CLIC

CIRCULAR MODELS LEVERAGING INVESTMENTS IN CULTURAL HERITAGE ADAPTIVE REUSE

LONDON LAB OF TRANSDISCIPLINARITY

February 8th 2019

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January 2019

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776758

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WP 2 T2.3

Environmental / Ecological Indicators of Circularity

WU: Currently four studies planned – two in 2018, two in 2019

2018:

- “Placing Culture in an Ecological Economics Ontology: Beyond a Pillar Approach”
- “Circular Economy Strategies for Adaptive Reuse of Cultural Heritage Buildings to Reduce Environmental Impacts”

2019:

- “Methods and Tools for the Assessment of the Environmental Impacts of Cultural Heritage Buildings”
- “The Environmental Impacts of Cultural Heritage Buildings: A Circular Economy Perspective”

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2018:

- "Placing Culture in an Ecological Economics Ontology: Beyond a Pillar Approach" **WRITTEN, POSTER PRESENTATION**
- "Circular Economy Strategies for Adaptive Reuse of Cultural Heritage Buildings to Reduce Environmental Impacts" **SUBMITTED TO JOURNAL (UNDER REVIEW)**

2019:

- "Methods and Tools for the Assessment of the Environmental Impacts of Cultural Heritage Buildings" **"UNDER CONSTRUCTION"**
- "The Environmental Impacts of Cultural Heritage Buildings: A Circular Economy Perspective" **"UNDER CONSTRUCTION"**

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“Circular Economy Strategies for Adaptive Reuse of Cultural Heritage Buildings to Reduce Environmental Impacts” T2.3

Importance of Research

Research establishes clear environmental benefits of adaptive reuse…

- Studies find significant reductions in energy consumption and related greenhouse gas emissions, fossil fuel consumption, fresh water consumption, and materials use.
- Embodied energy (CO_2 avoided) main reason for environmental benefits

… Yet, benefits are not widely embraced in practice!

…. How to change practice?

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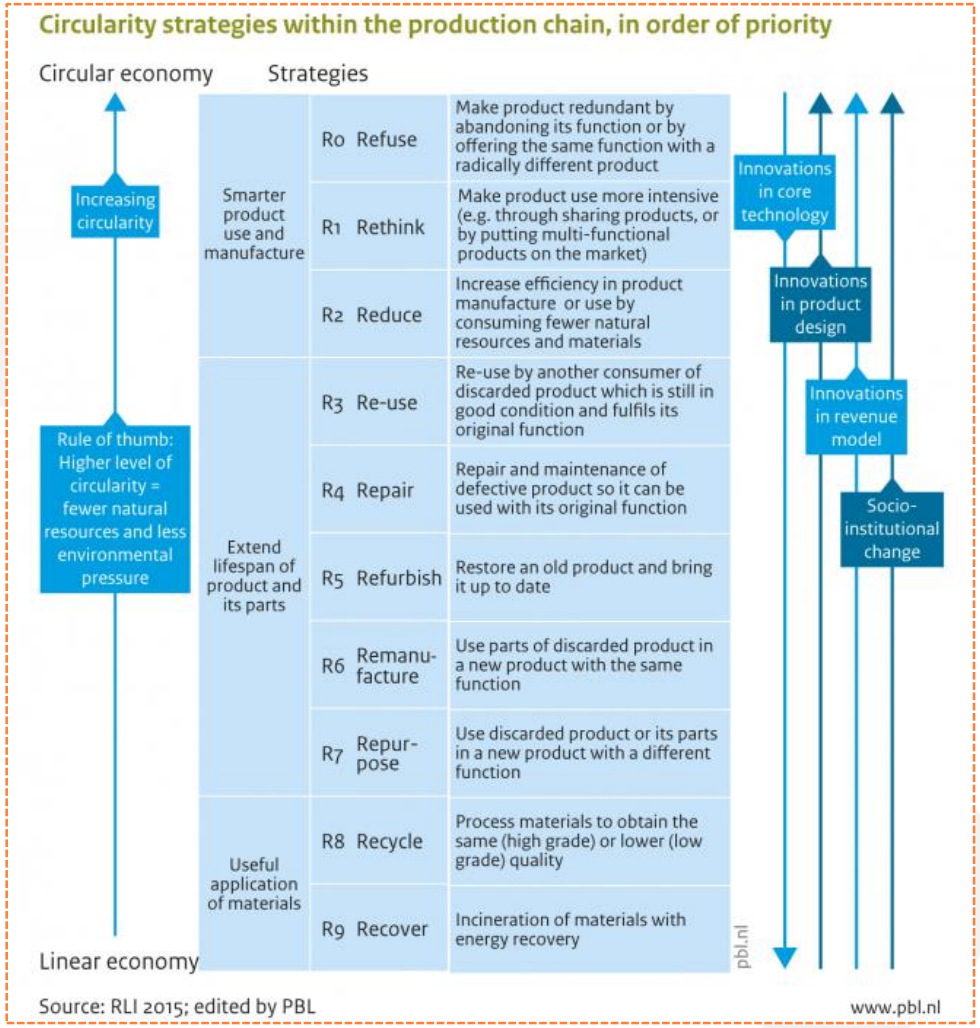
Imagine Buildings as Products…

- Product Supply Chain Circularity Strategies framework by Potting
- Prioritizes circular concepts and actions

Source: Potting, J., Hekkert, M., Worrell, E., Hanemaaijer, A., 2017. Circular economy: measuring innovation in the product chain. PBL.



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- 46 cradle-to-cradle strategies
- beyond linear supply chain cradle-to-gate perspectives
  - ✓Design considered as a critical separate phase (left out of many LCAs)
  - ✓Building Materials Sourcing considered as separate stage
  - ✓Embodied energy, impacts of occupancy stage and end-of-life of building
  - ✓Participants/stakeholders at each stage of circularity considered (those with financial stakes as well as use/operate stage parties)

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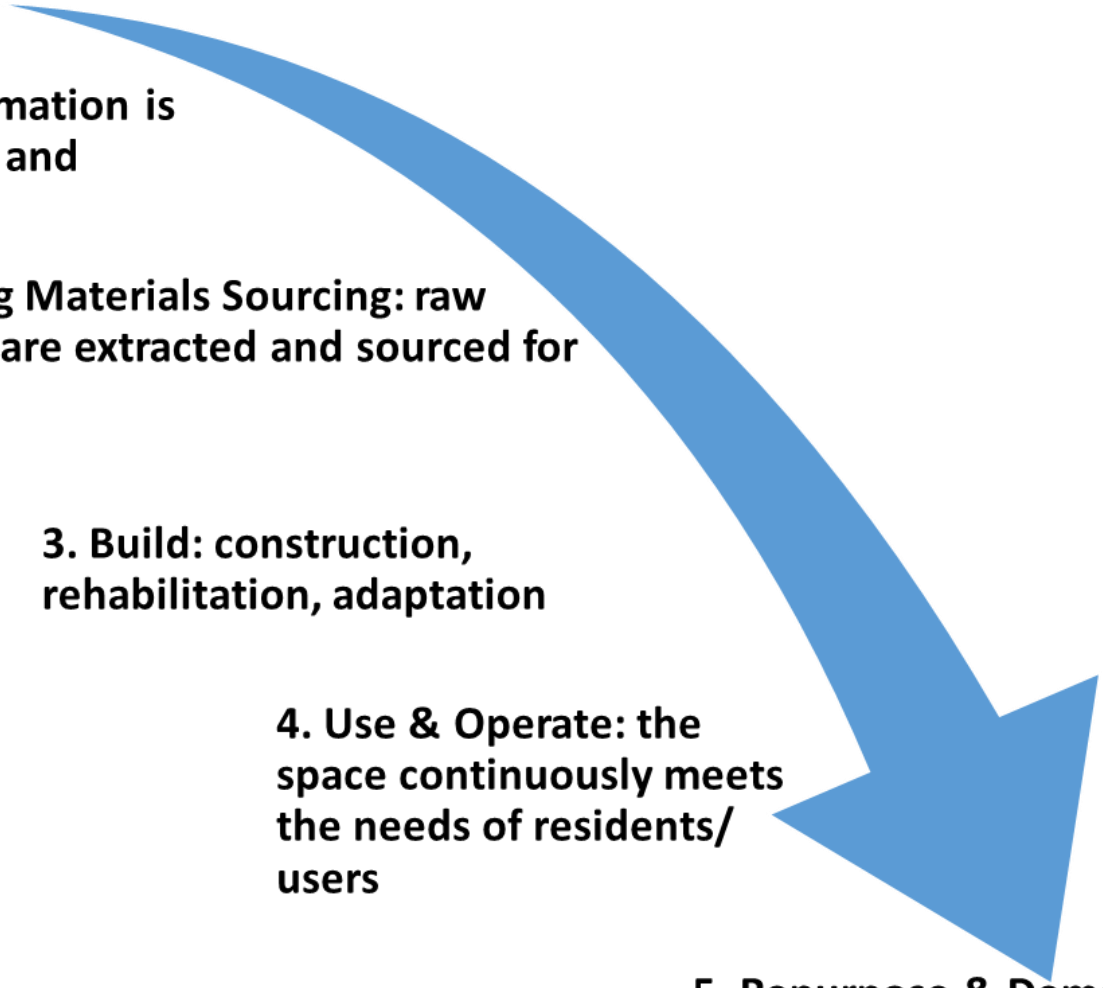
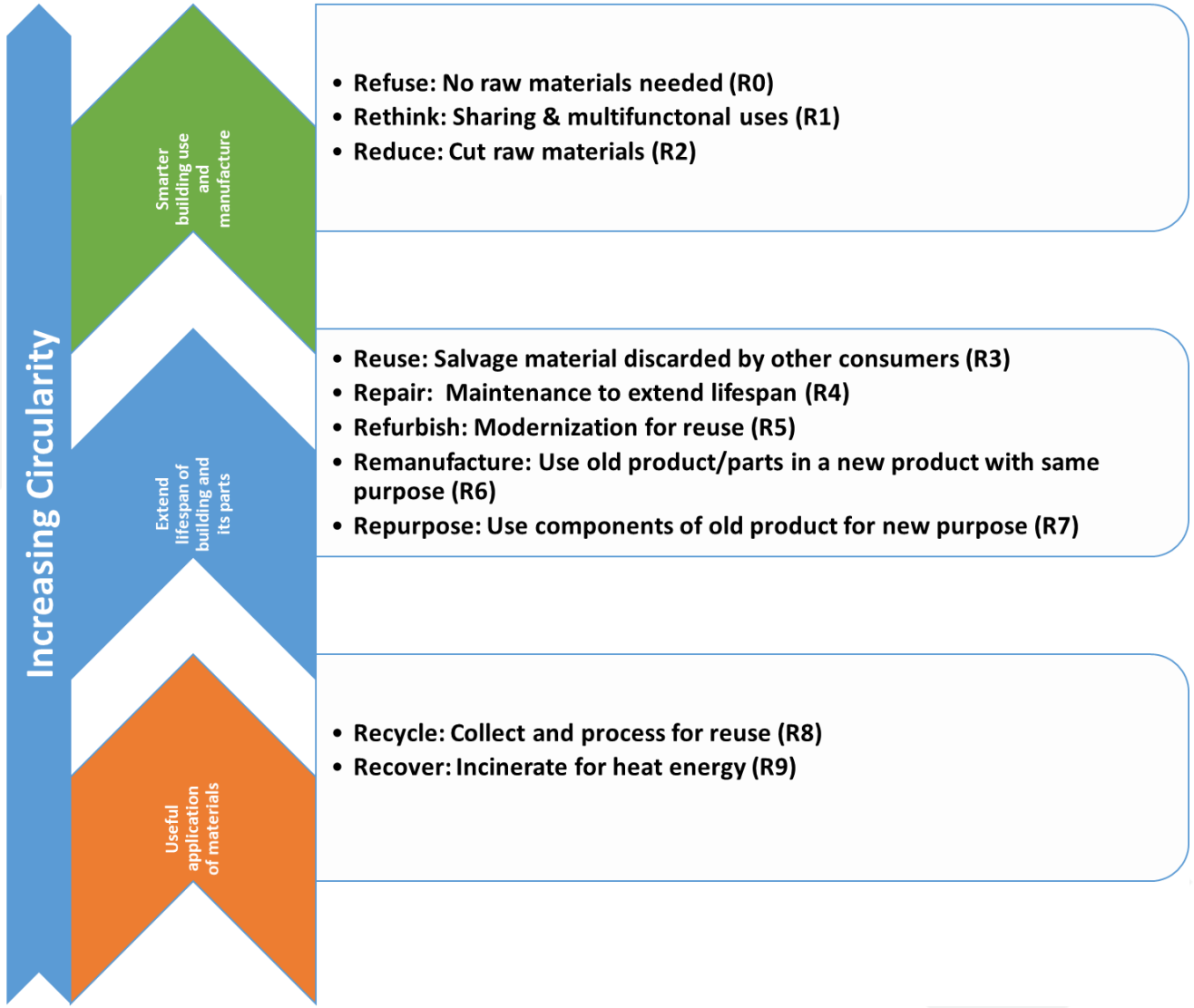
Building Life Cycle Phases as a Linear Product Supply Chain…



Imagining Buildings as Circular Products…

- Product Supply Chain Circularity Strategies Framework
- Applied to Buildings
- Transform Linear to Circular
- Cascading Material Use
- Posits micro to macro transformation



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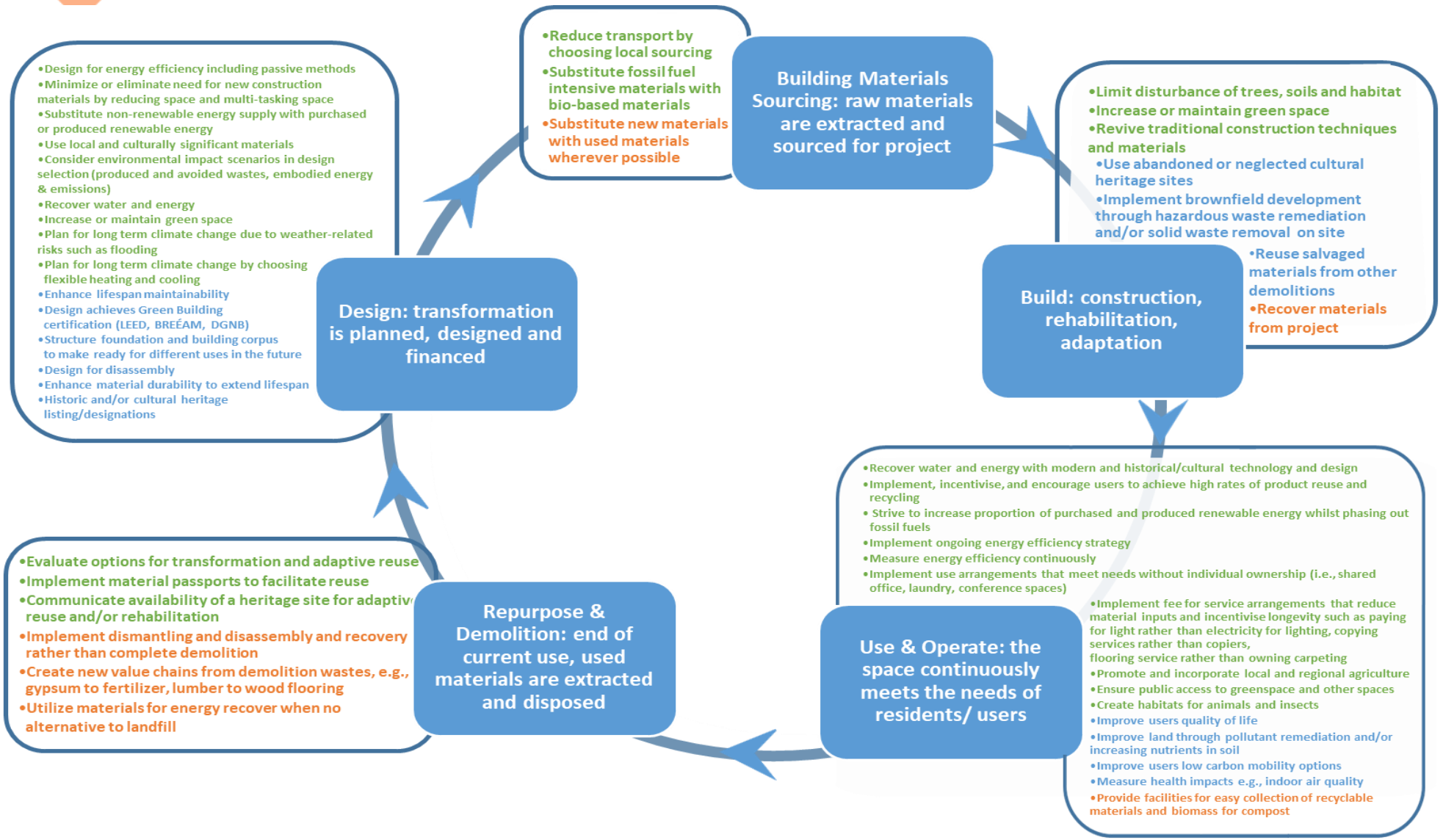

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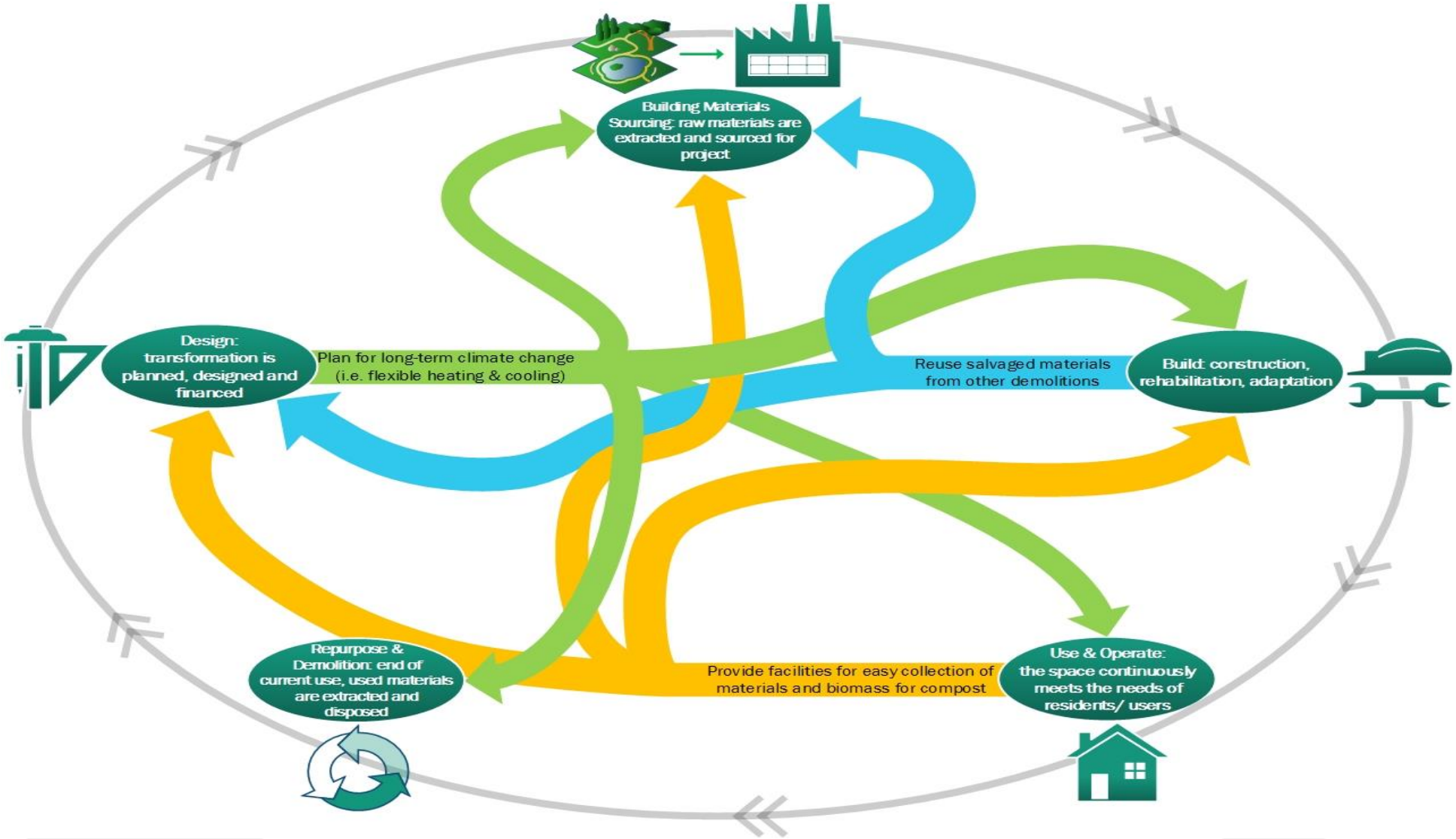
Zooming in:

- Each strategy connects 1+ phases of the building life-cycle



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	Building (Project) Lifecycle Phases	Links to Phases
1	DESIGN	
1.a	••Design for energy efficiency including passive methods	4, (3)
1.b	materials by reducing space and multi-tasking space	2, 4
1.c	or produced renewable energy	2, 3, 4
1.d	••Use local and culturally significant materials	2, 3, 4, 5
1.e	selection (produced and avoided wastes, embodied energy	4
1.f	••Recover water and energy	2, 3, 4
1.g	••Increase or maintain green space	3, 4
1.h	related risks such as flooding	3, 4
1.i	heating and cooling	3, 4
1.j	••Enhance lifespan maintainability	3, 4, 5
1.k	BREEAM, DGNB)	4
1.l	ready for different uses in the future	4, 5
1.m	••Design for disassembly	5
1.n	••Enhance material durability to extend lifespan	#
1.o	••Historic and/or cultural heritage listing/designations	2, 5
2	BUILDING MATERIALS SOURCING	
2.a	••Reduce transport by choosing local sourcing	(4)
2.b	••Substitute fossil fuel intensive materials with bio-based materials	3, 4
2.c	••Substitute new materials with used materials wherever possible	(4)

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Contribution

- This research establishes a new and comprehensive framework for circularity strategies for existing buildings, addressing cultural heritage preservation and environmental impacts.
- Findings derive from a structured review and synthesis of the relevant literature.
- The framework's design is straightforward and easily understood.
- It is intended as a practical tool for project teams made up of participants and non-participants at every stage of a building's life cycle.

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Expected Impact

Project teams can use it as:

- 1) a planning and evaluation tool at the start of project development;
- 2) an exploratory scoping exercise in combination with other participatory methods; and
- 3) for post project review of circularity

Non-participants may use the framework for education and policy development. For example, it can inform public procurement experts about the level of circularity that a building project achieves.

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Next Steps…

- We want people to use this!!
- Sent to Sweden and Pakhaus (Amsterdam, Netherlands) -> we want to find out what the needs of the community are
- We are prepared to present this for communities/community developers to use in their internal meetings

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Other news from the WU:
TU Graz STS Conference in Graz

6-7th of May

Science, Technology and Society Studies Conference, Graz, AT 6-7 May 2019

HTTPS://STS-CONFERENCE.ISDS.TUGRAZ.AT/EVENT/2/

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Science, Technology and Society Studies Conference, Graz, AT 6-7 May 2019

- Thank you for all the abstract submissions!

- Plan to arrive in Graz on Sunday (5th of May)
- Informal tour of Graz Sunday night
- Monday night (6th of May) CLIC dinner
- CLIC session: 18th Track (6th or 7th of May)

- Make bookings now!
- Everyone invited (no abstract submission needed)
- More poster presentations possible (hopefully)
- Online registration 20.2.2019 – 22.4.2019
- Early Bird: €195 until 22.3.2019 (then €255)

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STS Conference – The 7 Different Tracks:

- Digitalization of Society
- Sustainable and Innovative Public Procurement & Ecodesign
- **Towards Low-Carbon Energy and Mobility Systems**
- Gender - Technology - Environment
- Teaching STS
- Life Sciences - Biotechnology
- Science and Society Relationships revisited

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STS Conference – Low-Carbon Energy and Mobility Systems Track

Towards Low-Carbon Energy and Mobility Systems

S12 Towards a second stage of energy transition? - Socio-technical dimension of sector coupling

S13 The social pillar in the transition to a sustainable society/industry

S14 The spatialities of waste

S15 Aviation and shipping. Blind spots within the debate over sustainable mobilities

S16 STS perspectives on China´s low-carbon energy and mobility systems

S17 The role of users in energy transition: What do we know, what should we know?

S18 Is the Circular Economy able to transform the built environment in cities?

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Science, Technology and Society Studies Conference, Graz, AT 6-7 May 2019 – CLIC session

S18: Is the Circular Economy able to transform the built environment in cities?

FOSTER, Gillian & STAGL, Sigrid (Vienna University of Economics and Business), Austria

This session focuses on new research that explores Circular Economy concepts that transform the urban built environment to be more sustainable, inclusive, and future-ready. Circular Economy concepts are well suited to the building and construction sector in cities. For example, refurbishing and adaptively reusing underutilized or abandoned buildings can revitalize neighborhoods whilst achieving environmental benefits. New business models promote building materials sourced from biomass or recovered construction wastes in order to replace fossil-fuel-intensive building materials. In addition, cultural heritage buildings are modified to reflect the new needs of communities whilst increasing public access to icons of unique local cultures. Nevertheless, today these examples are primarily niche interventions. The research challenges, both theoretical and practical, are how to apply and scale-up circular economy models for the urban landscape. With an STS perspective on the issue, we look beyond the barriers and drivers of certain technological solutions to a broader societal concept. We ask the overarching question ``Is the Circular Economy able to transform the built environment in cities?"

KEYWORDS: circular economy, urban sustainability, building and construction, adaptive reuse, cultural heritage

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STS Conference Proceedings

- **Double-blind peer-review process for publication of conference proceedings**

Proceedings (full papers) can be submitted to sts-conf-graz@tugraz.at until May 31, 2019 and will be available as online proceedings. This year´s full papers will be peer reviewed.

The proceedings (full papers) will give an account of the work presented at the annual STS Conference in Graz.

These proceedings will be licensed under the terms of the Creative Commons Attribution 4.0

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WP 4

“A circular economy business model adaptive reuse of cultural heritage sites”

“A circular economy business model adaptive reuse of cultural heritage sites”

WP4 Task 4.3 Report

Current state-of-play, WU

- Literature review, abstract and introduction ready
- Planned finalising date: 2020 (end of 2019 if possible)

The Circular Business Model Canvas for Adaptive Reuse of Cultural heritage sites developed in this paper takes Lewandoski’s work a few steps further by:

1) applying it to a adaptive reuse of cultural heritage sites; emphasizing institutional factors;

2) incorporating elements from IAD and pairing it with a common-pool-resource analytical lens;

3) bringing forward the distributive links the adaptive reuse project has with its community;

4) reimagining value propositions to include cultural heritage and sustainability (not only environmental impact) [value mapping];

5) bringing forward the regenerative capacity of the adaptive reuse project [regenerative business];

6) incorporating elements from social enterprise literature, specifically business models for social enterprises literature; and

7) refocusing the finance discussion to include innovative financial mechanisms and alternative assets [Francesca Medda].

These innovations derive from an examination of the similarities and differences between traditional firms and adaptive reuse projects.

(Foster, Gillian & Medda, Francesca, forthcoming)

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