radical shift from merely limiting health-related impacts, to a series of newer regenerative performances improving building occupants' comfort perception and health,
- fully embrace the meanings of health generation and wellbeing, facilitating the likely effects and prospects to achieve regenerative targets, as well as being measurable to assess actual performance of the technologies.

For each KPI, a regenerative threshold is proposed, as shown in following table. As may be observed, besides the objective parameters that may be monitored with specific instrumentation, subjective ones are also introduced, i.e. the percentage of satisfied people assessed by means of POE survey questionnaires. Thermal comfort and indoor climate satisfaction are the results of a balancing process between the physical environment and subjective comfort expectations. Reactions and behaviour are based on experience. Thus, individual requirements and occupant satisfaction are "highly negotiable socio-cultural constructs".¹⁴

Environmental aspect	Sub-aspect	КРІ	Regenerative values
Air Quality Environment	Contaminants	Formaldehyde	≤ 0.1 mg m ⁻³ [30 min]
	Outdoor/Indoor	Particulate matter: PM ₁₀ PM _{2.5}	< 150 µg m ⁻³ [24h] < 12 µg m ⁻³ [1yr]
	Occupant satisfaction	% satisfied people	80 %*
Hygro-Thermal Environment	Temperature/ humidity/air speed	Implementation of ASHRAE 55	ASHRAE 55 + evaluation of air movement
	Occupant satisfaction	% satisfied people	80 % *
Visual	Daylight	Useful Daylight Illuminance	300 – 3000 lux
Environment	Circadian Rhythms	Equivalent Melanopic Lux	≥ 200 (9am-1pm) **
	Occupant satisfaction	% satisfied people	80 % *
Acoustic Environment	Background noise level	Noise criteria	
	Occupant satisfaction	% satisfied people	80 % *
Human Nature	Right to light	% with windows access to daylight	100 % of inhabitants
Environment	Connectivity to Nature (Biophilia)	Intentional interior design interventions that bridge the gap between natural and built environments.	 Biophilic Design Workshop held prior to design. Biophilic Interventions in- corporated: 7/14 Biophilic Patterns [Browning et al. 2014]. POE Connectivity with Nature satisfaction.

* response rate representing at least one quarter of the total number of building/indoor environment users. Although a value of 100% is desirable, and in some cases like hygro-thermal comfort is achievable with the use of personal comfort systems [Pasut et al. 2015], we are aware that there will always be a percentage of people that despite all efforts may never be satisfied. For this reason, we aim at a value that is 80% or higher.

** for 75 % or more workstations.

*** enclosed / open offices.

Fig. 2. Final list of KPIs and proposed values

A Post-Occupancy Evaluation (POE) is necessary for a practical evaluation of the quality of the indoor environment. Among many other definitions in the scientific literature, POE has been characterized as "... the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time."¹⁵ Data

¹⁴ Luo, M., de Dear, R., Ji, W., Cao Bin., Lin, B., Ouyang, Q., & Zhu, Y. (2016). The Dynamics of Thermal Comfort Expectations: The Problem, Challenge and Implication. Building and Environment, 95 (January), 322–329.; Chappells, H., & Shove E. (2005). Debating the Future of Comfort: Environmental Sustainability, Energy Consumption and the Indoor Environment. Building Research and Information, 33 (1): 32–40.

¹⁵ Preiser, W. F. E. (1995). Post-occupancy evaluation: how to make buildings work better. Facilities Journal, 13 (11) 19-28. MCB University Press

collection, evaluation and feedback are the cornerstones of continuous improvement in the supply of buildings. A robust data-collection procedure is an intrinsic part of good building briefing and design. POE is a way to obtain this information during the life cycle of a building and is often used as a generic term that can include both: a review of the process delivery of a project; and, an evaluation of the technical and functional performance of the building during the time of its occupancy. Other than driving the operation of the building and its related systems, the information from data collection, evaluation and feedback can also be transferred to future projects. POE can serve several purposes, including the following:

Short-term benefits

- Identification of building-related problems and definition of possible solutions;
- Response to user needs;
- Improvement of space utilization, based on feedback from users;
- Understanding the implications of changes within buildings (e.g., budget cuts, working context);
- Informed decision-making.

Medium-term benefits

- Built-in capacity for the adaptation of buildings to organizational change and growth;
- Finding new uses for buildings;
- Designer accountability for building performance.

Long-term benefits

- Long-term improvements in building performance;
- Improvement in design process quality;
- Strategic review

Technology solution-sets that enable the design of the regenerative indoor environment will first of all need to implement specific functions and to ensure proper operational performance. A specific framework for the collection of such solution-sets has been created. The framework is a means of establishing the links between the environmental aspects, their sub-aspects, and the functions upon which the performance of the building systems and components depend, in order to achieve the goals, and the related technologies that can be applied. The table that appears below provides an overview of these links between environmental aspects and sub-aspects and the functions of the building systems and their components. The analysis has mainly been focused on technologies suitable for office buildings and five main environmental aspects. However, the way in which the framework is designed also means that researchers and practitioners can implement solutions-sets for other building types (e.g., residential and commercial or educational buildings) and/or increase the number and the typology of environmental aspects under consideration. The five environmental aspects (i.e. indoor air quality, hygro-thermal environment, visual environment, acoustic environment, human values) and related sub-aspects within them (considered objective factors and subjective factors always related to occupant satisfaction levels) have all been analyzed in detail.

Environmental aspect	Sub-aspect	Function	
Indoor air quality	Contaminants	Remove/absorb pollutants	
	Outdoor/Indoor	Change air Control	
	Occupant satisfaction levels		
Hygro - thermal	Temperature/humidity/air speed	Passive/active	
Environment	Occupant satisfaction levels		
Visual Environment	Daylight	Allow/block light and sun	
	Occupant satisfaction levels		
Acoustic Environment	Background noise level	Prevent noise Absorb noise	
	Occupant satisfaction levels		
Human Values	External view and Right to light	Allow view and light Include natural elements within the space	
	Biophilia		

Fig. 3. The relation between environmental aspect, performance sub-aspects and building functions

The following functions of the building are identified to achieve the environmental goal: the indoor air quality can be controlled by capacity either to remove or to absorb pollutants, capacity to change the air, and, capacity to control the concentration of pollutants and contaminants; the hygro-thermal environment can be controlled by means of active and passive strategies; the visual environment can be controlled by either blocking solar radiation or facilitating its entry into the building. Finally, the acoustic environment can be controlled by means of two concurrent strategies: prevention and absorption of sound and noise. The last environmental aspect that has been analyzed is the one related to human values. Among the large number of human values to be integrated into building design, the two with the closest relation to regenerative design principles have been selected: external view and right to light, enabled by means of the presence of a view towards the outside and natural light within indoor spaces, and biophilia, enabled by the inclusion of natural elements, such as plants, within the space.



Compilation of technological solutions and best practices have been collected and selected for the repository of regenerative technologies (available at the COST RESTORE platform: <u>https://www.eurestore.eu/tools/</u>). The repository contains about 70 regenerative technological solutions grouped into three macro-categories (subsystems):

- Envelope systems
- Partitions and internal finishes
- Active building systems.

Fig. 4. The main sub-systems for achieving the function

The performance of these technologies must be evaluated during their life cycle, taking into account all the possible impacts. Although a mature concept, LCA is gaining ground, because it can be used to quantify the environmental impacts of design choices in the entire life of the project. There is also a wide-ranging life cycle thinking method which fairly considers all the environmental, economic, and social topics known as Life Cycle Sustainability Assessment (LCSA).



Fig. 5. Life Cycle Sustainability Assessment – LCSA (courtesy of prof. Marzia Traverso, Aachen University)

When applying the LCSA for a product, an equivalent system boundary must be used in all the three assessment tools. Clarification and translation of the results of the social impact for a product or a process into numerical values is no simple job. Whole Building Life Cycle Assessment (WBLCA) has proven to be a complex exercise practiced by experts¹⁶. Even though it has been incorporated into Green Building Rating Systems (GBRS), it is only in recent years that standardized methodologies have become accessible for building designers. The available methodologies are diverse and use a variety of international standards as their primary references. These variations imply differences in both goals and scope, particularly in relation to the description of the functional or reference units and system boundaries. The varied approaches to WBLCA that are available in different GBRS for the evaluation of embodied carbon are a barrier for precise comparisons between buildings assessed with different tools, m and likewise for the development of baselines to drive estimated reductions of environmental impact¹⁷. A standardized WBLCA methodology must be established for the building industry using simplified tools, in order to continue making advances with the holistic environmental assessment in buildings, including more robust databases and a large body of knowledge. In conclusion, nature-built environment-humans are part of the same system (SEVA vision, compared to EGO and ECO, as reported in RESTORE WG1 booklet) and the key for defining optimal interactions is an interdisciplinary approach including building physics, cognitive science, sociology, medicine, environmental science, and economics. Such an interdisciplinary approach will help find well-balanced solution-sets for technologies that, properly applied, can serve to define regenerative indoor environments.

Keywords: Regenerative Technology / Key Performance Indicators (KPIs) / Post-Occupancy Evaluation (POE) / Regenerative Technologies Repository / Life Cycle Sustainability Assessment (LCSA) / Whole Building Life Cycle Assessment (WBLCA)

¹⁶ Giesekam, J., Barrett, J. R., & Taylor, P. (2015). Construction sector views on low carbon building materials. Building Research & Information, 44(4), 423–444.

¹⁷ O'Connor, J., & Bowrick, M. (2014). Advancing Sustainable Design with Life Cycle Assessment (LCA) – SABMag.
Scale Jumping: Regenerative Systems Thinking within the Built Environment

Jelena Brajković (University of Belgrade, Faculty of Architecture, Belgrade – Serbia) / WG5

Scale Jumping: Regenerative Systems Thinking within the Built Environment is the approach developed and methodologically studied by the RESTORE last and final Working Group 5. It is at the end of the RESTORE journey where all previous working group findings and insights were interconnected in a systemic way, within a holistic vision. In the work of WG5 and its Final Book¹⁸ scale jumping potentials and approaches within regenerative practice are explored. It addresses the possibilities, problems and challenges of applying systems thinking to work towards the regenerative growth of our built environments. Tasks of the WG5 were to investigate current frontiers in regenerative research and practice, incorporate previous group's strategies and findings into the systems thinking and scale jumping approach in order to analyze and discern on the future directions for the human-nature-built environment nexus, and in more details, interactions, tools, platforms and metrics within it.

The interplay between human behavior, technology, nature and the built environment presents a compelling case for the urgent need to rethink our approaches to urban and architectural design. It's clear that rapid technological advancements have led to development of built environments that often prioritize efficiency and growth over sustainability and well-being. Over the years industrialization and digitalization have fundamentally altered human interactions with surroundings, offering both new challenges and potentials for the development of human-naturebuilt environment nexus. The shift from material-centric to process-oriented design, as noted by figures like Rachel Armstrong and Mario Carpo, signifies a move towards more dynamic and interconnected systems. This transformation underscores the potential of new technologies to foster environments that are not only innovative but also regenerative.

The identified challenges - climate change, social inequalities, and human disconnection from nature—illustrate the complexities we face. The urgency for regenerative practices cannot be overstated; it requires a concerted effort to align human needs with environmental health. WG 5 emphasis on systems thinking and scale jumping — considering both the size and quality of interventions — offers a framework for thinking beyond systems boundaries and limitations.

¹⁸ Reith, A., Brajković, J. (2021). Scale Jumping: Regenerative Systems Thinking within the Built Environment. A guidebook for regenerative implementation: Interactions, tools, platforms, metrics, practice. COST Action CA16114 RESTORE, Working Group Five: Scale Jumping, printed by Eurac Research (Bolzano, IT). ISBN (Printed version) 978-3-9504607-9-7, ISBN (Online version) 978-3-9504607-8-0.

At a detailed level, the work and findings of RESTORE Working Group 5 were presented in its Final Book – the exploration of scale jumping potentials for neighborhood, city and society-wide level regenerative sustainability, including analysis, solutions, implementations and discerns for future development. Scale Jumping potentials are discussed in the book in both size and quality:

- In size: upscale area thinking beyond building scale
 - upscale reach influence more people, target new audience
- In quality: upscale research potentials new directions and interactions
 - upscale market potentials enhance market interest
 - upscale networks develop interdisciplinary and intersectoral connections.



Fig. 1. Scale Jumping Framework, Source: Reith (2020)¹⁹

The *Scale Jumping* Book structurally presents a framework for analyzing, implementing, and exploring scale-jumping strategies through systems thinking and holistic approaches. Following a gentle introduction to systems thinking and its application in the context of regenerative city patterns, it is divided into two main thematic sections: *Interactions* and *Tools, Platforms and Metrics*.

¹⁹ Reith, A. (2020). RESTORE – WG5: Scale Jumping. The Kick off Meeting, Presentation by András Reith, Cyprus, 13th of February 2020.



Fig. 2. RESTORE WG5 Final Book

In the *Interactions* Section, the focus is set on analyzing the human-nature-built environment nexus. Three chapters examine the triangular relationships within this system, addressing topics such as design, energy, materials, education, and equitable economies. Key discussions include human-built environment interactions, featuring case studies, health impacts, and sustainability assessment tools. Nature-built environment interactions are explored through scale-jumping opportunities and small, impactful urban interventions.

The *Tools, Platforms and Metrics* Section analyzes the implementation of regenerative practices using supportive technologies and frameworks. It reviews current trends in scale-jumping technologies and green transition legislation that facilitate restorative urban planning. Throughout chapters topics include digital tools for district regeneration, smart technologies, (big) data, AI, digital twins and emerging technologies, while last chapter focuses on legislation and policy documents in support of a green transition.

Practice Exercise presented at the end of the Book reports on the *JUMP 2030 - "The Good Urban Life" A Holistic Vision for the Brigittaplatz/Hannovermarkt in the 20th district of Vienna*, Vienna Training School and Online Conference Program, which took place in Vienna (Austria) in September 2020.





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3 Practice Exercise
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ead Authors: Brajkovic, J., Calas, D.

JUMP 2030 - "The Good Urban Life"

A Holistic Vision for the Brigittaplatz/Hannovermarkt in the 20th district of Vienna

Vienna Training School and Online Conference

Vienna (Austria) 21st - 25th September 2020



- 16 trainees, 3 international trainers, 3 local trainers, 16 keynotes/speakers, 3 site visits, 1 exhibition, 5 jury members, 1 final presentation

- **urban renewal** of an existing neighbourhood

- an implementation of social cultural relations, an inclusion of circular considerations and a reflection of biophilic attibutes

Fig. 3. RESTORE WG5 JUMP 2030 "The Good Urban Life" Training School in Vienna, 2020.

The JUMP 2030 Training School is just one of many activities implemented by RESTORE WG5, which commenced in February 2020, and was active throughout 2020 and 2021. WG5 was comprised of many professionals and academics with different backgrounds, which allowed needed multidisciplinary and intersectoral approach to the topic concerned with systems thinking and holistic strategies. WG 5 had more than 80 active members across the sectors, who contributed to its work, and over 50 authors contributing to the final publication. Besides the Final Book, *Scale Jumping Regenerative Systems Thinking within the Built Environment*, the goals that were set within the RESTORE WG5 were achieved through many working and dissemination activities, meetings, published papers, conferences attended, and Short Time Scientific Mission (STSM) enrolments.



Fig. 4. RESTORE Working Group 5 Infographic

By examining human-nature-built environment nexus, as well as building, neighborhood, city, and societal levels, the work of WG5 and its Final Book conclude the regenerative journey and findings of RESTORE, and illuminate pathways for integrating holistic systems thinking into regenerative design and its practical applications. This approach fosters collaboration across disciplines and sectors, essential for developing healthy, regenerative, resilient and adaptable environments. It invites readers to envision solutions that prioritize both human well-being and ecological balance, ultimately encouraging a more harmonious existence within the intricate web of life.

Keywords: Scale Jumping / Systems Thinking / Regenerative Implementations / Human / Nature / Built Environment

Serbia GBC and Sustainable Building Projects in Serbia: An Overview

Martin Elezović²⁰ (REENG, Serbia GBC, Belgrade - Serbia)

SerbiaGBC (Serbian Green Building Council) was established in 2010 as a member based, non-profit, non-governmental organization, with the focus to raise awareness about "green buildings" and promote measures to reduce impact on environment and natural resources consumption. We are a member of the WorldGBC – World Green Building Council and actively participate in the work of ERN - European Regional Network of National Councils. This membership allows us to be involved in current trends through the exchange of information and access to the latest projects, research and campaigns, which we bring to our market.

Last year we were celebrating 10th anniversary in the changed environment caused by the Covid19 situation. Our main activity was shifted to online actions to promote "green buildings".



Fig. 1. Serbia Green Building Council – Annual report 2019

At the same time when Serbia Green Building Council was established in 2010, the very first project is registered in Serbia for green building certification. Green building certification schemes are developed by many large green building councils across the globe, like LEED by USGBC, Green Star by Green Building Council of Australia, DGNB by German

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Sustainable Building Council and BREEAM is adopted as a national green building rating tool by Norwegian Green Building Council, Sweden Green Building Council and Dutch Green Building Council, among others, although initially developed in UK by BRE. Green building certification schemes offers robust, independent rating tool, helping owners, users, and operators of the building to measure and compare their buildings against sustainability criteria defined by each certification scheme. Green building certification schemes represent important activity for green building councils. Serbian Green Building Council is focused on providing education on various certification systems with a longterm goal to develop national certification scheme in future. The development of the sustainable building in Serbia will be presented through the prism of certified green buildings in Serbia. Currently only LEED and BREEAM certified buildings are present in Serbia.

2011 was important year for Serbia and sustainable buildings overall since the new Energy Efficiency rulebooks, based on EU Energy Performance of Building Directive have been adopted. The new regulations set much stricter requirements on building envelope and for the first time the energy passports have been introduced in Serbia.

The next milestone was in 2013 when the first building in Serbia received green building certificate BREEAM In-Use Very Good/Excellent for Blue Center building in Belgrade.

In 2014 the first LEED certificate was awarded to MPC project Ušće Shopping Center in Belgrade.

In 2015 GTC HOUSE project in Belgrade with the LEED certificate for existing buildings, sets the new trend among office buildings intended for leasing. The GTC House together with atrium Belgrade offices was one of the first buildings in Belgrade developed by international developers and intended for renting. Those buildings received the first tenants in 2004-2005 setting the new trend of modern office buildings in Serbia.

Atrium Belgrade offices received LEED certificate in 2017 and at the same year Serbian Green Building Council moved to Atrium Belgrade offices.

The next important milestone was reached in 2019 when the first LEED Platinum certificate was awarded in Serbia for LIDL Logistics center in Nova Pazova. It is very important to promote projects reaching high rating because they are making only 15-20% of all certified projects overall. Those building sets standards and best practice approach how to reach green and sustainable buildings and should be recognized for their efforts.

In 2020 portfolio certification trend started with CTPark and portfolio of 4 buildings in Serbia have been certified against BREEAM In-Use International. CTP has also certified their portfolio of 292 buildings in EU. It is important to note that other developers, like GTC and MPC, are gradually certifying their portfolio over time, covering almost all buildings in their portfolio.

The latest milestone will be set in 2021 with MPC project UŠĆE TOWER TWO in Belgrade, with expected BREEAM New Construction International Excellent certificate (interim certificate awarded) setting another high rating building in Serbia.



Fig. 2. Certified buildings in Serbia – development over last 10 years

Although we can see that there is interest in green buildings in Serbia and that there is positive trend, the overall figures comparing the certified projects to non-certified projects are providing a less optimistic overview in which direction building sector is going:

- With 29 certified buildings, Serbia is among average countries by the relative number of certified projects this makes only 0.001% of the whole building stock in Serbia
- The total certified area is in range of 450.000 m² this makes 0.11% of total building stock in Serbia.
- Only 3-4% if building passports are entered in CREP (official building passports online register), although there
 is legal obligation to do it, but the lack of practice is probably the main cause why only small number of
 buildings have been entered (slightly above 4000)



Fig. 3. Sustainable buildings in Serbia – overall figures

It is important to note that there are for sure some other good examples of green and sustainable buildings in Serbia. This overview can serve as an illustration of the status of officially and independently certified buildings and current status of those buildings in Serbia. With just a fraction of the overall building stock in Serbia, certified building represents the exemplary green buildings. It is important to note that event these exemplary buildings using current best practice measures to reduce overall environmental impact are still far away from the concept of nearly zero carbon building (expected gap in range of 65-80%), not to mention net zero carbon, restorative or regenerative buildings. In order to reach EU 2050 carbon goals related to buildings, we will need to significantly increase the number of at least nearly zero carbon buildings by rate of thousandfold per year. The big question is if we have financial, technical and workforce resources to do so. Serbia Green Building Council is taking our part in this mission by educating, promoting green buildings, and advocating with policy makers in order to improve sustainability in building sector in Serbia.

Keywords: SerbiaGBC / Sustainability / Buildings / Timeline / Certifications

Living Future Green to Improve the Building Environment. A Case Study in Serbia

Jovan Mitrović (Living Future Green, Association Serbia Green Building Council, Slovenia)

There is an increasing number of incentives for architects and members of related professions in Serbia to think about green, sustainable architecture, and not only as a trend, but primarily as an essential need of society and its responsibility towards people, nature and the city. Such buildings include green facades - vertical gardens, use of renewable energy sources, good termalinsulation, triple glazing, natural materials and principles of circular economy, which can ensure maximum energy efficiency of the buildings. Case studies show Serbia is keeping up with regenerative principles in architecture.

Stattwerk Eco-Centre

The Stattwerk ECO-CENTRE concept was developed based on the original design brief and specialist analysis of the existing construction on the site. The concept takes sustainability as a core element in every decision made throughout the architectural and technical design of the building. This fully sustainable building will become a showcase for green innovation and technology and serve as a role model to other projects in Belgrade, Serbia and wider region. Stattwerk's international jury had selected LFG architectural studio as the winner of competition for eco-center in Zeleni Venac.



Fig. 1. Existing building construction, future appearance and interior of sustainable green Stattwerk building

The concept proposes a three-part architectural design for mixed-use purposes, consisting of: premium office space, apartments of various sizes, an organic restaurant and garage space (proposing the use of a fully automated mechanical parking system). The facade of the building features innovative solutions for sun protection and energy generation using triple-glazed glass, integrated photovoltaic sunshades and hanging gardens, whilst the roofs make use as urban gardens and rainwater collection systems.



Fig. 2. Appearance and sections of the future Stattwerk ECO-CENTRE

The existing constructive system of the previous Beobank building (the tower and the lower part) is retained in the majority of the building. Part of the reinforced concrete ceiling is removed, and the beams and columns that are used as mounts for hanging green gardens are remained and will be covered with photovoltaic Ductal panels.

Obrenovac Sports Hall

Sports hall is done as an extension to the original gymnasium building from 1930, yet 85 years later. The new hall was supposed to be located in a small school yard, between the old school building, Sokolski dom and church, which are under protection of the state, on the one hand, and outdoor playground on the other. The initial urban concept made by a local architect covered almost the whole yard and supposed to be higher than 19th century building in neighborhood. The new realized concept laid two-thirds of the hall and all supporting premises such as cloakrooms, bathrooms, and technical rooms under ground level, with only a simple glazed wooden skylight leaving a decent open space area, which is quite useful for children's activities on fresh air.



Fig. 3. Proposed and adopted solution for the position of hall level

In order to preserve the existing ambient environment and provide the students with as much space as possible for sports activities, the hall is digged into the ground to level of underground water, five meters deep, and its roof is raised three meters above the ground surface. Of course, protection from underground water had to be considered, so part of the underground hall is made from waterproof concrete. The interior lining of the hall is made of waterproof plywood as the final finish.



Fig. 4. Serie of small wooden coulmns as a symbolic representation of typical rural fences in Serbia

The part of the hall above the ground is made of laminated wood with a glass finish. Since there are open sport fields in the vicinity of the building, the thin vertical wooden pillars became part of the facade. They also protect the building from the balls and the impact of direct sunlight. The idea for this protection was found in traditional rural architecture. Namely, this element of protection is reminiscent of wooden fences, characteristical for this climate.

Architect Jovan Mitrović received the award of the 37th Salon of Architecture in the category 'Architecture – Reconstruction' for this project. As well, the Obrenovac gymnasium received the Ranko Radović award in 2015.

Bože Jankovića Family House

The existing family building on the site was not suitable for reconstruction, so a new one was built. The willingness to embrace sustainability through the principles of circular economy and affordability in the project led to an approach to utilize as much as possible of the demolition debris, resulting in a series of further design decisions.



Fig. 5. Layouts and section of the new family hause



Fig. 6. Circular economy principles in practice: reuse and recycling of an old building materials

Old concrete was grinded up and used for making a new foundation. Bricks were cleaned, cut in half and used for facade cladding. Old wooden beams were used for parts of the roof and interior finishing. The main brick part of the new house is following the footprint of the former house.



Fig. 6. Circular economy principles in practice: reuse and recycling of an old building materials

Wooden part of the new house, which hosts the sleeping zone on the first floor was designed as one big beam on a solid base. Green roof garden is on the top off brick cube and protect thermal and hydro insulation from overheating and freezing. Finally, interior home elevator was built for people with special needs.

Keywords: Sustainability / Green buildings / Circular economy / Reuse / Recycling / Accessibility

Creating a Resilient Urban Ecosystem using Eupolis Approach: Starting with Green Roofs

Filip Stanić, Anja Ranđelović, Željko Vasilić (University of Belgrade, Faculty of Civil Engineering, Serbia)

The main role of all Nature-Based Solutions (NBS) is to use natural ecosystems in urban areas to provide biodiversity benefits. As such, NBSs are fundamental for facing the actual urbanization consequences and building a sustainable environment. Green roofs are the basic and the most widespread type of NBS-s that provide several ecosystem services.

Besides reducing the urban heat island effect, green roofs also cause mitigation and delay of the urban runoff peak. This is their main role since they are designed to respect regulation rules adopted by local authorities based on minimizing the water quantities in sewer systems. In many places, however, building/designing green roofs is still not normalized by law and hence they can be seen only sporadically in the exclusive residential areas, serving mostly as the decorative roof gardens.

To meet as much as possible the requirements set by local authorities in terms of the allowed flow rates coming from the building roofs and reaching sewer systems, plenty of scientific investigations from the aspect of hydrology and stormwater management have been conducted. Even though many of technical issues related to green roofs and other NBSs have been addressed during the years, their regenerative effect and impact on people's overall health and wellbeing is still to be identified. This exactly is the topic of the ongoing H2020 project euPOLIS that is, besides the innovative technical cognitions, and promoting participatory co-design, expected to evaluate the impact of NBSs, among them green roofs, on the public health and wellbeing. In this project, the city of Belgrade participates as the largest demo site with two micro-locations containing different types of NBSs, setting up an enhanced multiparameter monitoring system to follow direct and indirect effects of NBSs on people's health and wellbeing. Due to such multidisciplinary evaluation, project team includes academia, City authorities, NGOs and SMEs.

Keywords: Green Roofs / Nature-Based Solutions / Urban Runoff / Sustainable Environment

1. Introduction

- euPOLIS is a part of Horizon 2020 European projects
- euPOLIS aims improving Public Health & Wellbeing in urban areas through different Nature Based Solutions (NBSs)
- Belgrade is the largest urban demo site with numerous interventions to be built and investigated
- Green Roofs (GR) are the most widely used type of NBSs with multiple functions
- Few of GR functions and their future perspectives are presented here

3. euPOLIS interventions in Belgrade (1)

- 3.1. Linear Park
- Currently an industrial zone
- Abandoned railway track (4.2km)
- Neighboring a vibrant community
- In contact with two rivers, major cultural and historic places

3.2. Ušće Park

- An existing green area/park
- In a highly urbanized part of Belgrade
- In a near vicinity of the river
 Danube and Museum of Contemporary Arts





2. euPOLIS project (1)

- Goal: Innovative, integrative, systematic planning with NBSs improving
 Public Health and Wellbeing
- Innovative Tools:
- Extensive participatory planning
- > Monitoring of urban, environmental, socio-economic and H&WB indicators



Numerical analysis and modeling of interactions between urban components and ecosystem services

3. euPOLIS interventions in Belgrade (2)

3.2. Ušće Park – pilot pocket park

"Pocket Park Model" equipped with NB MF "canopy" units for natural shading of 30m2 (irrigated vertical climbing vegetation) for socializing, recharging electronics, playing chess, or waiting for buss, in three spots in the greater park area





3. euPOLIS interventions in Belgrade (3)



4. Green roofs (1)

4.1. General characteristics

- Most widely used type on NBSs
- Multiple functions:
- ➢ Reduction of the urban water runoff
- Reduction of the urban heat island (UHI) effect
- Improving indoor thermal comfort
- ➢ Air cleaning
- ➢ Urban gardening



4. Green roofs (2)

4.2. Types of green roofs

Intensive GR

- ✓ higher substrate thickness
- ✓ significant load on the roof
- ✓ demanding maintenance
- ✓ better water retention properties



Extensive GR

- ✓ smaller substrate thickness
- ✓ insignificant load on the roof
- ✓ easy for maintenance
- ✓ worse water retention properties



4. Green roofs (3)

4.3. Runoff water quantity - Hydrological aspect (1)

Main purposes:

- 1. Reduction of the stormwater quantities entering sewer system
- 2. Reduction and delay of the stormwater rate peak
- To design green roofs, it is necessary to:
- > estimate the hydraulic properties of the substrate layer
- introduce these properties into the rainfall-runoff model to simulate the infiltration through the substrate layer for a given critical rainfall event

4. Green roofs (7)

4.5. Urban heat island (UHI) effect (1)

- · GRs reduce temperature locally compared to the surrounding urban areas
- GRs provide thermal comfort temperature on the surface of GR is lower compared to the conventional roofs
- To simulate/predict ground temperature on the GR combine rainfall-runoff model & energy balance model



- GR is to be implemented on Eco-edu center in Ušće park
- Besides thermal comfort and reduction of the stormwater runoff, the GR is to be used as urban garden with meteo station
- This pilot site could be used for popularization of GRs through urban gardening/farming - improving biodiversity in cities and creating feeling of ownership and community participation
- Belgrade has plenty of potential for GRs, since most of the old buildings are designed to carry on an additional load

Solutions for Regenerative Cities – Case: Linear Park

Darko Šutanovac²¹ (Department of City Architect of the City of Belgrade - Serbia)

About Belgrade

Belgrade, the capital of the Republic of Serbia, is located at the confluence of two international rivers: the Danube and the Sava. About 1.7 million people live in the wider area of the city, which is the fourth largest city in Southeast Europe, after Istanbul, Athens and Bucharest. The City of Belgrade, as a specific territorial unit, consists of 17 municipalities. During 2020, Belgrade issued construction permits for about 1.6 million m2, which places Belgrade in one of the largest construction cities in Europe. Belgrade is also home to one of the largest construction sites in Europe. Out of 1.8 million m2 of the "Belgrade Waterfront" project, more than 150 thousand have been built already, and 750 thousand are currently under construction. Belgrade Tower, within "Belgrade Waterfront", with its height of 168 m and 42 floors is the tallest building in the Balkans. Also, Belgrade will start the construction of the 1st line of the Metro by the end of this year. But, all these shiny facts lose its' glitter if they are not determined by one characteristic - sustainability.



Fig. 1. Belgrade Waterfront.

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What Belgrade has?

It has General Regulation Plan. The concept of the Plan makes continuity to the General Urban Plan of Belgrade 2021 implemented in several basic elements such as:

- taking into account the current construction rate and realistic assessment of the physical possibilities for further investments in the city,
- continuity in transportation and infrastructural planning in accordance with current and planned land use,
- integration of different developments without negative influence for each other
- planning the protection and development of the remaining natural green belt deeply engraved into the city core, as well as nurturing the inner-city greenery.

It has Urban Plan of General Regulation of Green Areas, which in context of sustainable development, defines plans and principles of connecting green areas, achieving multi-functionality and accessibility, preserving the character of the landscape and biodiversity improvement.

It has Sustainable Urban Mobility Plan (SUMP), which defines the obligation to implement projects that increase the percentage of pedestrians and cyclists in modal share for the next ten years. This will eventually protect the environment; raise the general level of public health and lower CO2 emissions.

It has Action Plan for Adaptation to Climate Change with Vulnerability Assessment, 2015.

What is Belgrade going to have?

Urban Planning Institute is preparing General Urban Plan of Belgrade 2041, which defines the strategic concept of development and protection of the city as a European metropolis, the centre of administration, culture, business and commerce.

The City of Belgrade signed the Global Covenant of Mayors for Climate & Energy (GcoM) on October 5, 2018, committing to reducing its carbon dioxide (CO2) emissions in selected sectors, by at least 40%, and to increase the city's resilience on the impact of climate change and to provide secure access to sustainable and affordable energy by 2030. As a result, the city of Belgrade started drafting the Sustainable Energy and Climate Action Plan (SECAP), which, in a broader sense, should address environmental challenges (including water, air and land). In addition to the development of SECAP, the City of Belgrade is currently developing a Green City Action Plan (GCAP), which represents the vision of the "Green City" for 2030 and provides a financially sustainable plan for achieving the ambition of Belgrade to win the "Green Capital of Europe" award in the near future. Both Draft Action Plans were presented to the public in Public Consultation process last month. Green City Action plan includes the Linear Park as one of the activities, establishing a program to achieve maximum environmental, social and economic benefits.

What is Linear Park?



Fig. 2. Linear park – Zones

By relocating the railway, that surrounds the Kalemegdan fortress, and by converting the existing traffic infrastructure into green areas for public use, the precious public space in the central city zone will expand and be given a new purpose - a public multifunctional city park. Belgrade's Public Land Development Agency has initiated deployment of a Detailed Regulation Plan (DRP) for this area, which is currently being developed by the Urban Institute of Belgrade. With a total area of 46.7ha, the DRP's Linear Park stretches from the municipality of Stari Grad to Palilula, and from Beton Hala to the Pancevo Bridge, with a length of 4600m. This transformation has multiple meanings for the future of Belgrade and the quality of life of all its inhabitants.

Due to its distinct length and small width, the Linear Park has been divided into ten spatial and program zones. The Department of the City's architect had organized a Public invitation for young professional multidisciplinary teams to qualify for the development of conceptual landscape design for the Linear Park in Belgrade. As a result, 10 teams, made up of architects, urban planners, engineers, biologist, etc. were selected. Each team, under the supervision of experts from the City Assembly, eminent architects and urbanists and representatives from the public institution, created a unique vision of the landscape's design for the zones, which, when assembled, will represent a collage of diverse ideas and designs.

There are two Horizon 2020 project studying Linear park as a Demo site. Not just for the zone 7 and 8, but also for the whole park. The other Horizon 2020 project is Clever Cities, where Belgrade is a follower city. Leader cities - Hamburg, London and Milan are designing and implementing nature-based solutions in key districts of their cities for urban regeneration, and Belgrade as a partner, will collect all good experience and implement them in planning of the Linear Park. Through exchange between cities, inclusive collaboration and multi-disciplinary learning, the CLEVER Cities project aims to drive a new kind of nature-based urban transformation for sustainable and socially inclusive cities. We implemented this concept via wide experts and citizens engagement in various planning phases, supported by CEUS, our local CLEVER Cities partner.

What makes cities regenerative?

- Benefits for the environment and natural ecosystems At the core of the regenerative vision is ensuring that
 future generations inherit a robust and intact world in which they can realise their full human potential and
 that cities continue to provide opportunities for all people to improve their quality of life. In the Linear Park,
 we will insist on: Shortening the distance with new crossing through the area, promoting urban and periurban agriculture; 5km of cycle path, 4.7km of pedestrian and running pathway;
- Drive the local economy We are all sure that one comfortable public space, designed for everybody, is used by everybody. Linear Park surrounding benefits from this social diversity and agglomeration in so many ways. Increased land value is just a side effect of this regeneration;
- Improve neighbourhood cohesion and health Urban agriculture has proven to improve social cohesion and lower crime rates by enabling local residents to take pride and ownership of their community and daily lives;



Fig. 3. Linear park – Zone 4, current state.

• Increase their own resilience - Increased self-sufficiency allows a city to be more resilient to external shocks. euPOLIS locally and Action Plan for Adaptation to Climate Change with Vulnerability Assessment, deal with increasing the scope and quality of the landscape and drainage of surface waters for the city.



Fig. 4. Linear park project visualisation for zone 2, Flood prevention – Luka Ilić, Đorđe Bulajić, Kosta Dimitrijević, 2020.

Enhance participatory decision making - Regenerative urban development is driven by democratic decision
making and implementation. The Law on planning and construction has public participation in 2 steps – Early
public display and Draft Plan Public Consultation. We recognized that Linear Park needs more public
participation and the new way to address it. So, Belgrade become a partner in both HORIZON 2020 projects:
euPOLIS and Clever Cities, where we engaged together in their activities and interaction with local
stakeholders. Many of them already participated in several reunions (online and local conferences before
COVID-19). Both projects approached the citizens with surveys, and inspired and encouraged to take part in
the process of altering their neighbourhood.



Fig. 5. Clever Cities – engaging and interacting with local stakeholders.

And for the end

"Dull, inert cities, it is true, do contain the seeds of their own destruction and little else. But lively, diverse, intense cities contain the seeds of their own regeneration, with energy enough to carry over for problems and needs outside themselves." - Jane Jacobs

This 2nd Jane's phrase describes Belgrade perfectly.

Keywords: Linear Park / Natural Ecosystems, Regeneration / Resilience / Participatory Planning / PH&WB

References

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Fig. 6. euPOLIS – engaging and interacting with local stakeholders.

The Line Park – Zone 8, Urban Space Transformation as a Challenge for Young Talents

Una Korica²², Ivana Korica²³ (Faculty of Architecture, UB, Association Serbia Green Building Council - Serbia)

The Linear Park Belgrade is a 4.6km of an old railway line spanning along river Danube in downtown Belgrade, starting beneath the historical park Kalemegdan. During 2019. it was decided that the area will be occupied by a new modern park, joining different parts of the old town and regenerating much of the old and abandoned industrial area. In January 2020. after a national architecture and urban design competition, dividing the 46.7ha area of the Linear Park into 10 zones, 10 teams of young architects in interdisciplinary teams were chosen to each design one of the zones.



Fig. 1. Area of the Linear Park Belgrade.

Zone 8 of the Belgrade Linear Park 2020, one of the 10 zones, is located in the area south of the Port of Belgrade. The current purpose of the location is industry, but according to the new regulation plan, a residential and residential-commercial zone is envisioned, including a metro station southeast of Zone 8. The area of the location is 24,730m2, which is exceptional for a multi-purpose park.

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Zone 8 is divided as following: Square, Meadow, Forest, Commercial zone, Educational zone (education through nature) – each of the segments interlinked. These zones are defined according to the distribution of key movement directions, where communication is shaped through several layers so that all types of movement are included.

Focusing on the users - the visitors of the park, the tenants of the future surrounding buildings, as well as the casual passers-by - the pedestrian communication is designed through three levels. The space visually integrates sustainability at every step, from solar panels and rainwater use, to every fragment of its functionality - urban agriculture, instant on location food sourcing (0km concept), open workspaces - hubs that economically contribute to the site and create a mini-epicentre of knowledge and innovation, as well as many other aspects.



Fig. 2. Area of ZONE 8 - Linear Park Belgrade.

The space depicts a creative ambience where all age groups intertwine and find attractive segments. It is crucial that the role of the square be a modern place that is both a natural oasis and a compact set of content. The value of a place is best defined by its resilience and strong character that develops over time by different participants. The design is such that the initially attractive space, rich in vibrant biodiversity of indigenous varieties, gives a great degree of flexibility and with that adaptability with each user, providing a great diversity of functions. The final project design is the product of interdisciplinary cocreation between young architects, planners, designers, biologist and landscape architect, allowing for knowledge expansion and problem solving on different levels and disciplines.

Keywords: Nature-Based Solutions / Sustainability / Regeneration / Urban Design / Nature

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RESTORE and Beyond: Materials for Dissemination

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With COST ACTION CA 16114 "RESTORE" (**Re**thinking **S**ustainability **To**wards a **R**egenerative **E**conomy) nearing its end, an overview of its output over the past years is presented together with details of activities that are still underway. The RESTORE Action has brought together over 160 researchers from 40 countries and the resulting output takes great advantage of drawing from their competencies from many different disciplines in a truly holistic approach. This includes an impressive number of book publications, journal publications and congress participations, interconnecting universities by scientific missions, education through training schools and industry workshop for industrials.



Fig. 1. RESTORE Participants

The RESTORE Action website²⁴ serves as a central output communication hub but several online channels, such as Twitter²⁵, Facebook²⁶ or the RESTORE's Researchgate²⁷ profile are also used to facilitate dissemination. Throughout the RESTORE Action a newsletter was released each month, providing reviews of finalized RESTORE activities, disseminations acknowledging RESTORE, details of Management decisions and announcing planned RESTORE activities, relevant paper calls in journals and congresses and similar.

The research work of RESTORE Action was carried out in 5 Working Groups (WG) that started chronologically and sequentially with the topics, thus dissemination had a special significance to pass on the results from one WG to the next. Each WG produced a dedicated booklet: WG1 – *Sustainability, Restorative to Regenerative* (2018), WG2 – *Regenerative Design in Digital Practice, A Handbook for the Built Environment* (2019), WG3 – *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* (2019), WG4 – *Regenerative technologies for the indoor environment, Inspirational guidelines for practitioners* (2020) and WG5 – *Scale Jumping* (to be published in 2021). The combined work of all WGs will be presented in the RESTORE Final Book *Rethinking Sustainability Towards a Regenerative Economy* due in 2021. Additionally, WG4 produced a specific tool *Atlas of Solutions* providing more detailed and structured overview into technologies improving indoor environment quality on 36 case studies. There are 2 further publications under preparation: (1) *RESTORY: Managing a COST Action as a project* intended to give insights on how to manage a project like a Cost Action through project presentation, an overview of activities and lessons learned from the Action, and (2) *RESTORD 2030: A city following RESTORE philosophy* intended to demonstrate approach that embraced regenerative principles and definitions, mandated regenerative design, construction, facility operation and technologies and successfully scale jumped into an exemplary regenerative city.

All outputs of RESTORE are freely available and may serve as inspiration and tool for students, lecturers, industrial or project managers, universities, public authorities, politicians, and humanists.

Keywords: RESTORE / Outputs / Scientific / Dissemination / Communication / Materials

²⁴ https://www.eurestore.eu/

²⁵ https://twitter.com/CostRestore?s=20

²⁶ https://www.facebook.com/COSTRestore

²⁷https://www.researchgate.net/project/MC-membership-of-COST-Action-CA16114-REthinking-Sustainability-TOwards-a-Regenerative-Economy



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