

REGENERATIVT BYGGERI

Eksempler, processer og fortællinger
fra et igangværende paradigmeskifte

Aarhus Arkitekturuge



Realdania



REGENERATIVT BYGGERI

Aarhus Center for Regenerativt Byggeri



Forskningsprojekter

REGENERATIVT BYGGERI – EKSEMPLER, PROCESSER OG FORTÆLLINGER FRA ET IGANGVÆRENDE PARADIGMESKIFTE

Projektets mål er at styrke og påvirke debatten om en regenerativ omstilling af byggeriet i samfundet ved hjælp af fakta baserede kortlægninger og visuelle fremtidsscenarier på grundlag af disse.

REGENERATIVT BYGGERI

Projektgruppen ved Arkitektskolen Aarhus



Lotte Bjerregaard
Jensen
(PI)



Heidi Merrild
(Post-doc)



August Sørensen
(LCA-specialist/
Ekstern lektor)



Peer Nätke
(Forsknings-
assistent)

REGENERATIVT BYGGERI

Projektgruppen ved Arkitektskolen Aarhus



Antonio Bernacchi



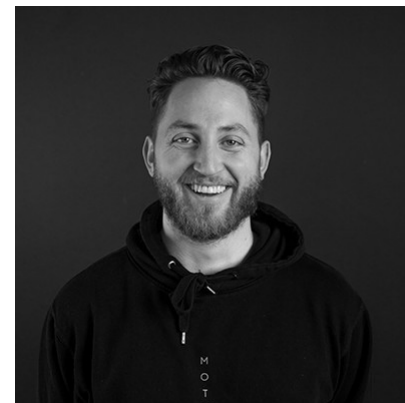
Alicia Lazzaroni



Anna-Lena Müller
(Forsknings-
assistent)



Elizabeth Donovan
(Co-PI)



Jens Pedersen



Emma Holm Kjær
(Studerer-
medhjælper)



Johan Hvidtfeldt
Rahbek
(Studerer-
medhjælper)

REGENERATIVT BYGGERI

Hvorfor Regenerativt Byggeri?

Hvorfor regenerativt byggeri?

...

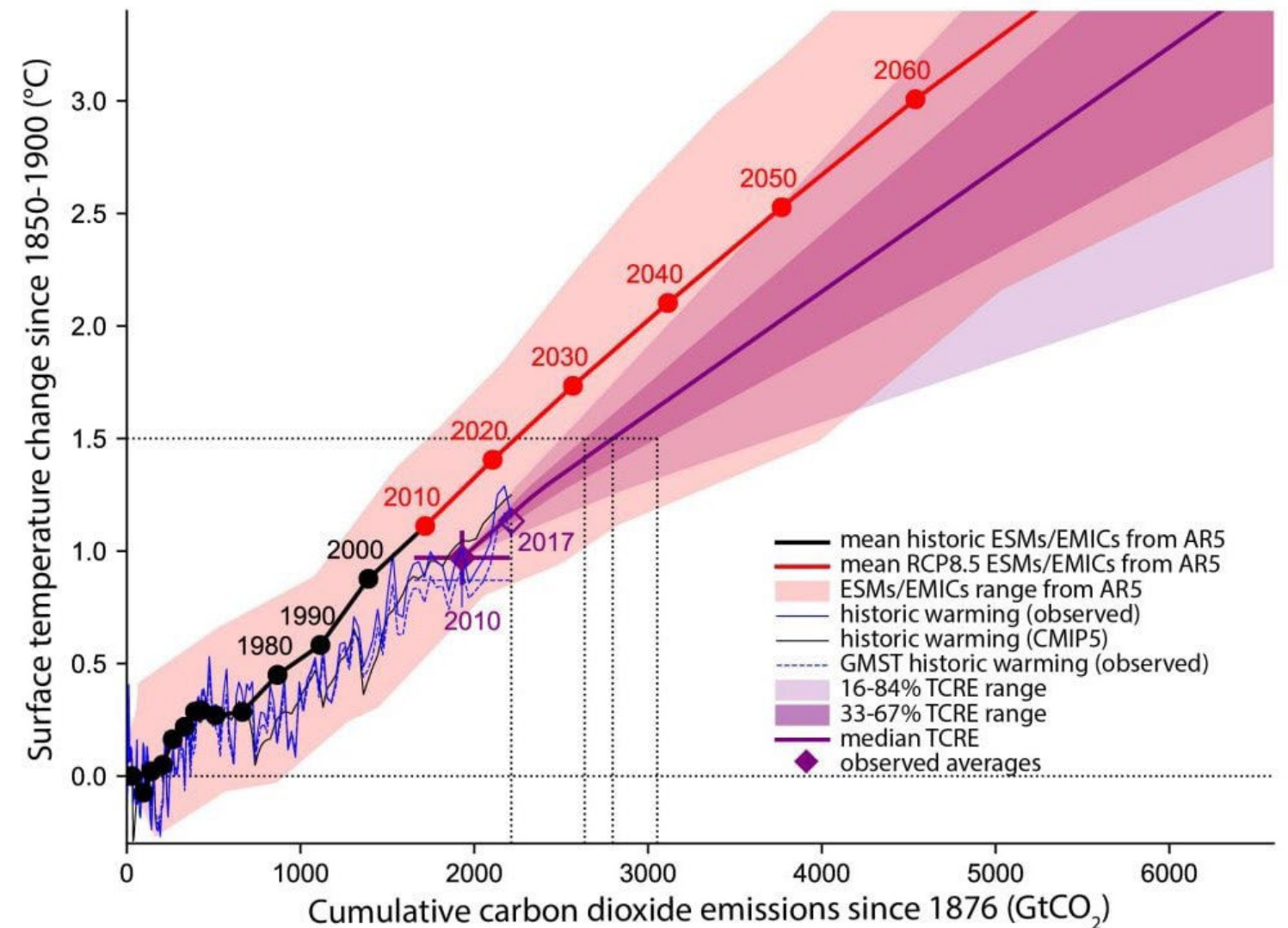
...

REGENERATIVT BYGGERI

Hvorfor Regenerativt Byggeri?

Hvorfor regenerativt byggeri?

- Klimakrise



Temperature changes from 1850–1900 versus cumulative CO₂ emissions since 1st January 1876.

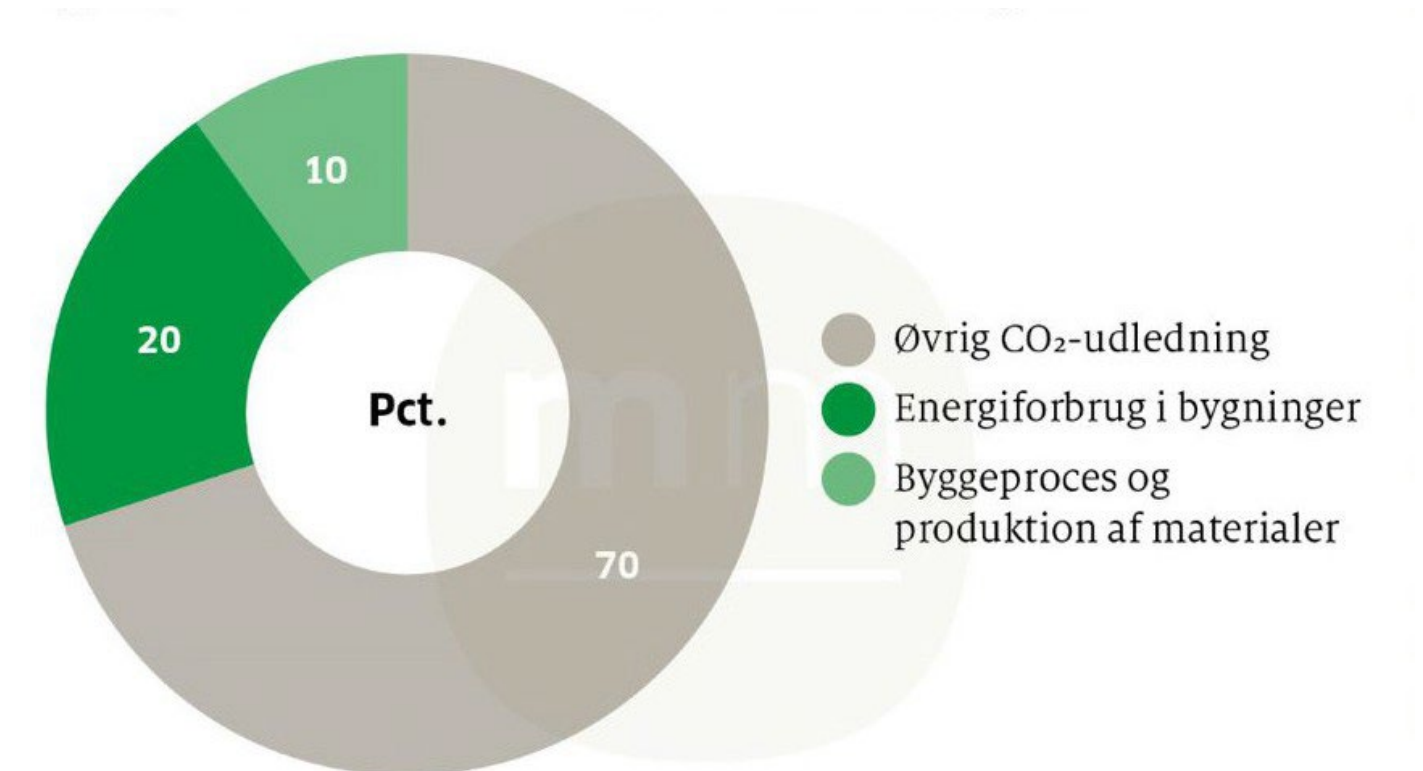
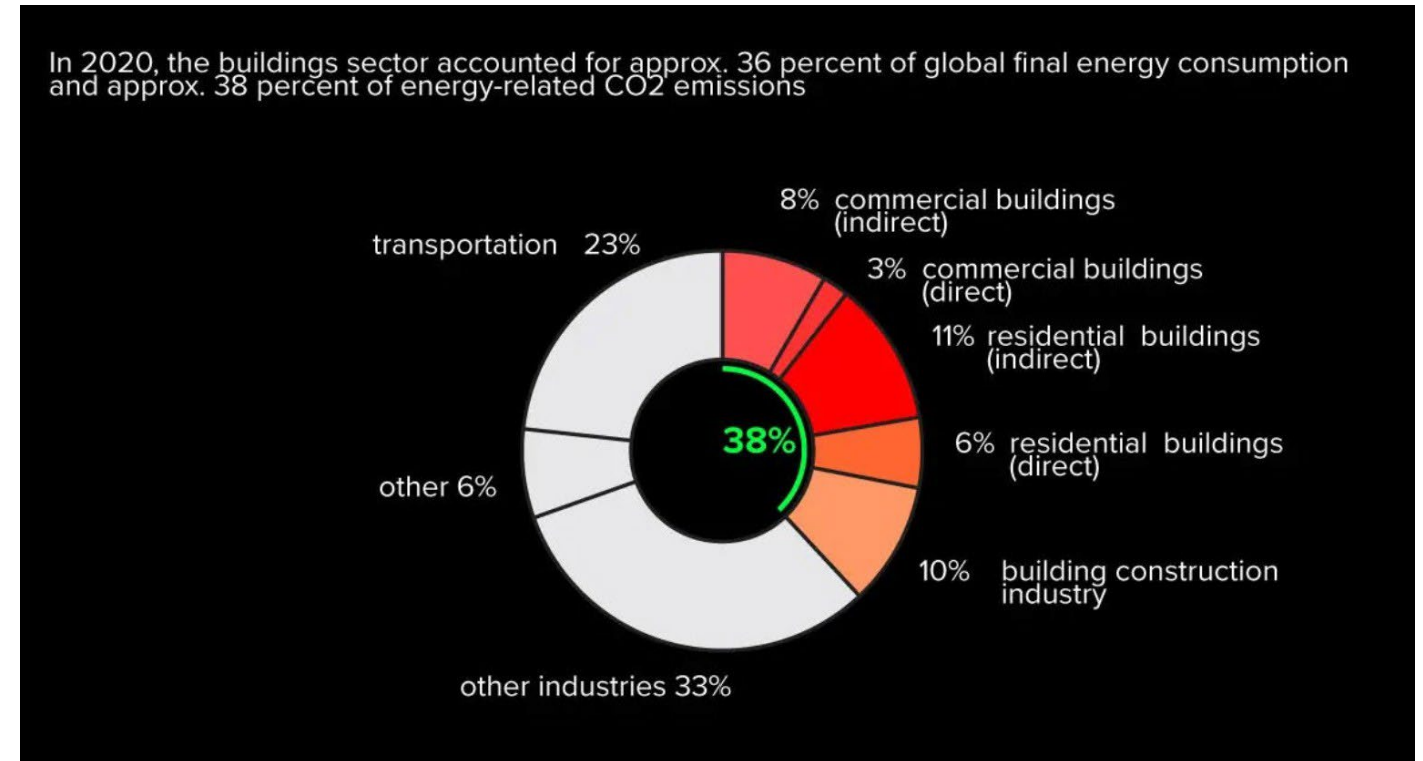
IPCC Special Report: Global Warming of 1.5 °C
<https://www.ipcc.ch/sr15/chapter/chapter-2/>

REGENERATIVT BYGGERI

Hvorfor Regenerativt Byggeri?

Hvorfor regenerativt byggeri?

- Klimakrise



Bygningers andel af samlede drivhusgasudledninger - Internationalt og i Danmark

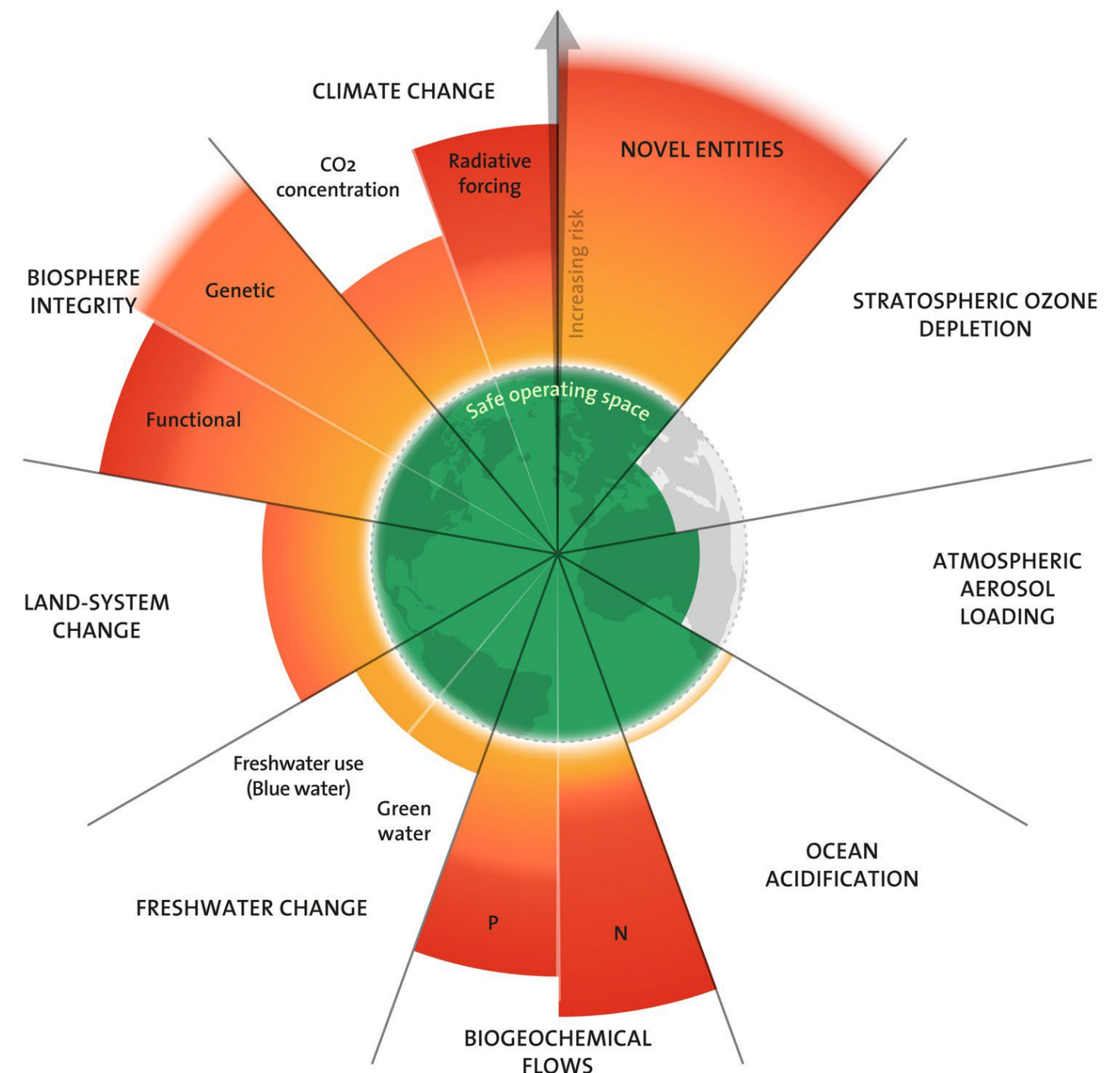
[Spaceforfuture.org](https://spaceforfuture.org/) / [DI Byggeri](#) / [Social- og boligstyrelsen](#)

REGENERATIVT BYGGERI

Hvorfor Regenerativt Byggeri?

Hvorfor regenerativt byggeri?

- Klimakrise
- Biodiversitetskrise
- Overforbrug af ressourcer
- Luftforurening
- Udvaskning af næringsstoffer
- Overforbrug af ferskvand
- ...



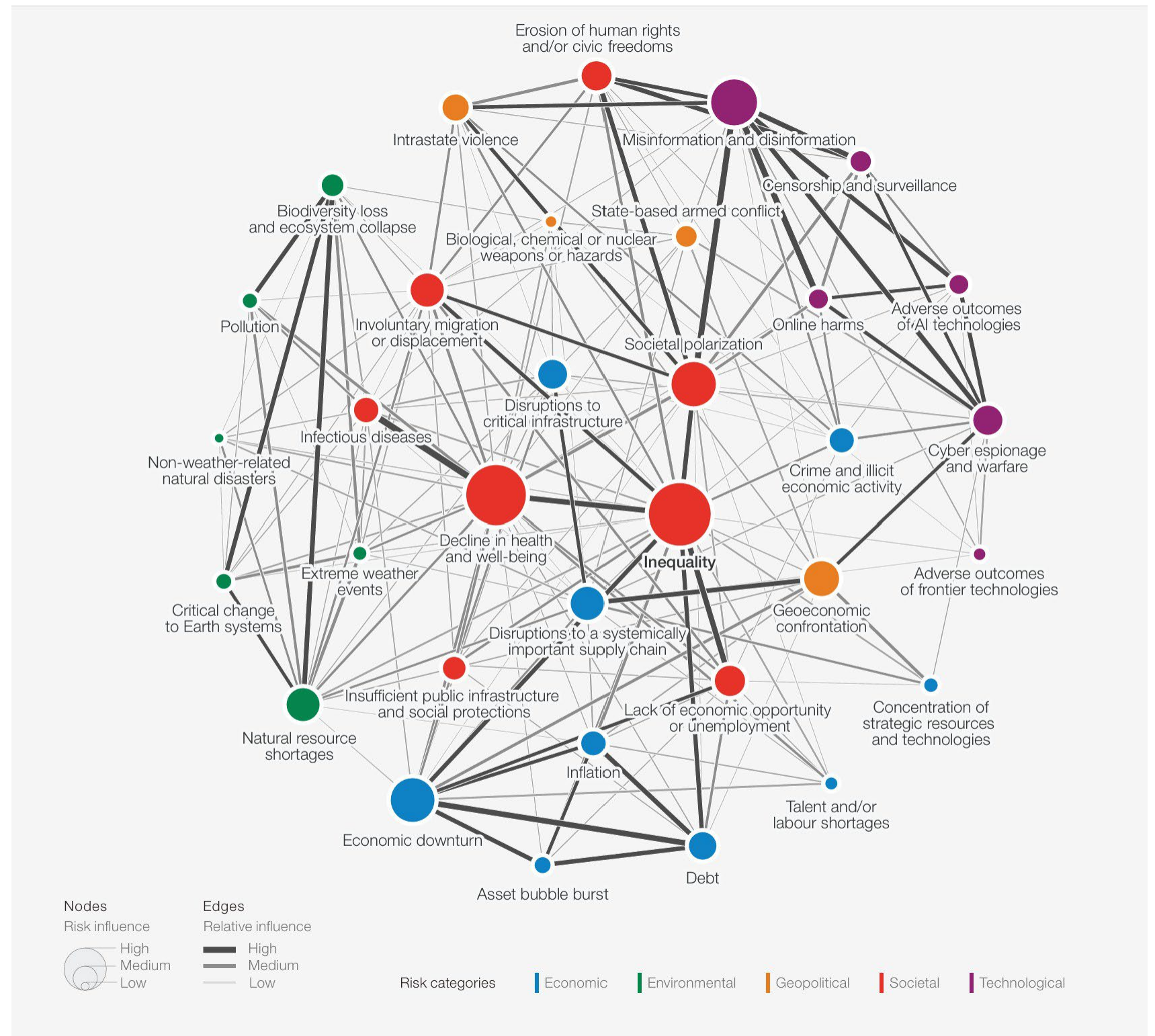
The 2025 update to the Planetary boundaries

Azote for Stockholm Resilience Centre, based on analysis in Sakschewski and Caesar et al. 2025

REGENERATIVT BYGGERI

Hvorfor Regenerativt Byggeri?

Polykriser



Global risks landscape: An interconnections map

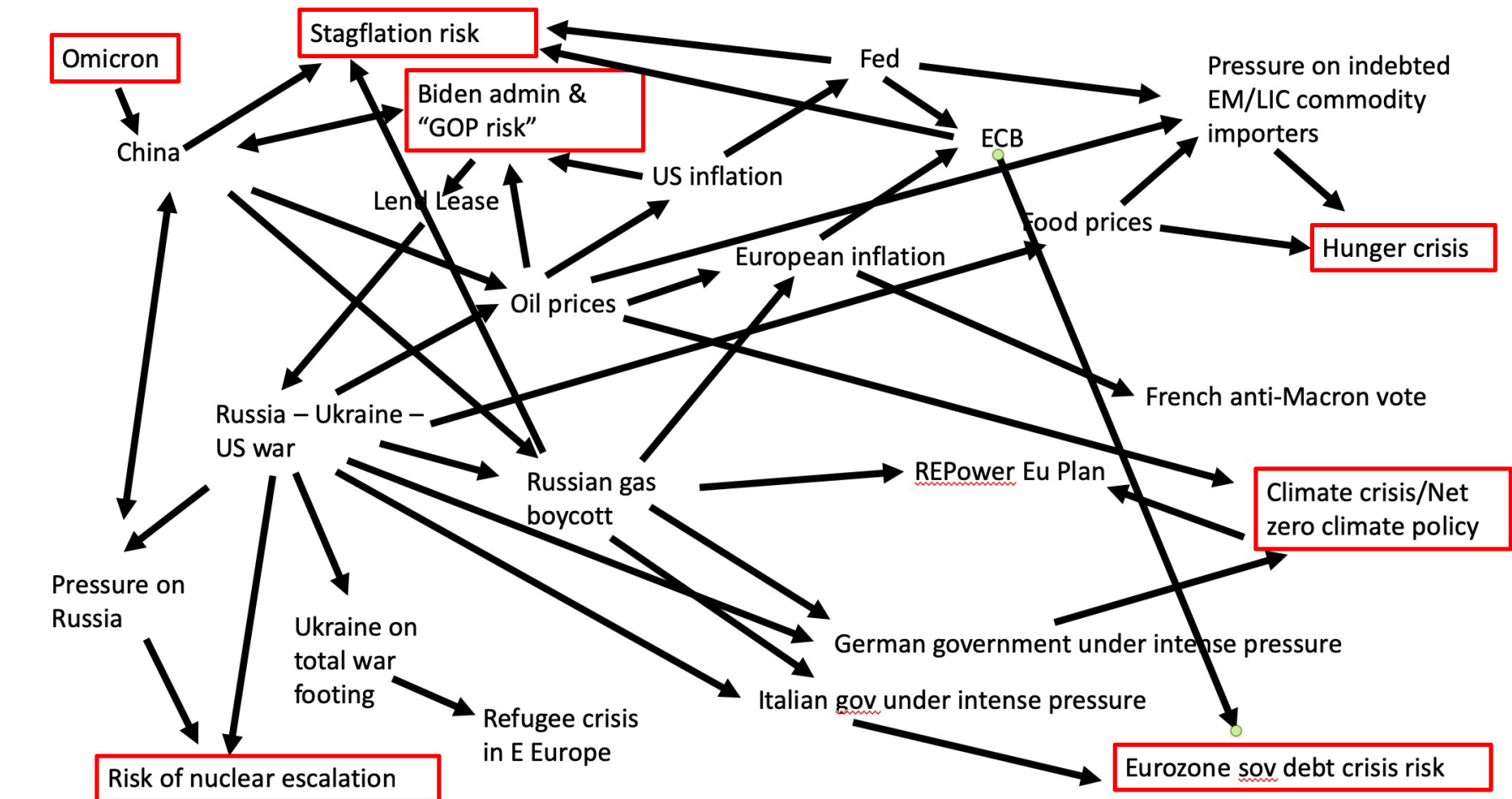
World Economic Forum Global Risks Perception Survey 2024-2025

<https://www.weforum.org/publications/global-risks-report-2025/>

REGENERATIVT BYGGERI

Hvorfor Regenerativt Byggeri?

Polykriser



How do risks interact?									
	COVID	Inflation	Recession	GOP risk	Hunger crisis	Climate crisis	EZ sov debt	Nuclear escalation	
COVID		Deescalate	Escalate	?	Escalate	Deescalate	Escalate	?	
Inflation	NA		Escalate	Escalate	Escalate	?	Escalate	NA	
Recession	NA	Deescalate		Escalate	Escalate	Escalate	Escalate	NA	
GOP risk	Escalate	Deescalate	Escalate		Escalate	Escalate	?	?	
Hunger crisis	Escalate	?	?	NA		NA	NA	NA	
Climate crisis	NA	Escalate	Deescalate	Escalate	Escalate		NA	NA	
EZ sov debt	NA	Deescalate	Escalate	NA	NA	Escalate		NA	
Nuclear escalation	NA	Deescalate	Escalate	?	Escalate	Escalate	Escalate		
Cells show impact of risk in row on risk in column									
e.g. a new COVID outbreak will deescalate the risk of inflation but escalate the risks of recession									

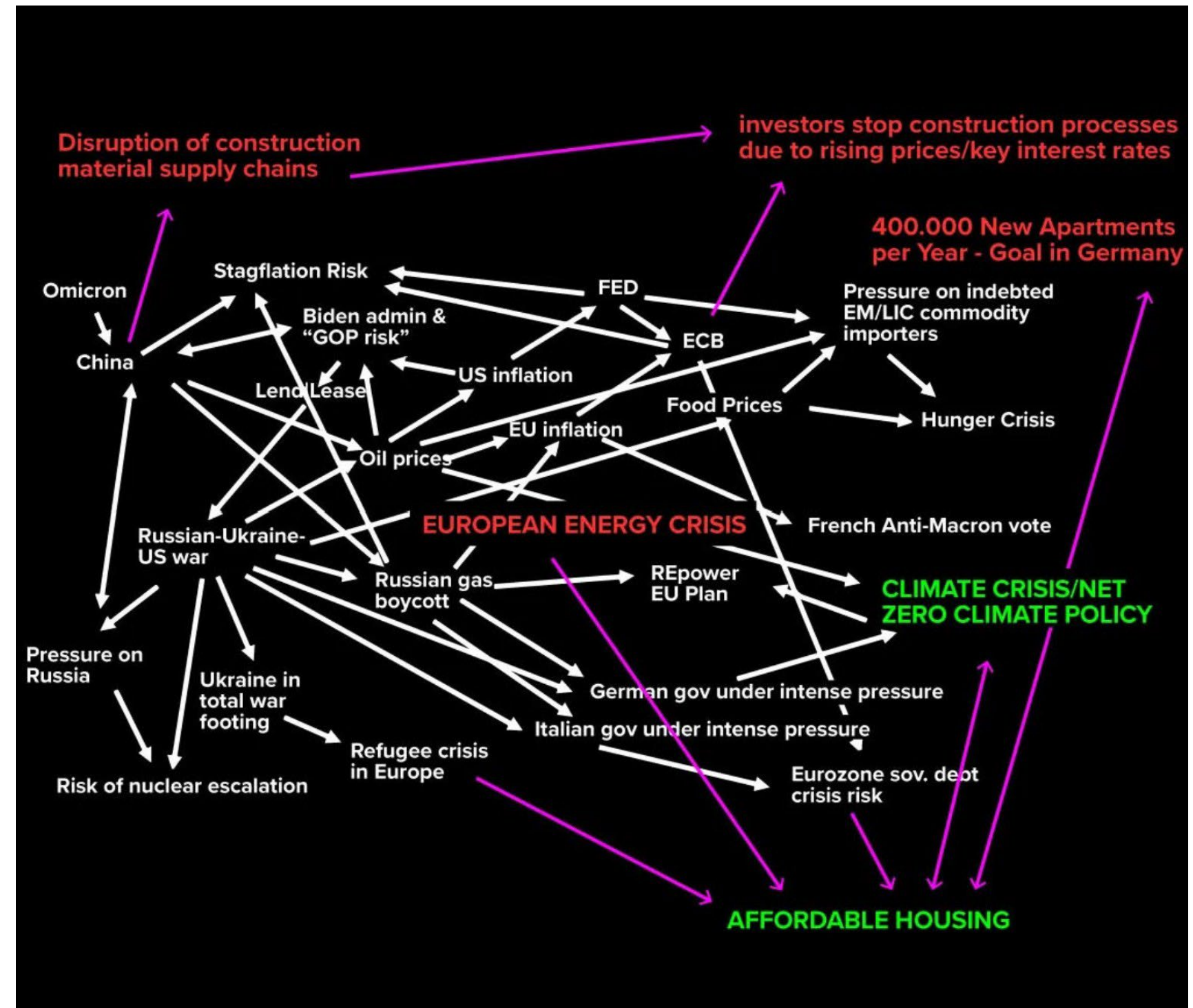
Krisenbilder: Defining polycrisis - from crisis pictures to the crisis matrix.

Adam Tooze

<https://adamtooze.substack.com/p/chartbook-130-defining-polycrisis>

Hvorfor Regenerativt Byggeri?

Polykriser



The complexity of polycrisis. Extended illustration based on the thinking of Adam Tooze

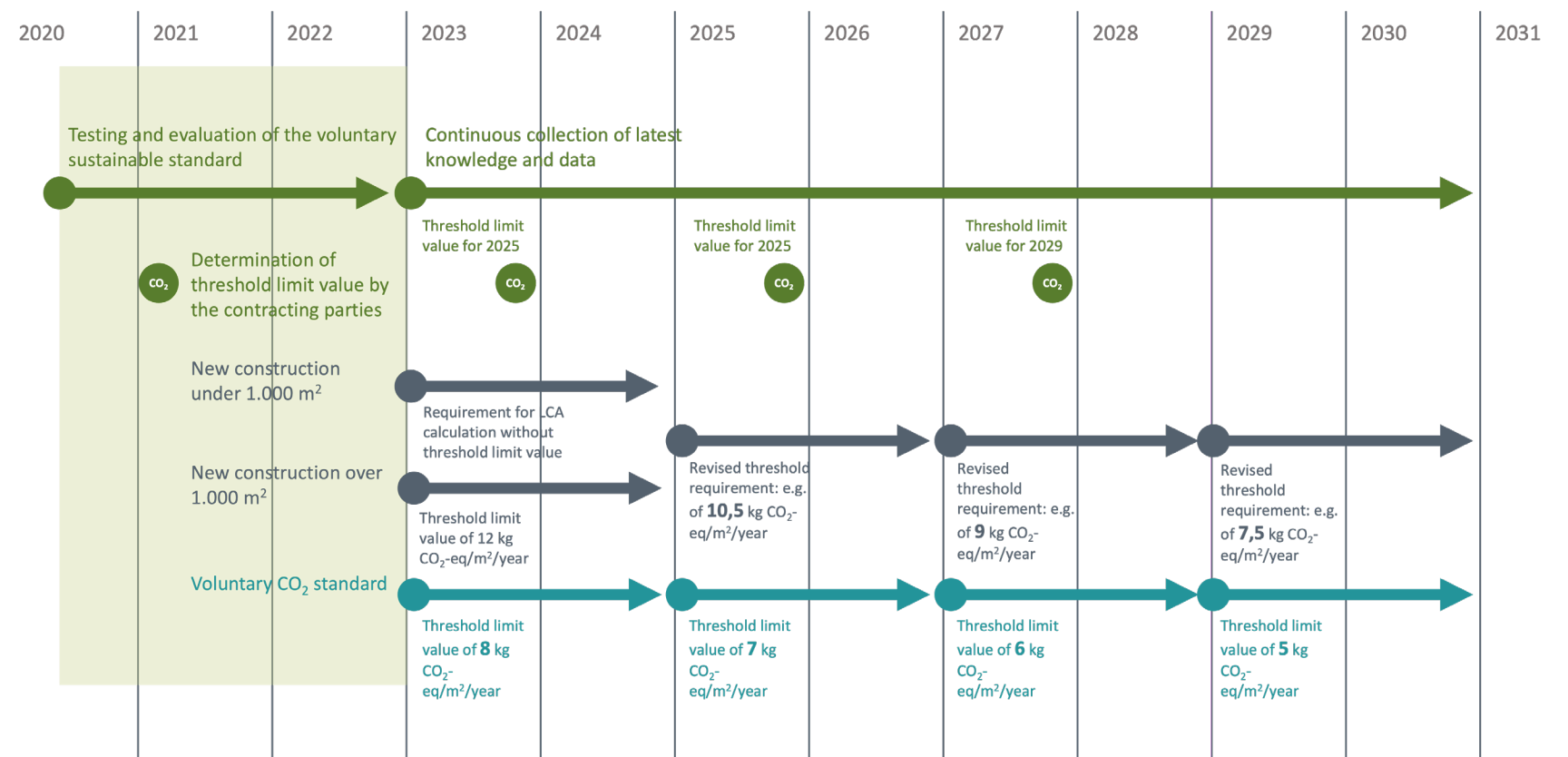
spaceforfuture_org

REGENERATIVT BYGGERI

Hvorfor Regenerativt Byggeri?

Initiativer

- Doughnut Biotool
- 4-1 Planet
- Reduction Roadmap
- Byggestop
- Danske Klimakrav (LCA) i bygningsreglement

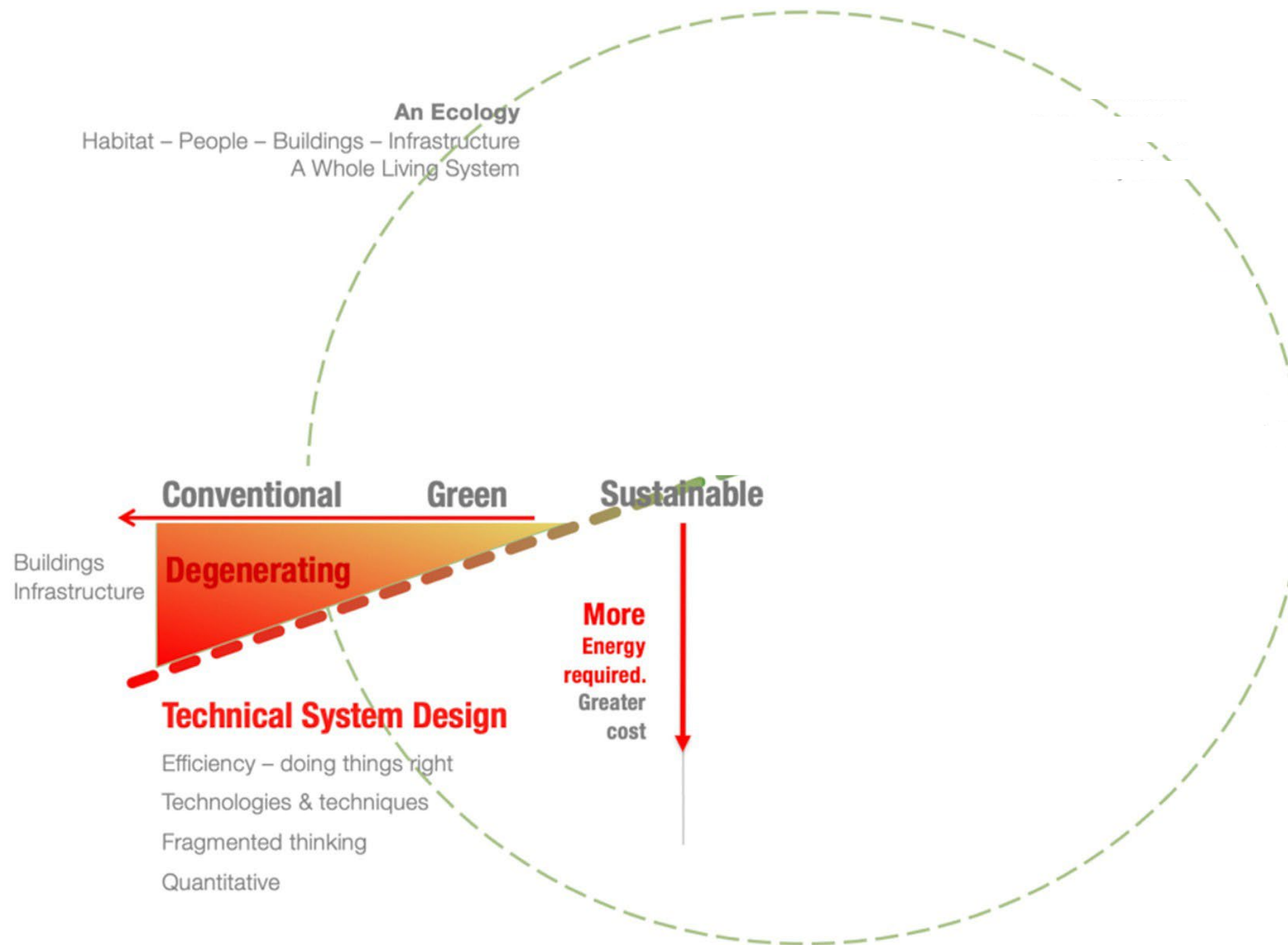


CO2 krav i nybyggeri fra 2023

LCAByg

REGENERATIVT BYGGERI

Hvorfor Regenerativt Byggeri?



Trajectory of ecological design

Bill Reed, Regenesi Group

Hvorfor Regenerativt Byggeri?



15	Regenerativt Byggeri	Aarhus Arkitekturuge	10/10/2025
----	----------------------	----------------------	------------

REGENERATIVT BYGGERI

Om Projektet

Kan byggeri være regenerativt?

- Hvad er regenerativt byggeri?
- Findes der eksempler på regenerativt byggeri?
- Kan regenerativt byggeri lade sig gøre i dag?
- Hvordan måler man regeneration?
- Hvilke forhindringer/barrierer står i vejen for mere regenerativt byggeri?
- Hvad skal der til for at gøre byggeriet mere regenerativt?

...

...

REGENERATIVT BYGGERI

Om Projektet

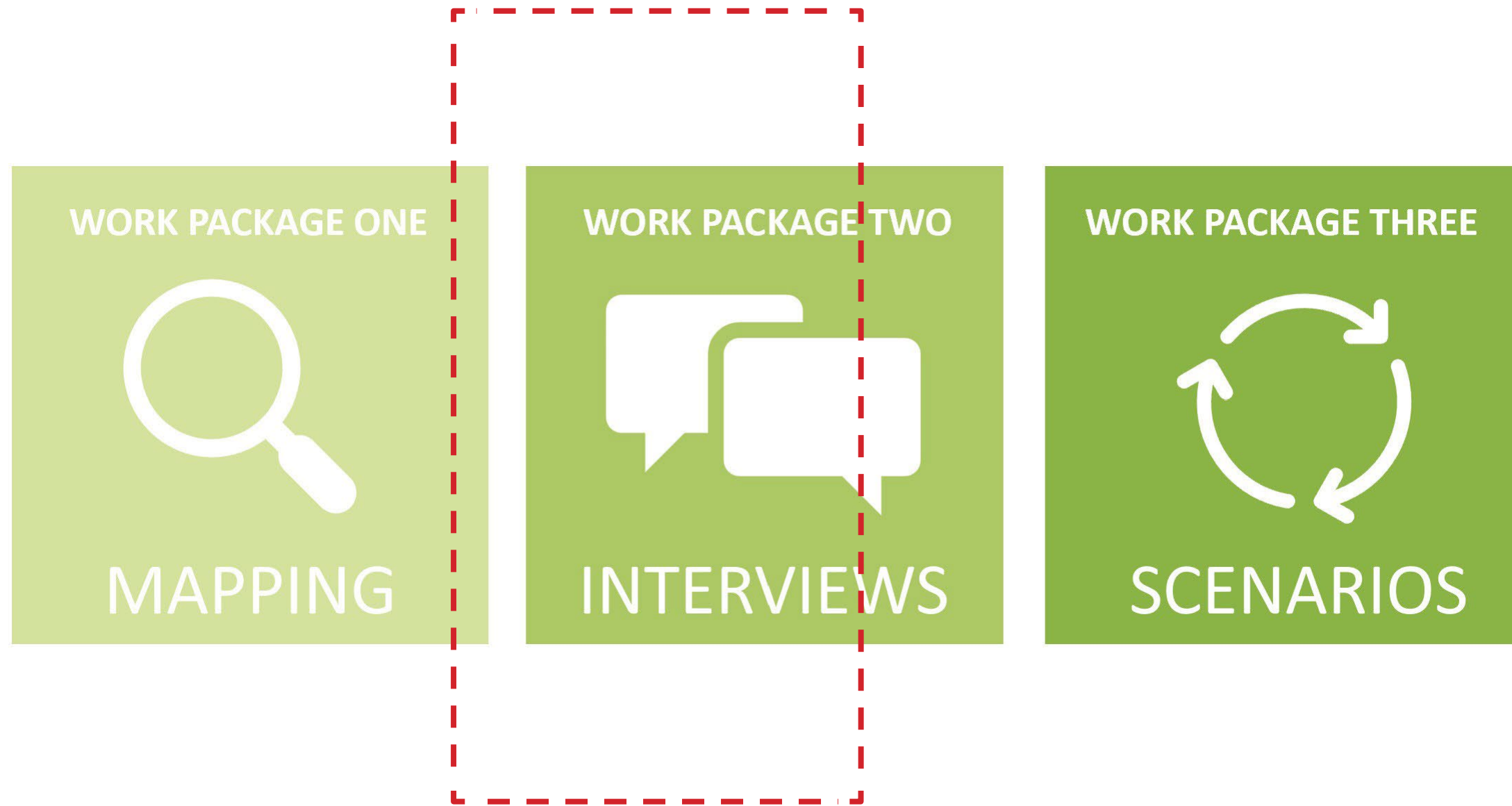


Tre Arbejdsplaner

...

REGENERATIVT BYGGERI

Om Projektet



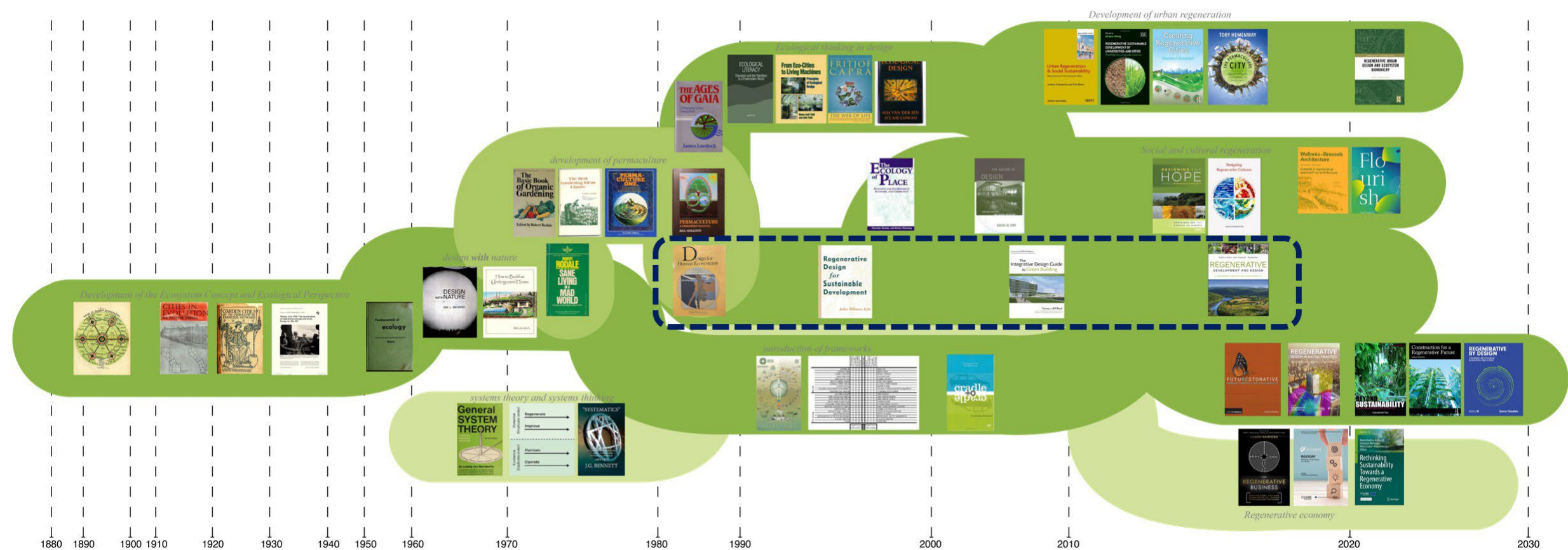
Tre Arbejdsplaner

...

HVAD ER REGENERATIVT BYGGERI?

HVAD ER REGENERATIVT BYGGERI?

Baggrund



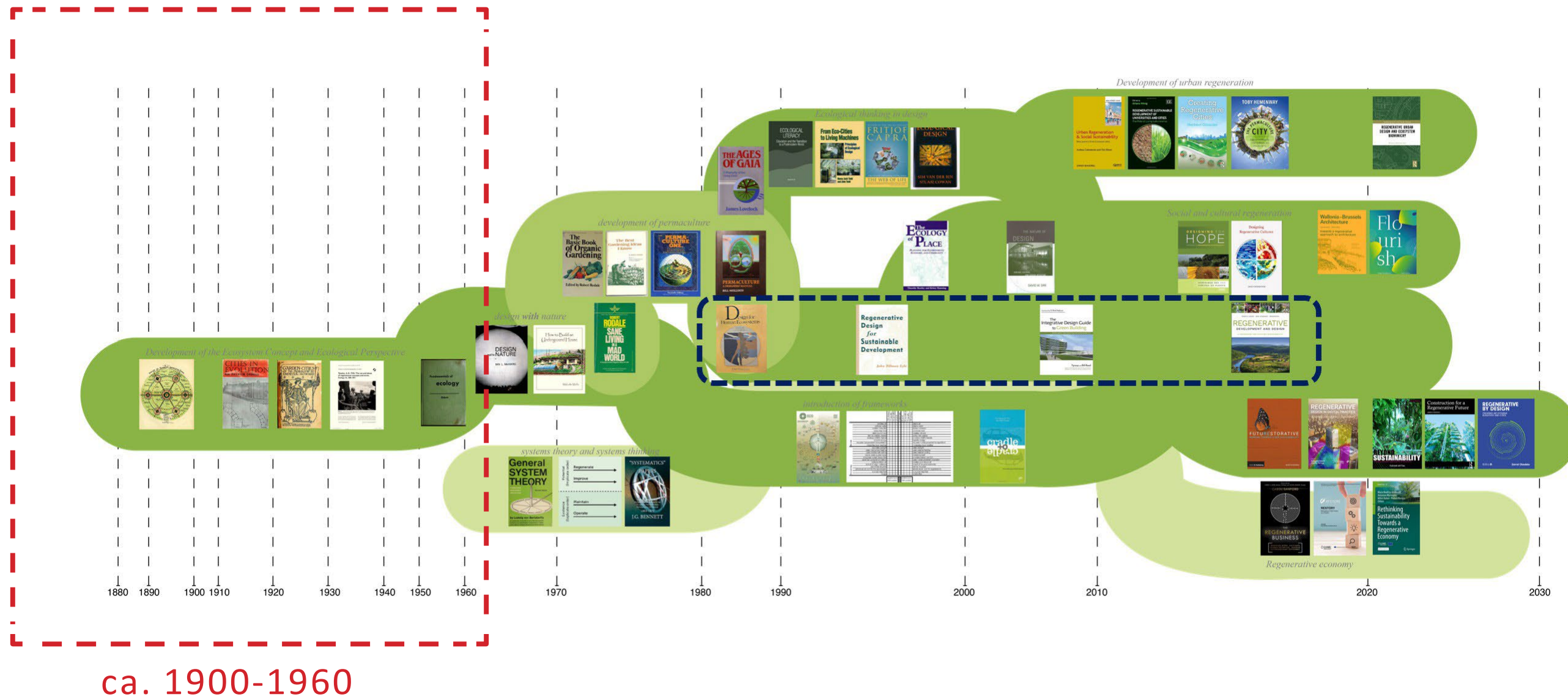
Tidslinje

...

HVAD ER REGENERATIVT BYGGERI?

Baggrund

Tidlig baggrund for regenerative tanker



Tidslinje

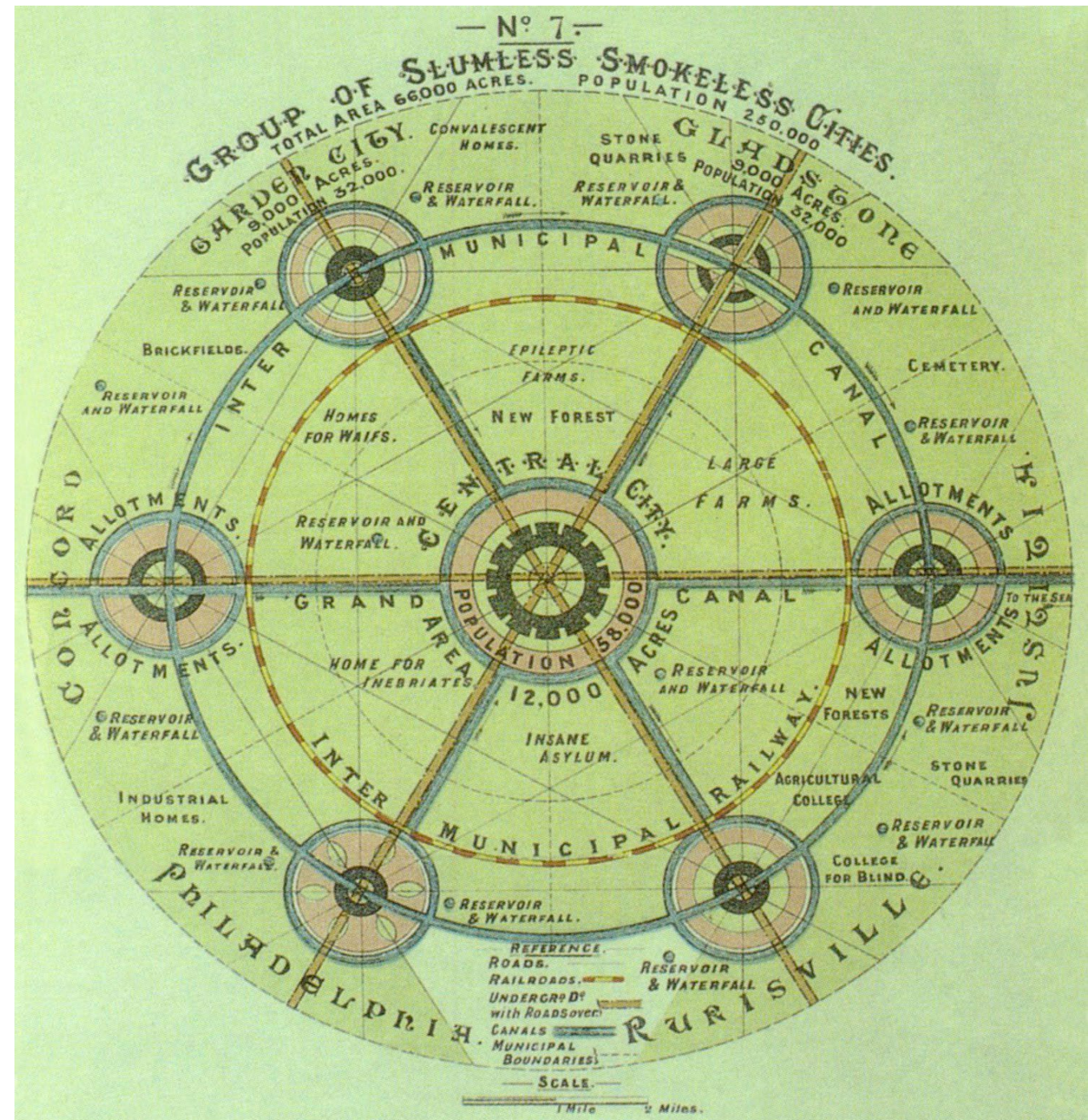
...

HVAD ER REGENERATIVT BYGGERI?

Baggrund - Tidlige regenerativ tænkning

Ebanezer Howard:
Garden Cities (1902)

“utopian city in which man lives harmoniously with the rest of nature”.



Ebanezer Howard: Garden Cities of To-Morrow

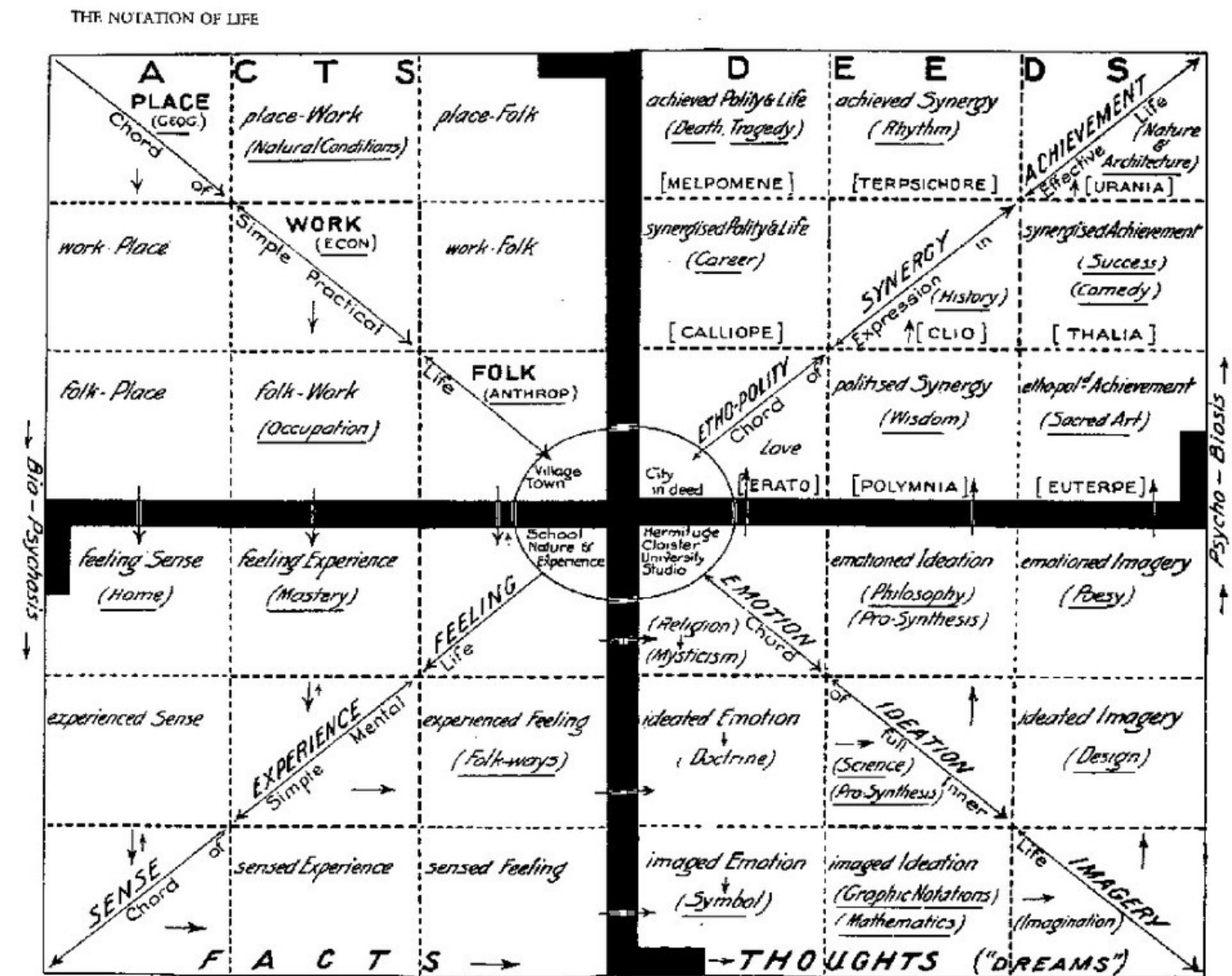
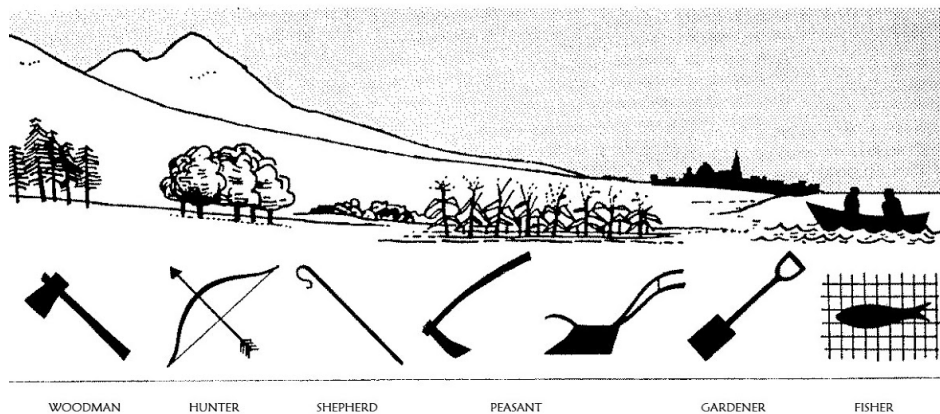
https://commons.wikimedia.org/wiki/File:Garden_City_Concept_by_Howard.jpg

HVAD ER REGENERATIVT BYGGERI?

Baggrund - Tidlige regenerativ tænkning

Patrick Geddes (1854-1932)

Byer som "living organisms"



Patrick Geddes

...

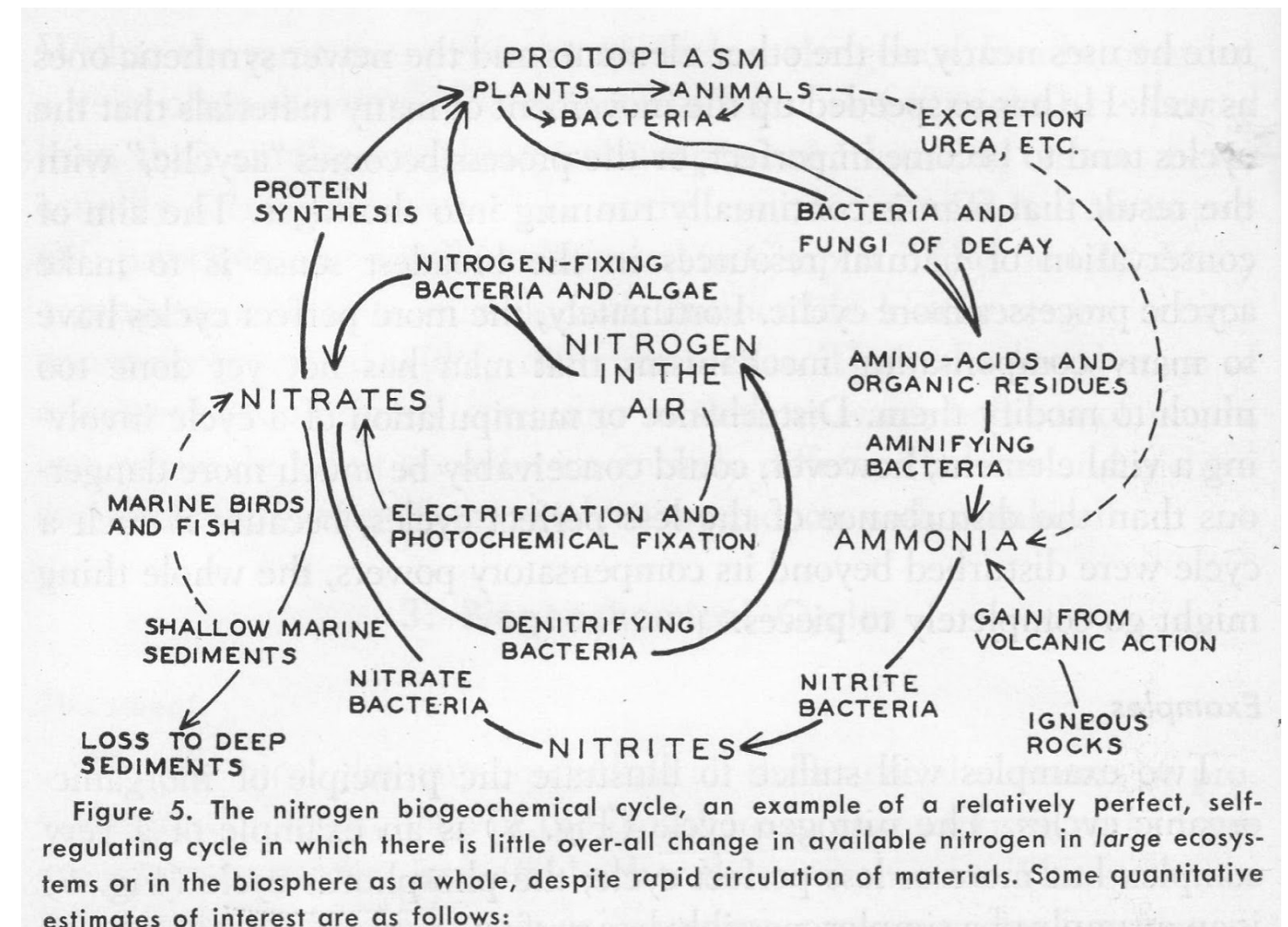
Baggrund - Tidlige regenerativ tænkning

Arthur Tansley

Introducerer begrebet "Økosystem" i 1935

Mennesker og økosystemer som forbundne

“we cannot separate them [organisms] from their special environment, with which they form one physical system”



The nitrogen biochemical cycle

● ● ●

HVAD ER REGENERATIVT BYGGERI?

Baggrund - Tidlige regenerativ tænkning

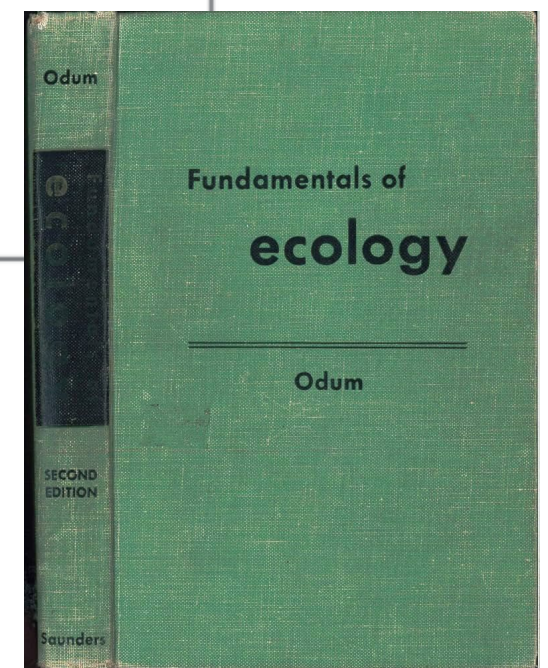
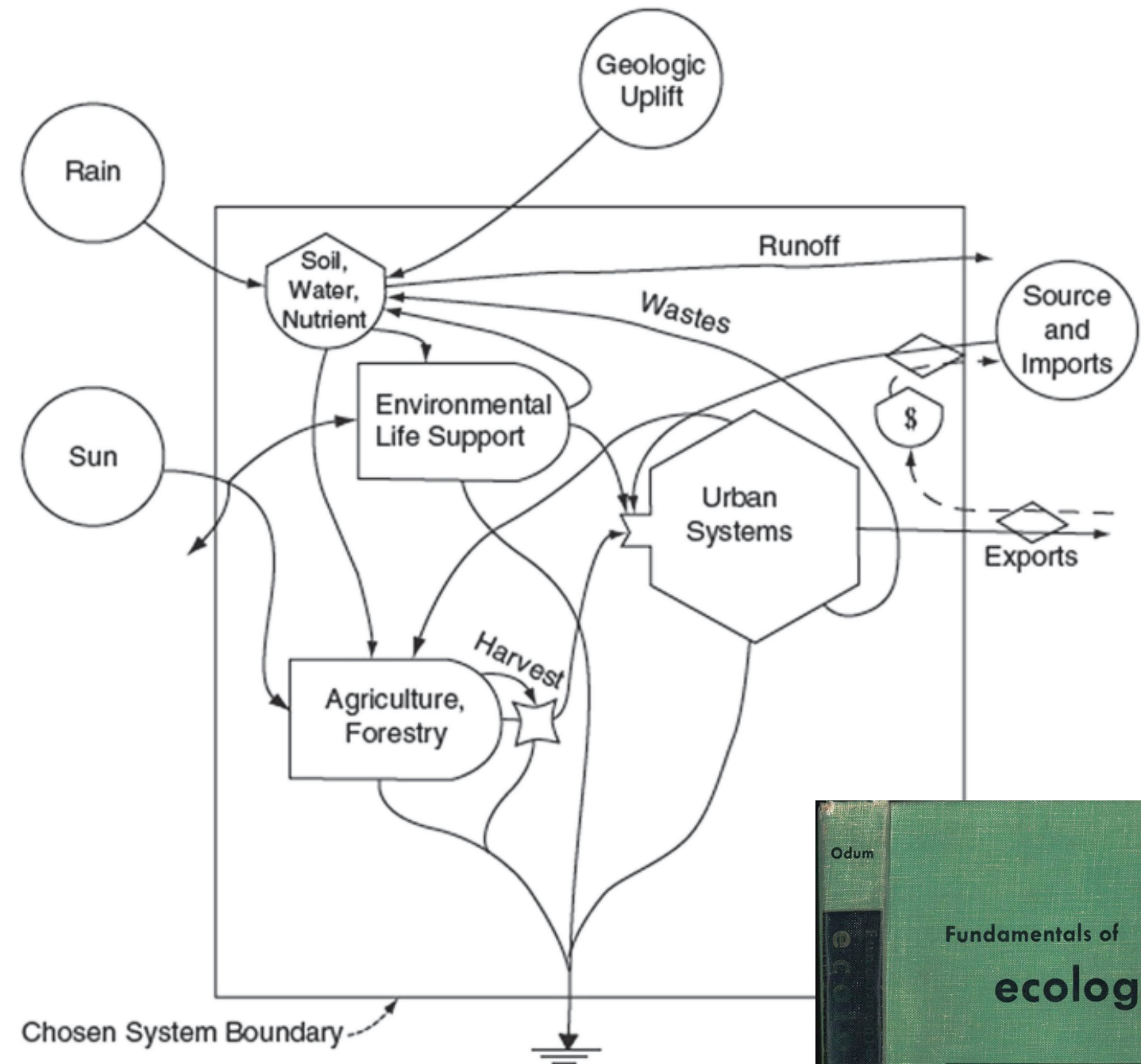
Augene og Howard Odum

The Fundamentals of Ecology
(1953)

Etablerer økologi som
moderne videnskab

Økologien som den centrale
organisationsstruktur i naturen

"Energy Systems Language"



Fundamentals of ecology

...

HVAD ER REGENERATIVT BYGGERI?

Baggrund - Tidlige regenerativ tænkning

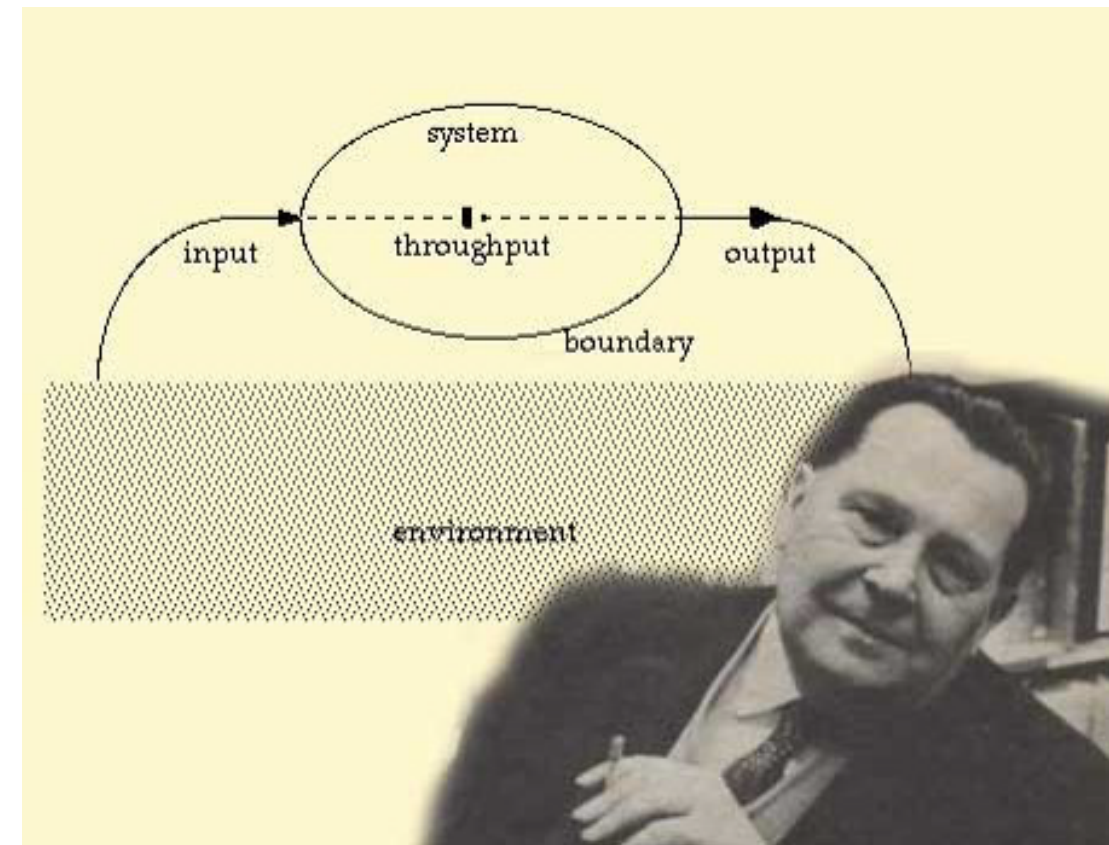
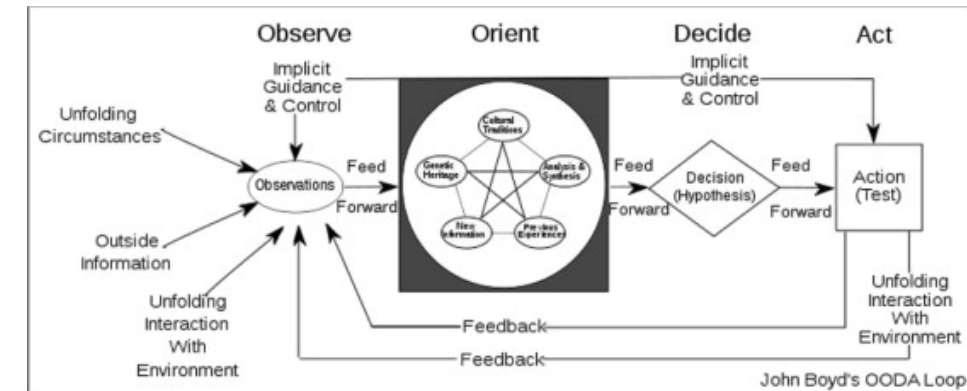
Ludwig von Bertalanffy

"General Systems Thinking"
(GST) - 1968

Systems theory

Åbne systemer, evolutions-
tænkning og adskillelse mel-
lem fysiske og biologiske sy-
stemer

Holistisk analyse af
komplekse systemer
(frem for reduktionistisks)



General Systems Thining

<https://www.sesge.org/en/87-uncategorized/296-what-is-the-general-systems-theory.html>

HVAD ER REGENERATIVT BYGGERI?

Baggrund - Tidlige regenerativ tænkning

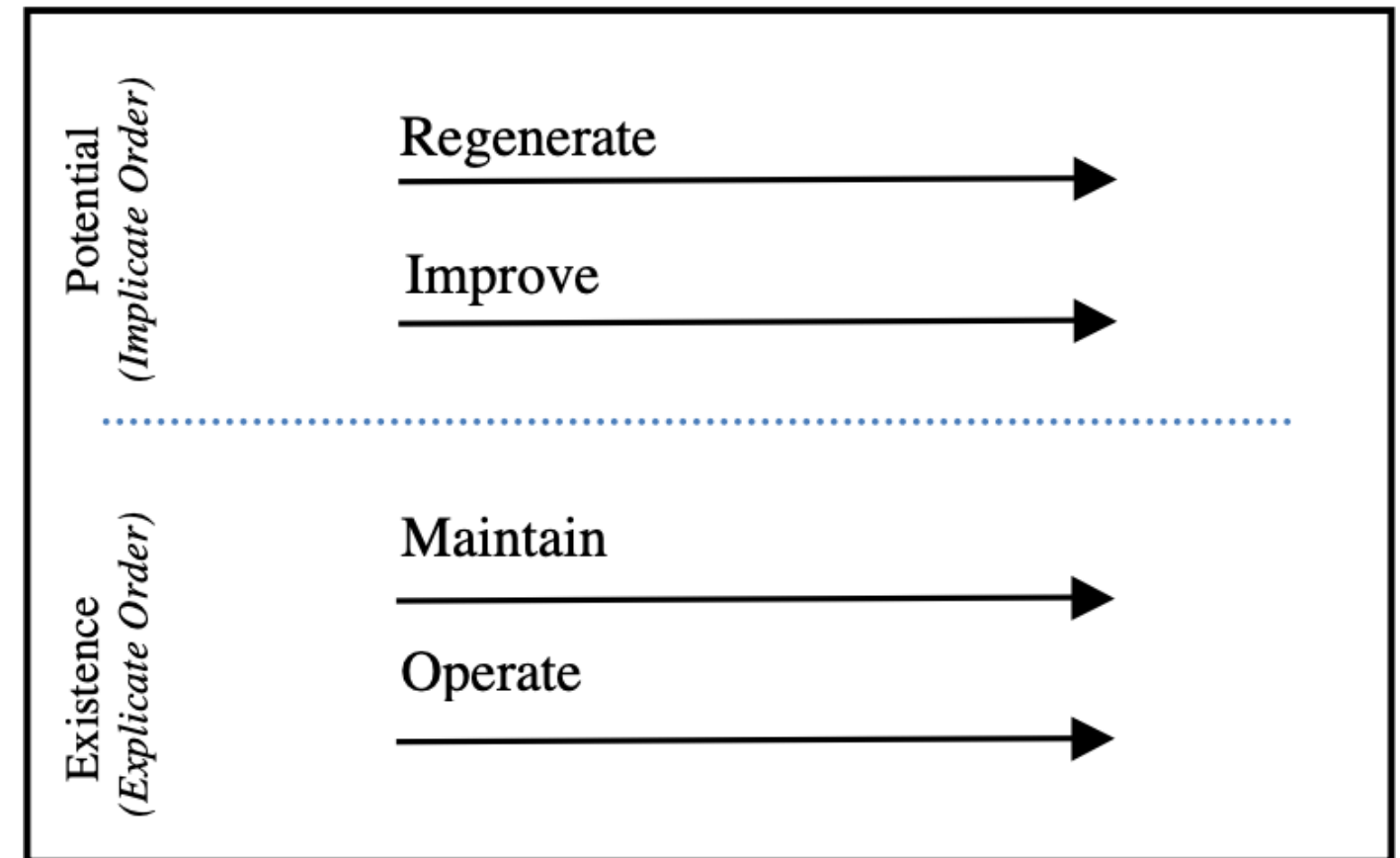
Charles Krone

"Living Systems Thinking"
(LST)

1960'erne og 1970'erne

Skabe gensidige forbindelser
mellem organisationer,
samfund og natur

Figure 3: Levels of Work Framework

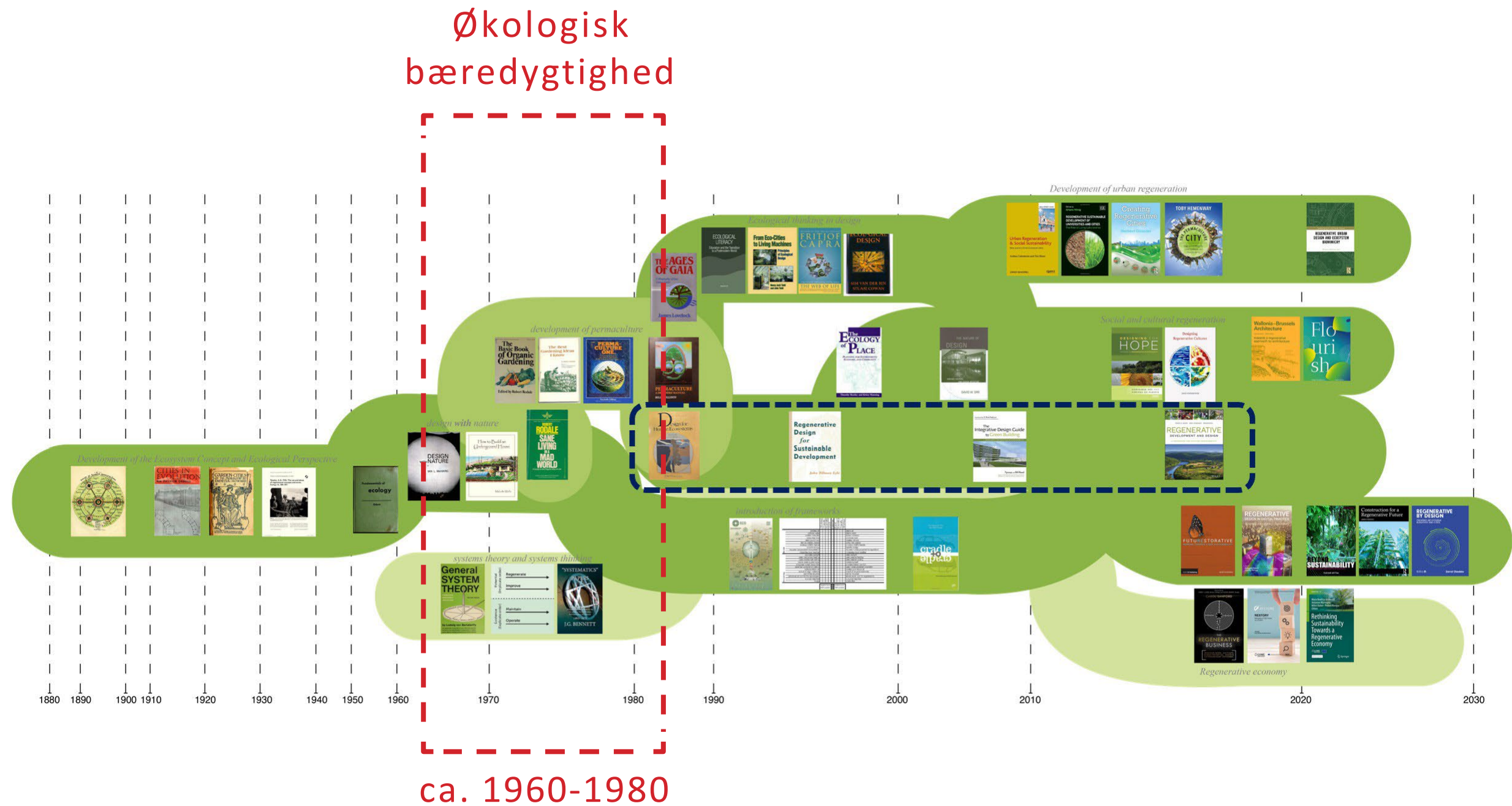


Charles Krone: Levels of work framework

<https://thesustainableagency.com/blog/the-history-of-regeneration-and-regenerative-sustainability/>

HVAD ER REGENERATIVT BYGGERI?

Baggrund



Tidslinje

...

HVAD ER REGENERATIVT BYGGERI?

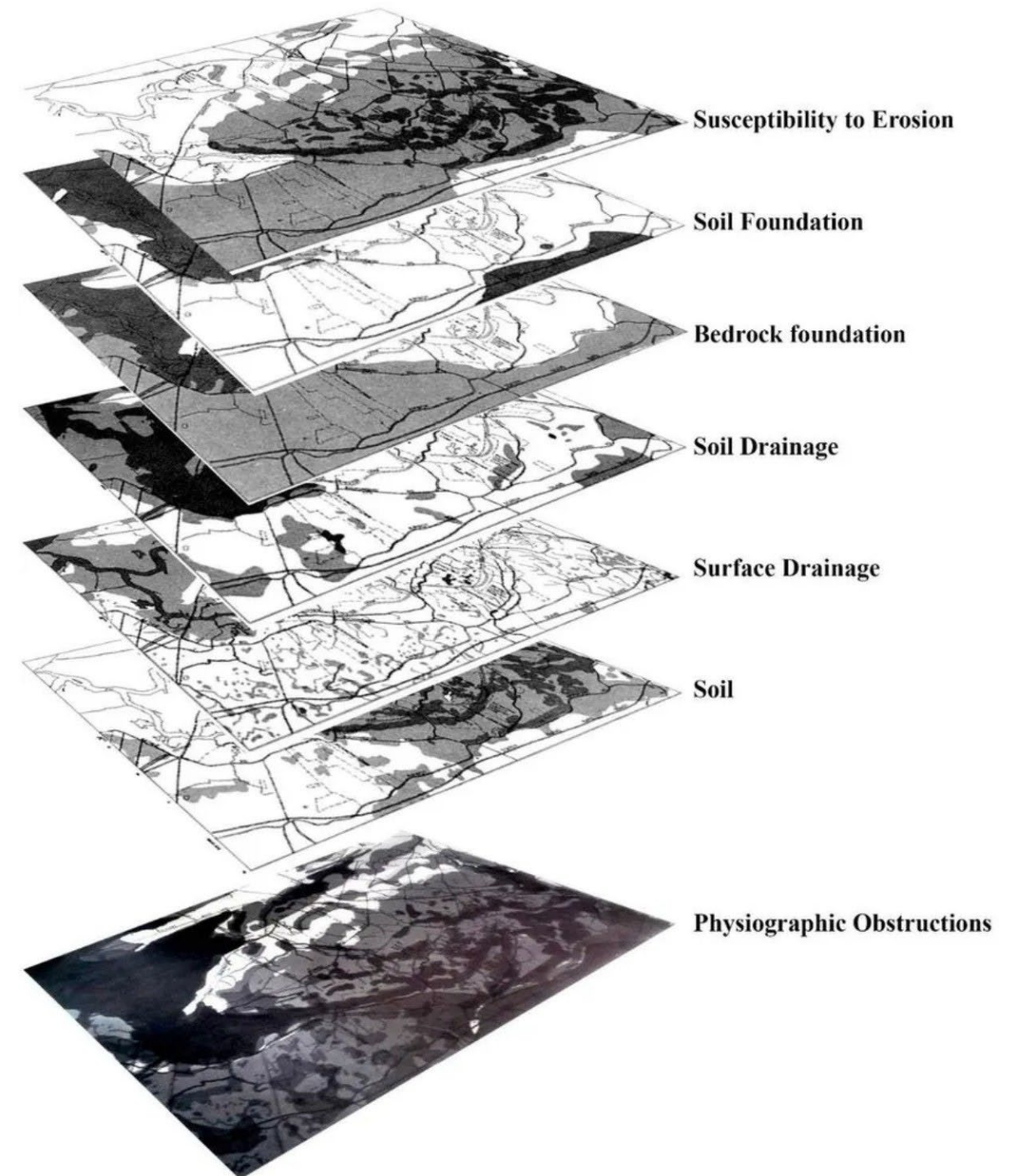
Baggrund - Økologisk bæredygtighed

Ian McHarg

Design with Nature (1969)

Økologisk landskabsplanlægning

Inspirerede udviklingen af GIS



an McHarg's Physiographic Obstructions

Design with nature

HVAD ER REGENERATIVT BYGGERI?

Baggrund - Økologisk bæredygtighed

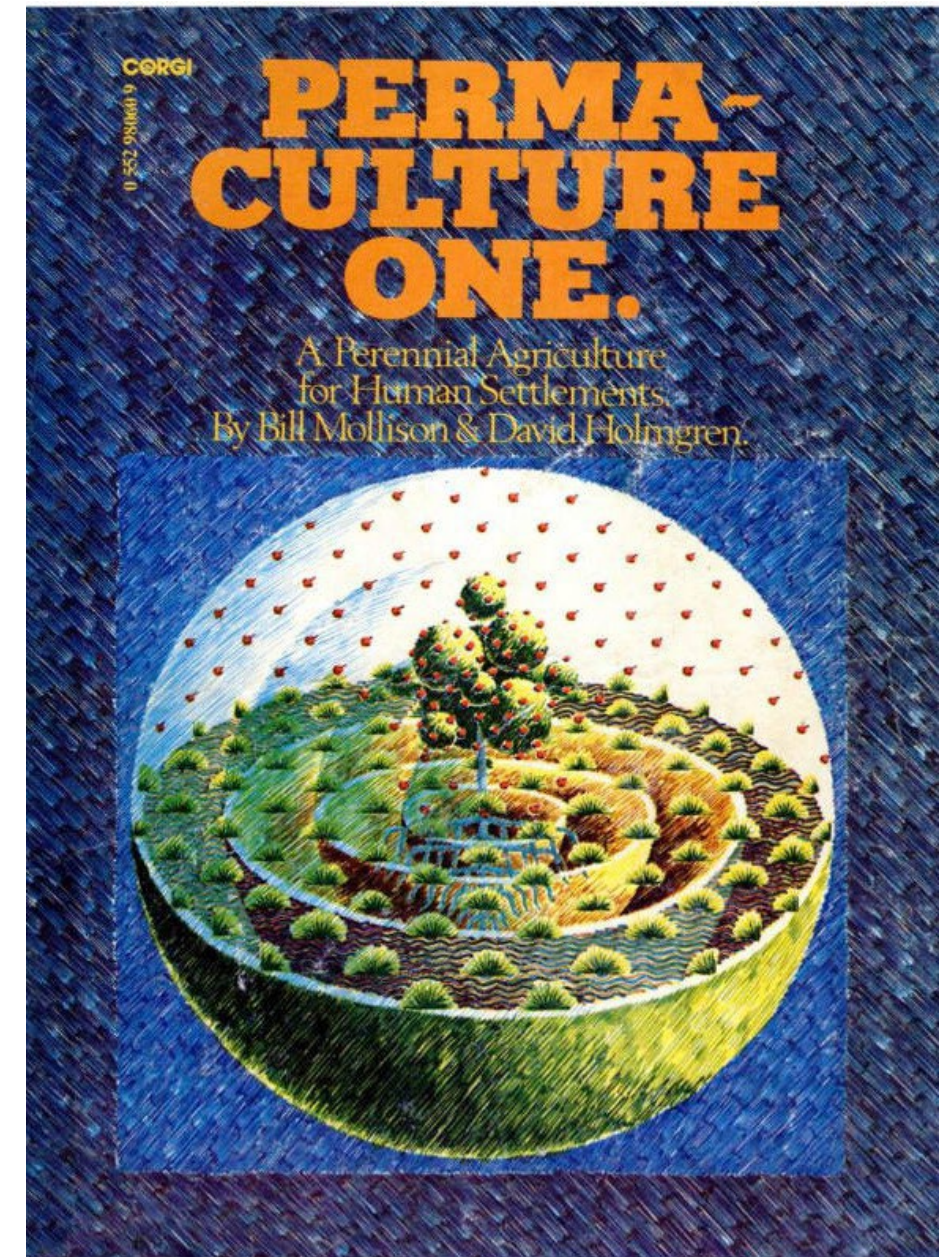
Bill Mollison og David Holmgren

*Permaculture One:
A Perennial Agriculture for
Human Settlements (1978)*

Opfindelse af *permakultur*-
begrebet

*"Regenerativ effekt" som "skal give over-
skud af energi og reessourcer, som kan
geninvesteres" i økosystemer*

Selvopretholdende, lukkede systemer



Permaculture One: A Perennial Agriculture for Human Settlements

...

HVAD ER REGENERATIVT BYGGERI?

Baggrund - Økologisk bæredygtighed

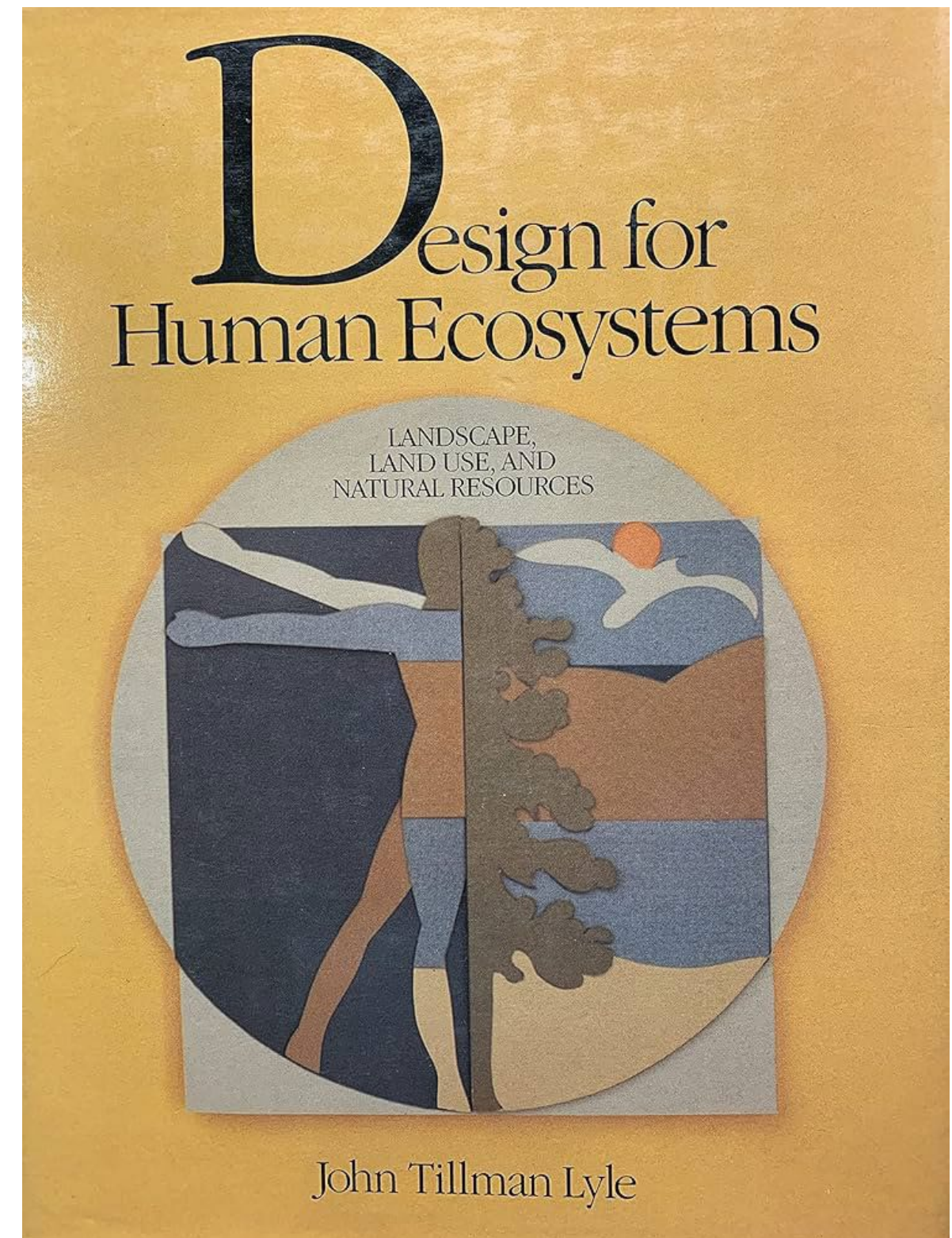
John Tillman Lyle

Design of Human Ecosystems
(1985)

Økosystemtænkning i design

Introducerer designprincipper for menneskelige økosystemer, hvor mennesker og natur kan sameksistere

Danner grundlag for regenerative designmetoder



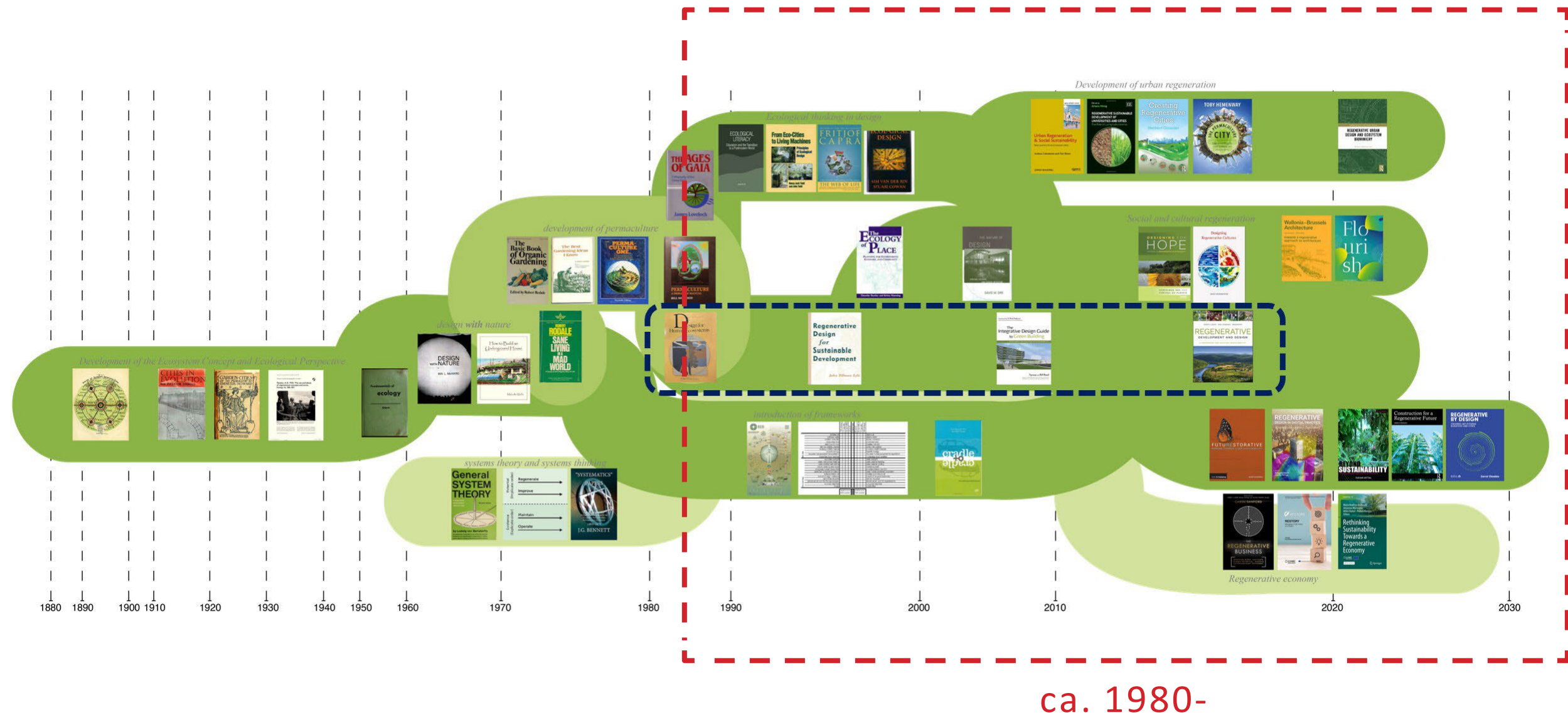
Design of Human Ecosystems

...

HVAD ER REGENERATIVT BYGGERI?

Baggrund

Begyndende regenerativ tænkning i sammenhæng med byggeri



Tidslinje

...



REGENERATIV DEFINITION based on systematic literature review...

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

COMMENTARY

Routledge

Taylor & Francis Group

The nature of positive

Pamela Mang and Bill Reed

Regenesis Group, 1219 Luisa Street, Suite 5, Santa Fe, NM 87505, US
E-mail: pamela@regenesigroup.com and bill@regenesigroup.com

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

RESEARCH PAPER

Routledge

Taylor & Francis Group

Designing from place: a regenerative framework and methodology

Pamela Mang and Bill Reed

Regenesis Group, 1219 Luisa Street, Suite 5, Santa Fe, NM 87505, USA
E-mail: pamela@regenesigroup.com and bill@regenesigroup.com

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

RESEARCH PAPER

Routledge

Taylor & Francis Group

Forum

Shifting from 'sustainability' to regeneration

Bill Reed

Integrative Design Collaborative and Regenesis, 20 Woodland Street, Arlington, MA 02476, US
E-mail: reed@integrativedesign.net

Reed

then, at a deeper level still, 'seeing things differently'. Watulawick et al. (1980) make the distinction that there are two different kinds of change: one that occurs within a given system which itself remains unchanged, and one whose occurrence changes the system itself. (Watulawick et al., 1980, quoted in Sterling, 2003)

Hawkins (1991) suggests that Learning Level II alone is insufficient. Although it helps to move from 'efficiency thinking' at Learning Level I level towards 'effectiveness thinking' at Learning Level II, 'to take to address the fundamental question: effective for what, or to what end?' Learning Level III adds our attention to the context of planetary survival, and the evolutionary need of what he calls 'regenerative awareness'. Hence, Learning Level III is associated with epistemological and perceptual change and a transpersonal/transcultural ethical and participative sensibility (Sterling, 2003).

Issue-based approaches (fragmented – as currently practised)

High-performance design

Limiting the damage

Designing for high efficiency and reduced impact in the building structure, operations, and site activities. This term can imply a more technical efficiency approach to design and may limit an embrace of the larger natural system benefits.

Neutral Green design

A general term implying a direction of improvement in design, i.e. continual improvement towards a generalized ideal of doing no harm. Some people believe this is more applicable to buildings and technology.

Conventional Practice

Incremental improvement within the system, making the best of what is.

Figure 1

Topology of Environmentally Responsible Design

Living Systems

Understanding

Whole System

Whole System Response

Technologies/Techniques

Fragmented

Regenerative

Human NETWORKING AS nature – the evolution of the Whole System

Reconciliatory

Practices as an emergent part of nature

Restorative

Human DESIGN THINKING TO better – towards the evolution of the Whole System

Regenerative

Human DESIGN THINKING TO better – towards the evolution of the Whole System

Reconciliatory

Practices as an emergent part of nature

Restorative

Human DESIGN THINKING TO better – towards the evolution of the Whole System

PAMELA MANG · BEN HAGGARD · REGENESIS

REGENERATIVE DEVELOPMENT AND DESIGN

A FRAMEWORK FOR EVOLVING SUSTAINABILITY

WILEY

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

INFORMATION PAPER

Routledge

Taylor & Francis Group

Towards a regenerative paradigm for the built environment

Christina du Plessis

Department of Construction Economics, University of Pretoria, Private Bag X20, Hatfield, Pretoria 0028, South Africa
E-mail: christina.duplessis@up.ac.za

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

INFORMATION PAPER

Routledge

Taylor & Francis Group

Journal of Cleaner Production

An ecological worldview as basis for a regenerative sustainability paradigm for the built environment

Christina du Plessis^{a,*}, Peter Brandon^b

^aDepartment of Construction Economics, University of Pretoria, Private Bag X20, Hatfield 0028, South Africa
^bSchool of the Built Environment, University of Bedford, Bedford, UK

Chapter 2

The City Sustainable, Resilient, Regenerative – A Rose by Any Other Name?

Christina du Plessis

Abstract

As humans struggle to come to terms with how to move forward in the confusing and frightening world of the Anthropocene, a number of new concepts and terms developed to describe different approaches to find meaning and identify appropriate actions and solutions. These approaches define different paradigms of what can broadly be described as ecologically responsible design. While each of these paradigms provide useful tools and strategies, they also evolve as their shortcomings and limitations become apparent. Unfortunately, as terms fall out of favour and fashion, there is a tendency to replace the old term with the newest buzzword, without critically engaging with the theory underpinning this new terminology. Thus, sustainability becomes resilience, which becomes regenerative, with little acknowledgement that these require different design paradigms with different goals, practices and rules.

Keywords

Sustainable · Resilience · Regenerative · Design · Paradigm

C. du Plessis

Department of Architecture, University of Pretoria, Pretoria, South Africa
E-mail: Christina.duplessis@up.ac.za

© The Author(s), under exclusive license to Springer Nature Switzerland AG 2022

R. Roggen (ed.), *Design for Regenerative Cities and Landscapes*, Contemporary Urban Design Thinking, https://doi.org/10.1007/978-3-306-97023-9_2

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

EDITORIAL

Routledge

Taylor & Francis Group

Regenerative design and development: current theory and practice

Raymond J. Cole

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

RESEARCH PAPER

Routledge

Taylor & Francis Group

Theoretical underpinnings of regenerative sustainability

John Robinson and Raymond J. Cole

Centre for Interactive Research on Sustainability/University of British Columbia, 2280 West Mall, Vancouver, BC V6T 1Z4, Canada
E-mail: john.robinson@ubc.ca and ray@iprc.ubc.ca

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

RESEARCH PAPER

Routledge

Taylor & Francis Group

Transitioning from green to regenerative design

Raymond J. Cole

School of Architecture and Landscape Architecture, University of British Columbia, 6333 Memorial Road, Vancouver, BC V6T 1Z2, Canada
E-mail: robert@ula.ubc.ca

Chapter 12

Regenerative sustainability

Rethinking neighborhood sustainability

Raymond J. Cole, John B. Robinson, and Lisa M. Westerhoff

Introduction

The scientific community presents compelling evidence that climate change and global environmental degradation pose two of the most significant and pressing societal issues of our time, central to any discussion of sustainability. The potentially catastrophic consequences of unabated climate change and the strategic actions necessary to affect positive change have therefore been the subject of considerable political, public, and academic discourse. However, the commonly accepted definition of sustainability that has emerged from this discourse is one that has emphasized certain dimensions over others, ultimately shaping a narrative of sustainability based in environmental constraints and societal limitations.

While this approach to sustainability has without question been instrumental in creating and informing valuable responses to complex environmental problems, Robinson and Cole (2015) have argued that this dominant narrative of sustainability has proven to be problematic in four key ways. First, an emphasis on scarcity and sacrifice over abundance or achievement is by its very nature unimproving and risks cultivating further apathy or denial over active engagement or desire for change. Second, by focusing on slowing the infliction of harm (as opposed to much-needed rehabilitation), such an approach does not go far enough to counteract dangerous trends and rehabilitate existing damage. Third, the focus of sustainability has been predominantly on environmental dimensions and has paid much less attention to the important social dimensions of sustainability. Finally, predominant notions of sustainability assume an unproblematic view of scientific knowledge and by association, a unidirectional path of knowledge transmission from scientific to layperson or politician.

In response to such concerns, the notion of regenerative sustainability has been proposed as a means of re-framing the discussion towards both net positive aims (i.e., doing "more good") instead of "less bad") and to a more explicit embrace of human well-being and agency.

Robinson et al. (2013a) and neighborhood Waldron et al. (2013) studies have already been made, there remain a number of questions as to the operationalization of a regenerative approach to sustainability in the built environment. In this chapter, we offer some basic principles for the application of regenerative sustainability to the built environment, and propose that urban neighborhoods represent a particularly potent context in which to imagine, understand, catalyze, and assess regenerative sustainability. Neighborhoods represent an effective "niche" that contains much of the specificity and rigor of building-scale sustainable design characteristics, but that introduces a greater degree of the human and ecosystem complexity that exists at the city scale. Explorations and evaluations of regenerative sustainability at the neighborhood scale can therefore serve to highlight the cross-scale

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

RESEARCH PAPER

Routledge

Taylor & Francis Group

CONSTRUCTING A REGENERATIVE FUTURE

Why moving away from constant growth and instead investing in the potential of people and places is the key to addressing the climate crisis

by Daniel Christian Wahl
✉ d@dcwahl.com

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

RESEARCH PAPER

Routledge

Taylor & Francis Group

Transitioning from green to regenerative design

Raymond J. Cole

School of Architecture and Landscape Architecture, University of British Columbia, 6333 Memorial Road, Vancouver, BC V6T 1Z2, Canada
E-mail: robert@ula.ubc.ca

Designing Regenerative Cultures

Daniel Christian Wahl

TRANSFORMATIVE INNOVATION

BIOLOGICALLY-INSPIRED DESIGN

MULTIPLYING RESILIENCE

LIVING SYSTEMS THINKING

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

RESEARCH PAPER

Routledge

Taylor & Francis Group

Ecosystem services analysis for the design of regenerative built environments

Maibritt Pedersen Zari

School of Architecture, Victoria University PO Box 600, Wellington 6140, New Zealand
E-mail: maibritt.pedersen@vuw.ac.nz

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

RESEARCH PAPER

Routledge

Taylor & Francis Group

REGENERATIVE URBAN DESIGN AND ECOSYSTEM BIOMIMICRY

Maibritt Pedersen Zari

Chapter 6

Ecopolis The regenerative city

Daniel Christian Wahl

TRANSFORMATIVE INNOVATION

BIOLOGICALLY-INSPIRED DESIGN

MULTIPLYING RESILIENCE

LIVING SYSTEMS THINKING

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

INFORMATION PAPER

Routledge

Taylor & Francis Group

REGEN: toward a tool for regenerative thinking

Phaedra Svec^a, Robert Berkebile^b and Joel Ann Todd^c

^aYHM, 106 W 14th Street, Suite 200, Kansas City, MO 64105, US
E-mail: phaedra@yhm.com and joel@yhm.com
^bIndependent consultant, Cabin John, MD, US
E-mail: joel@yhm.com

BRI

BUILDING RESEARCH & INFORMATION 2022

Vol. 48, No. 1, 1–14, <https://doi.org/10.1080/13680161.2024.911161>

INFORMATION PAPER

Routledge

Taylor & Francis Group

REGEN: toward a tool for regenerative thinking

Phaedra Svec^a, Robert Berkebile^b and Joel Ann Todd^c

^aYHM, 106 W 14th Street, Suite 200, Kansas City, MO 64105, US
E-mail: phaedra@yhm.com and joel@yhm.com
^bIndependent consultant, Cabin John, MD, US
E-mail: joel@yhm.com

Chapter 6

Ecopolis The regenerative city

Daniel Christian Wahl

TRANSFORMATIVE INNOVATION

BIOLOGICALLY-INSPIRED DESIGN

MULTIPLYING RESILIENCE

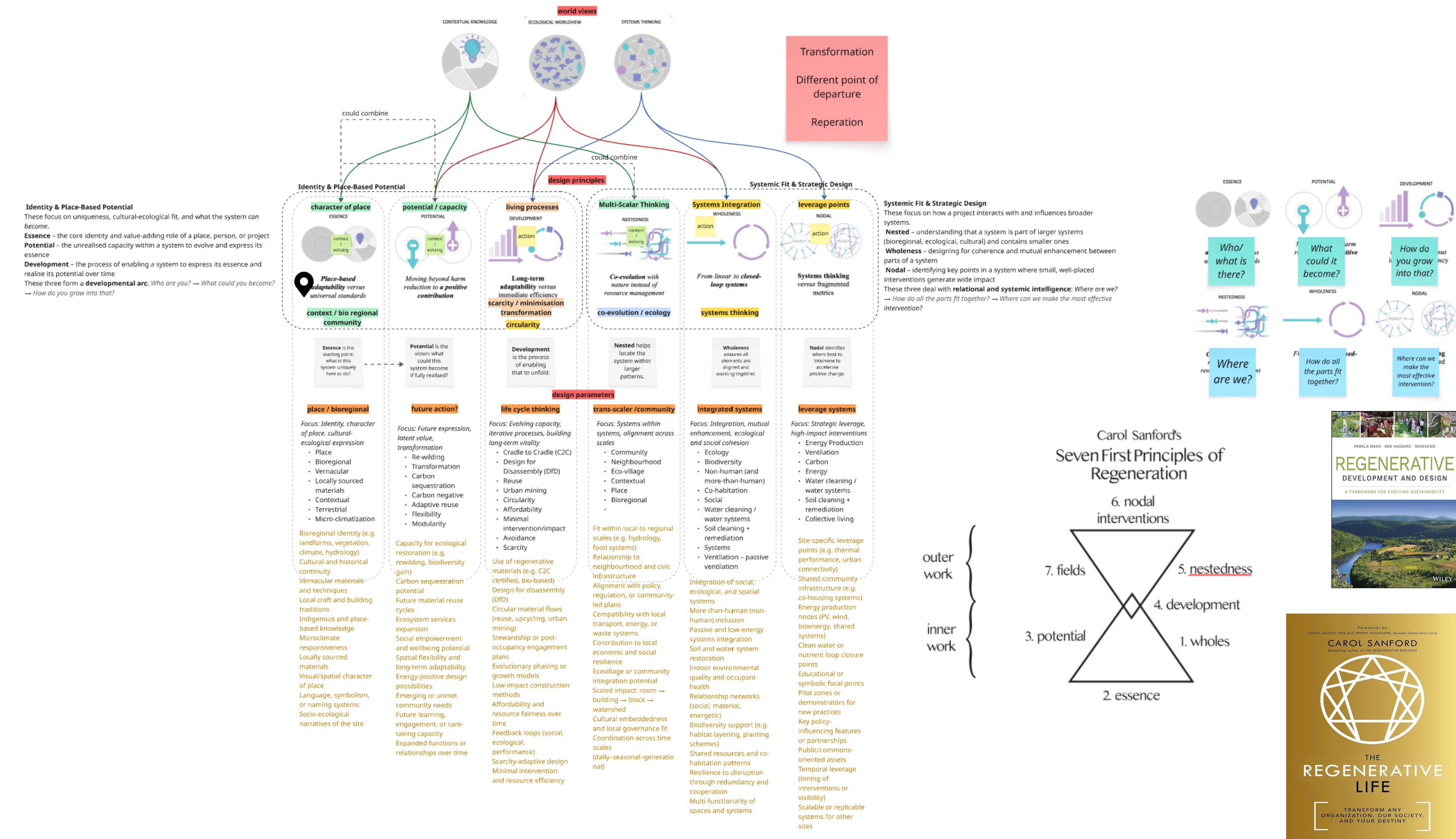
LIVING SYSTEMS THINKING

Regenerative Design for Sustainable Development

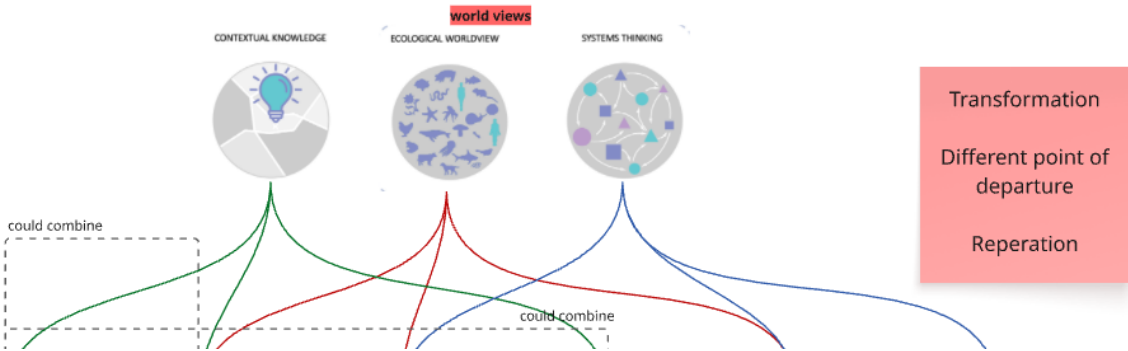
John Tillman Lyle

WILEY

REGENERATIV CONCEPTS based on systematic literature review...



REGENERATIV CONCEPTS based on systematic literature review...



Three concepts within regenerative design and development

Identity & Place-Based Potential
These focus on uniqueness, cultural-ecological fit, and what the system could become.
Essence – the core identity and value-adding role of a place, person, or project
Potential – the unrealised capacity within a system to evolve and express its essence
Development – the process of enabling a system to express its essence and realise its potential over time
These three form a **developmental arc**: Who are you? → What could you become? → How do you grow into that?

Ecological worldview: co-evolution with nature

Systems thinking: creating systems of interdependence and closed-loop cycles

Contextual knowledge: designing with and from place

7 principles of regenerative design

Place (essence)

Focus: Identity, character of place, cultural-ecological expression,

Future Action: working with potential, not just problems (potential)

Focus: future expressions, latent value

Lifecycle thinking: co-evolution and developmental thinking (developmental)

Trans-scaler: systems thinking and nested hierarchies (nested)

Focus: Systems within systems (nestedness), alignment across scales, interconnected hierarchy, holistic transformations

Wholeness: Integrated systems / whole systems thinking (wholes)

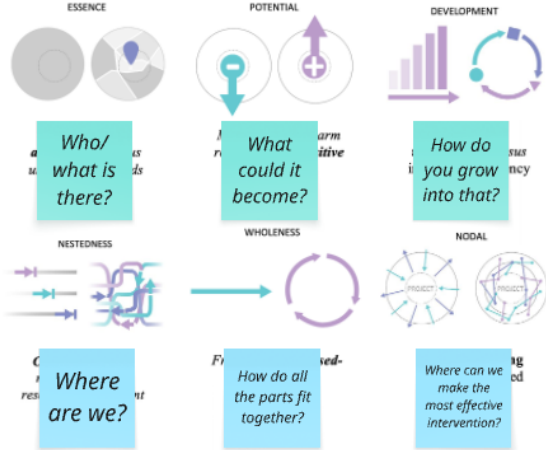
Focus: Integration, mutual enhancement, ecological and social cohesion

Reciprocity: mutual benefits (Fields)

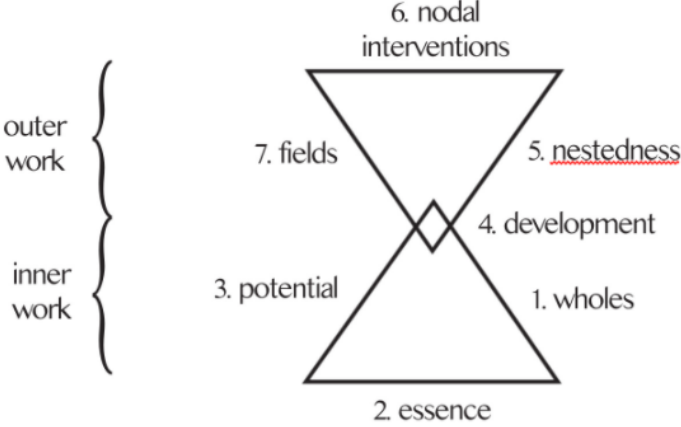
Leverage System: (Nodal)

Focus: Strategic leverage, high-impact interventions

Strategic Design
on how a project interacts with and influences broader systems
Understanding that a system is part of larger systems (ecological, cultural) and contains smaller ones
– designing for coherence and mutual enhancement between systems
Identifying key points in a system where small, well-placed interventions generate wide impact
Deal with **relational and systemic intelligence**: Where are we? / How do the parts fit together? → Where can we make the most effective interventions?



Carol Sanford's Seven First Principles of Regeneration



relationships over time
performance)
Scarcity-adaptive design
Minimal intervention and resource efficiency
scales (daily-seasonal-generational)
Shared resources and co-habitation patterns
Resilience to disruption through redundancy and cooperation
Multi-functionality of spaces and systems
Public/commons-oriented assets
Temporal leverage (timing of interventions or visibility)
Scalable or replicable systems for other sites



REGENERATIVE DEFINITION based on systematic literature review...

In short, the most commonly used definitions derive from:

*“**Regenerative design** is a system of technologies and strategies, based on an understanding of the inner working of ecosystems that generates designs that regenerate socio-ecological wholes rather than deplete their underlying life support systems and resources”.¹*

*“**Regenerative development** provides the **framework**, and builds the local capability required to ensure regenerative design processes achieve maximum systemic leverage and support through time”.¹*

A defining aspect of RDD is its focus on closed-loop systems that support interdependence among all ecological participants, from flora and fauna to the built environment. This requires a shift from fragmented problem solving to a whole-system or nested systems perspective.(Ref Reed)

Similar to Lyle’s original definition, it is also explained as “a closed-loop life cycle” where “every being or element is dependent on the other”,⁵³ aiming to create environments that benefit all ecological stakeholders.

It is further characterised as “a systems thinking approach that is process-oriented, rather than goal-oriented. The result is a system in which people and nature mutually benefit”.¹²



OBSTACLES based on systematic literature review...

- Difficulty in shifting paradigms from sustainable to regenerative approaches
- Fragmented knowledge and limited interdisciplinary collaboration
- Policy, governance, and institutions
- Lack of skilled professionals and education in regenerative practices
- Challenges in practical application and scalability
- Standardised definitions and metrics
- greenwashing and misuse of terminology
- Economics, materials, and timeframes

regenerative projects require extensive stakeholder engagement and long-term stewardship. Successful projects depend on “building a field of commitment and caring in which stakeholders step forward as co-creators and ongoing stewards”.^{71(p18)} Yet such processes are resource-intensive and clash with conventional design’s short-term timelines, introducing logistical and financial challenges that deter clients and developers.

7.6 Standardised definitions and metrics

The absence of standardised definitions and metrics is widely recognised as a barrier in the literature. Regenerative practices are difficult to apply consistently across projects without clear criteria,⁵⁵ while it has been cautioned that RDD “does not lend itself to a ‘menu approach’”.^{19(p13)} Inconsistent terminology leads to uneven application and confusion within the industry.

Measurement is further undermined by data limitations. It was indicated that there are insufficient datasets and challenges in monitoring long-term ecological and social performance.^{46(p25),72(p12)} Yet opportunities exist in the development of place-specific rubrics, standardised “handprint” metrics, and open-data platforms.^{46(p25),73(p15)}. Furthermore, demonstrator projects were highlighted as critical for building evidence and confidence (du

HVAD ER REGENERATIVT BYGGERI?

Baggrund - Regenerativt Byggeri

Initiativer

- Doughnut Biotool
- 4-1 Planet
- Reduction Roadmap
- Byggestop
- Danske Klimakrav (LCA) i bygningsreglement

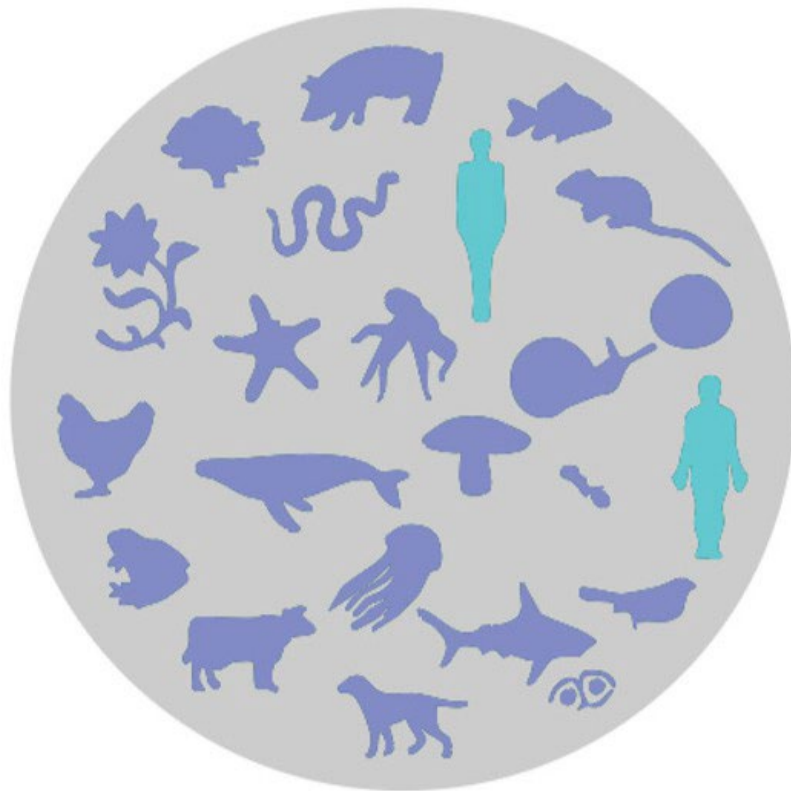
CO2 krav i nybyggeri fra 2023

LCAByg

HVAD ER REGENERATIVT BYGGERI?

Tre Koncepter

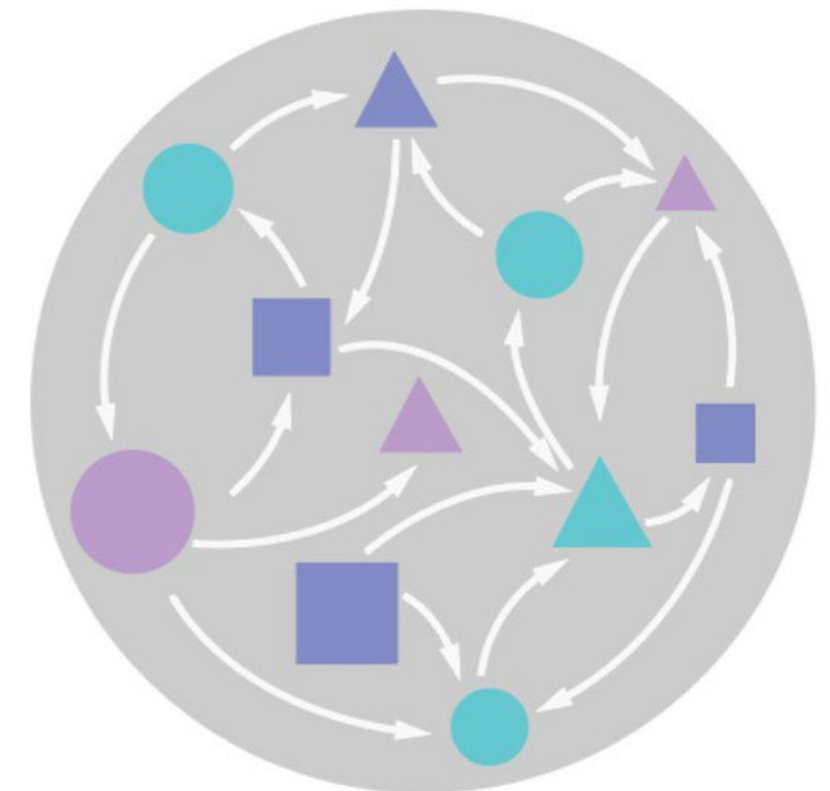
ECOLOGICAL WORLDVIEW



CONTEXTUAL KNOWLEDGE



SYSTEMS THINKING



...

...

HVAD ER REGENERATIVT BYGGERI?

Syv Principper

1. Place (sted)
2. Future Action (Fremtidigt potentiale)
3. Lifecycle thinking (livscyklustænkning)
4. Trans-scalar
5. Wholeness (helhed)
6. Reciprocity (Gensidig vekselvirkning)
7. Leverage systems (Systemløftepunkter)

...

...

HVAD ER REGENERATIVT BYGGERI?

Syv Principper: 1) Sted

...



...

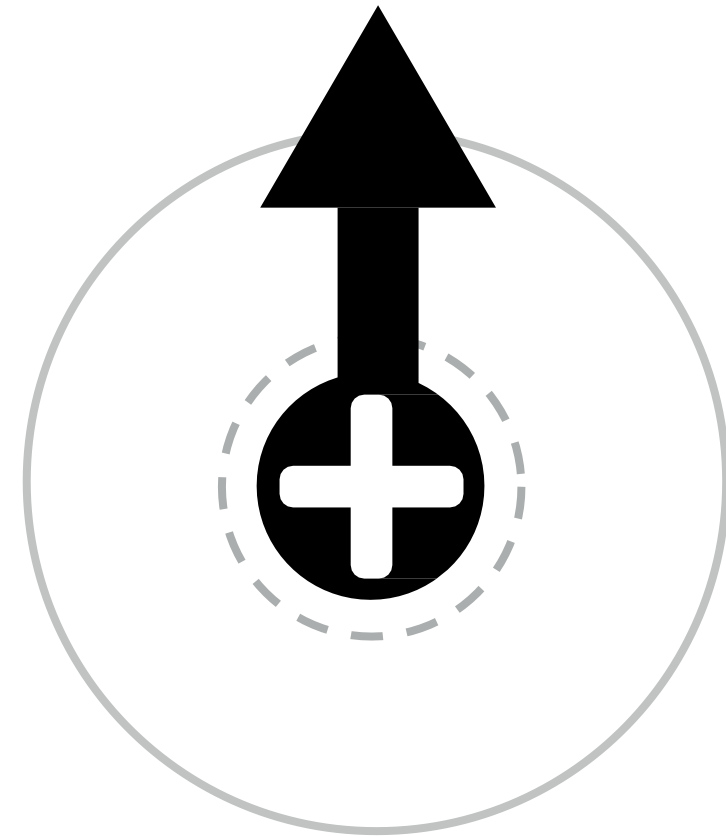
...



HVAD ER REGENERATIVT BYGGERI?

Syv Principper: 2) Fremtidigt potentiale

...



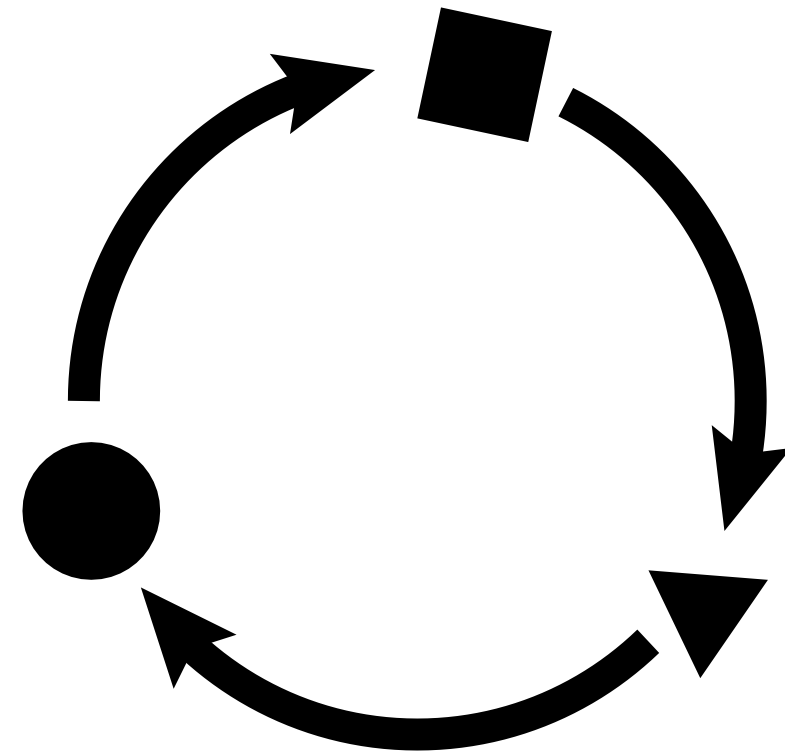
...

...

HVAD ER REGENERATIVT BYGGERI?

Syv Principper: 3) Livscyklustækning

...



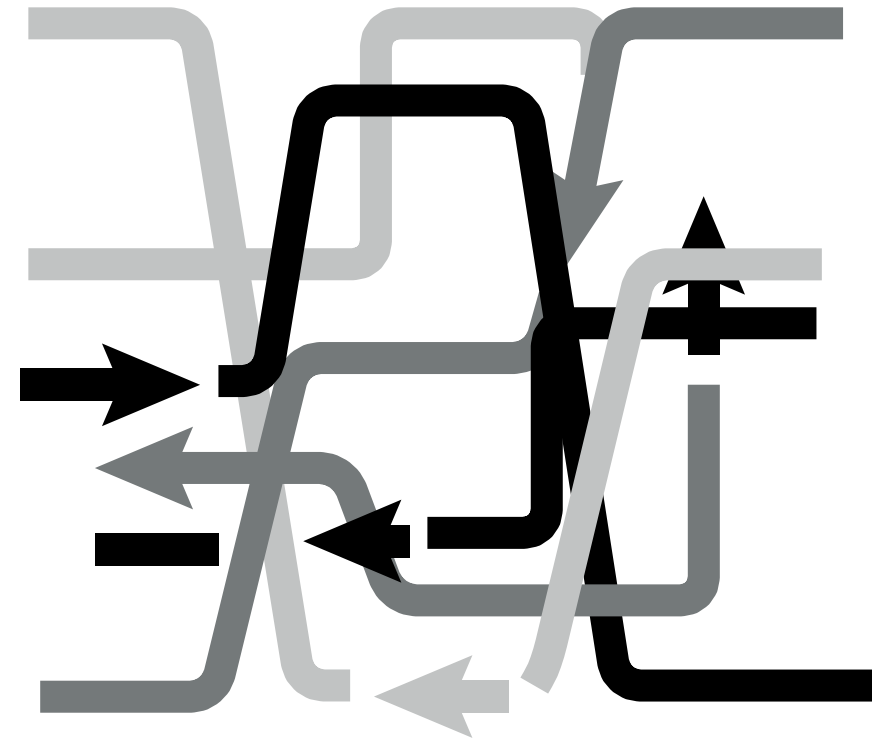
...

...

HVAD ER REGENERATIVT BYGGERI?

Syv Principper: 4) Transskalært

...



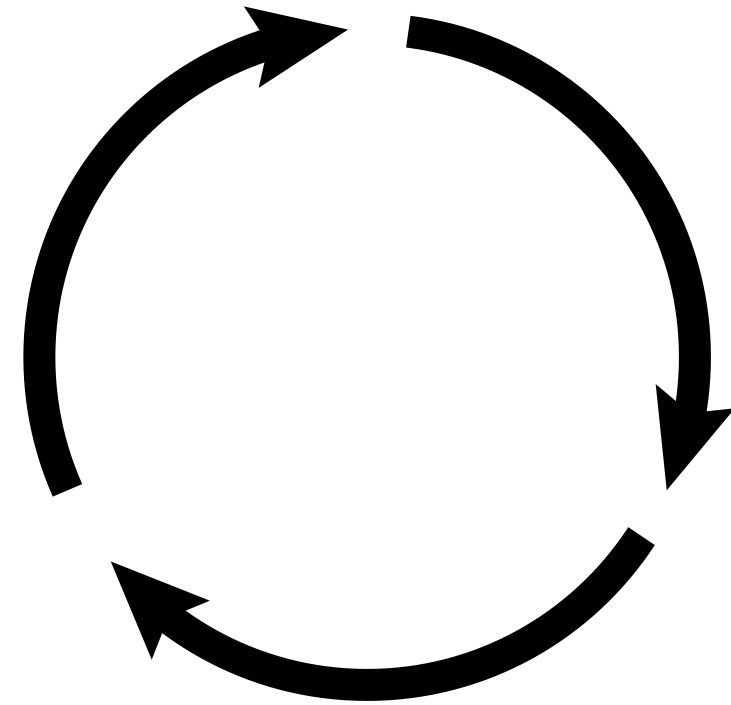
...

...

HVAD ER REGENERATIVT BYGGERI?

Syv Principper: 5) Helhed

...



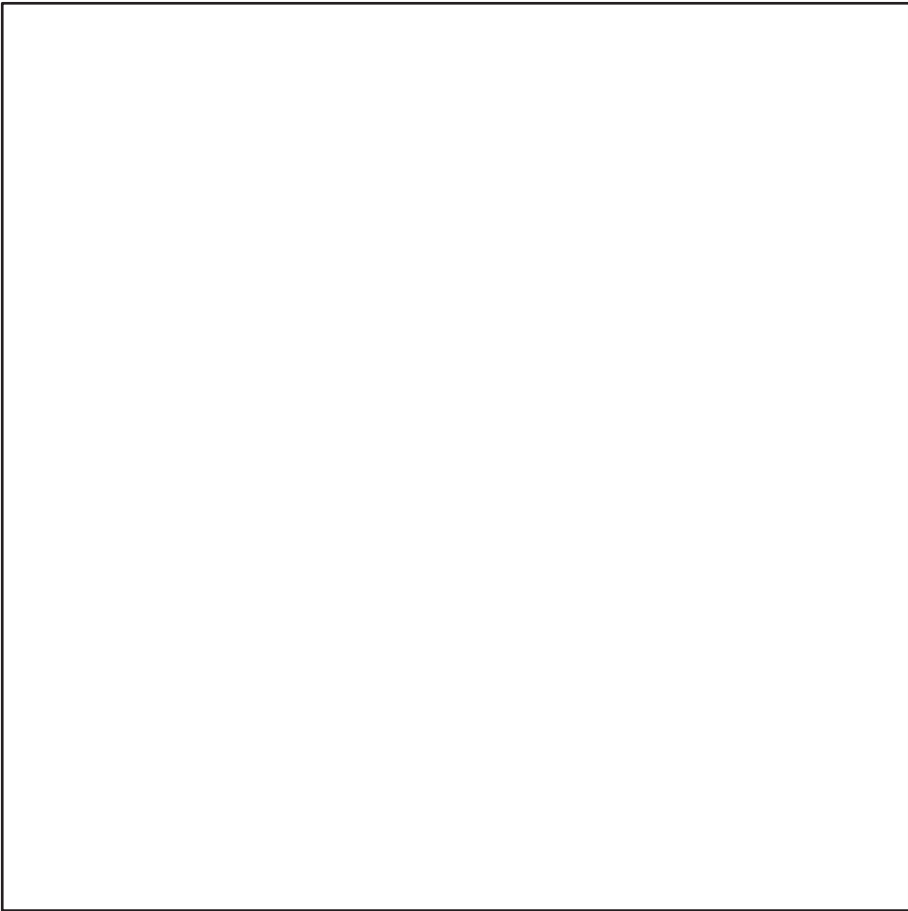
...

...

HVAD ER REGENERATIVT BYGGERI?

Syv Principper: 6) Gensidig vekselvirkning

...



...

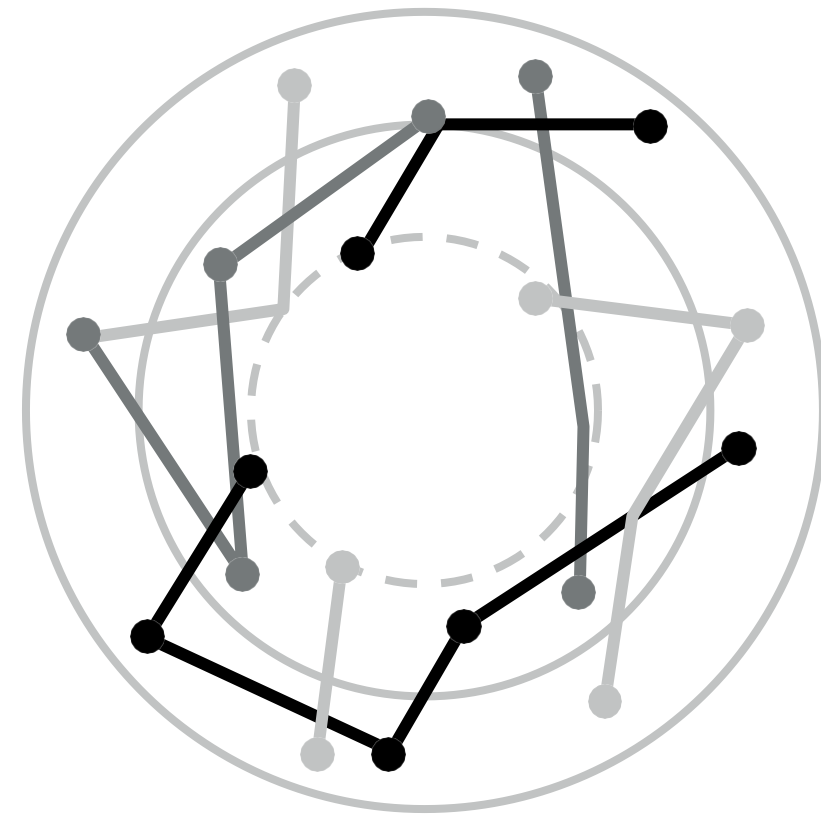
...



HVAD ER REGENERATIVT BYGGERI?

Syv Principper: 7) Systemløftepunkter

...



...

...

HVORDAN KAN REGENERATIVT BYGGGERI SE UD?

LONG LIST

...

...

...

...



SHORT LIST

...

...

...

...



HVORDAN MÅLER MAN REGENERATION?

KVANTIFICERING AF REGENERATION

Hvordan måles byggeriet i dag?

...

Carbon Tunnelvision

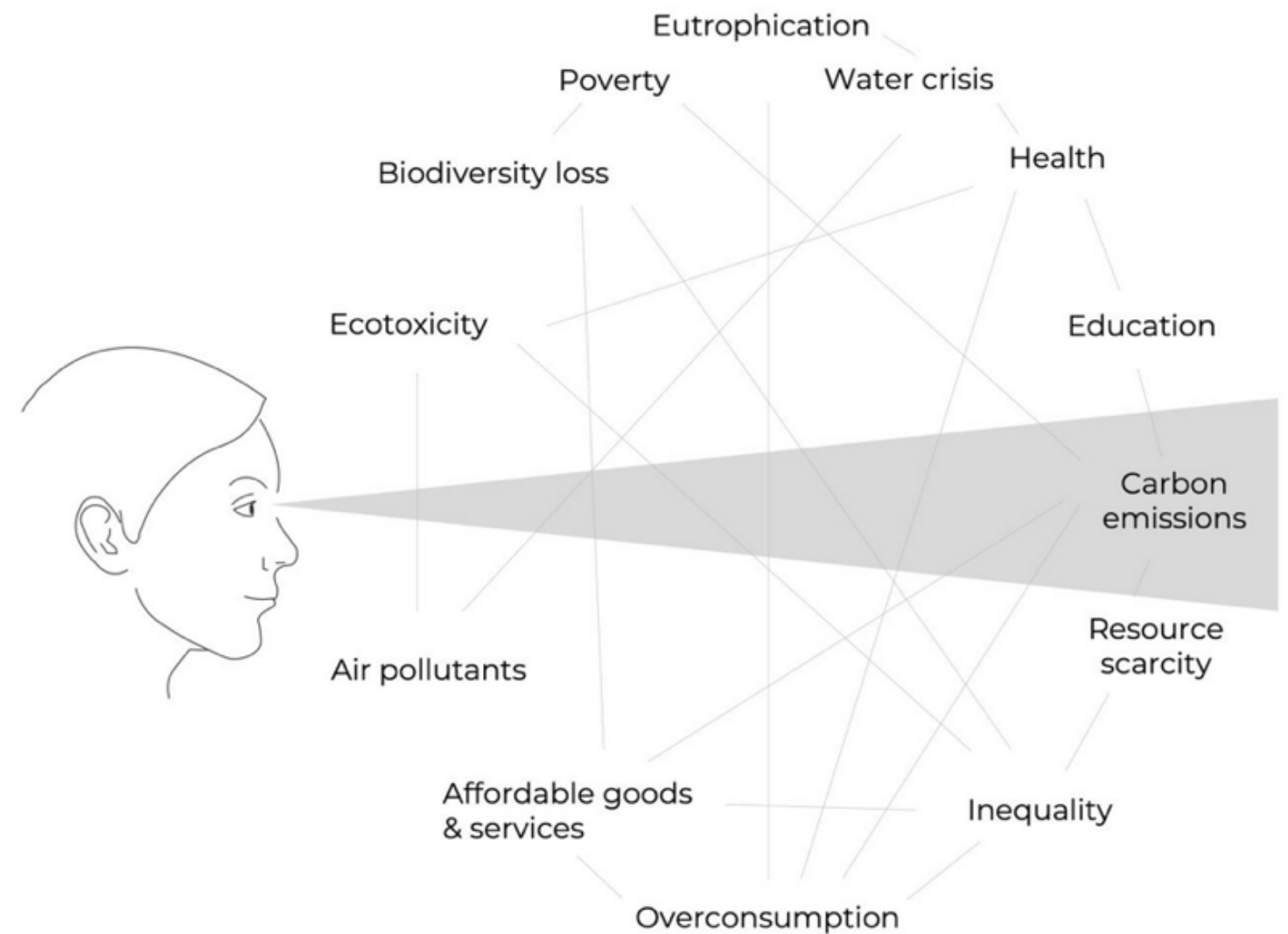
Graphic by Jan Konietzko

<https://www.sei.org/perspectives/move-beyond-carbon-tunnel-vision/>

KVANTIFICERING AF REGENERATION

Hvordan måles byggeriet i dag?

”CO₂-ækv/m²/år.”



Carbon Tunnelvision

Graphic by Jan Konietzko

<https://www.sei.org/perspectives/move-beyond-carbon-tunnel-vision/>

KVANTIFICERING AF REGENERATION

Hvordan måles byggeriet i dag?

...

...

...

