
Adaptive reuse
PARKASSOCIATI

Indice

01 Intro
Buildings as static objects
Construction and demolition waste
Buildings life cycle
Building for Change

02 Design for adaptability
Architecture as a Palimpsest
Architecture's 'Political Compass'
Adaptive re-use
Types of adaptive re-use
Benefits of adaptive re-use

03 Building Deconstruction
Designing without Depletion
Reversible building design
Urban mining
Retrofitting

04 Reversible building design
Building Decomposition
Buildings layers
Circularity

05 Material passports

01 Intro

Our buildings and surroundings hold the history and culture of a place. They show what people wanted and needed at a certain time, like a record of who we are.

However, exceptional architecture goes beyond that; it embraces **adaptability, evolution & reuse.**

Buildings as static objects

In the past, architects tended to concentrate their attention on the building as a static object where design, structures are often viewed as unchanging entities. However, dynamics take on a more vital role specifically, the dynamics of people, their interactions with spaces, and environmental conditions. While a design might suggest layouts, materials, and relationships that align with one possible scenario for a building’s utilization, the actual lifespan of a building remains uncertain and is subject to the influence of those who occupy it beyond its initial construction.

This has led to a divergence between the conventional approach to designing and depicting architecture, which often portrays it as though it were eternally static, and the practical reality where buildings frequently undergo adjustments and alterations to suit evolving needs.

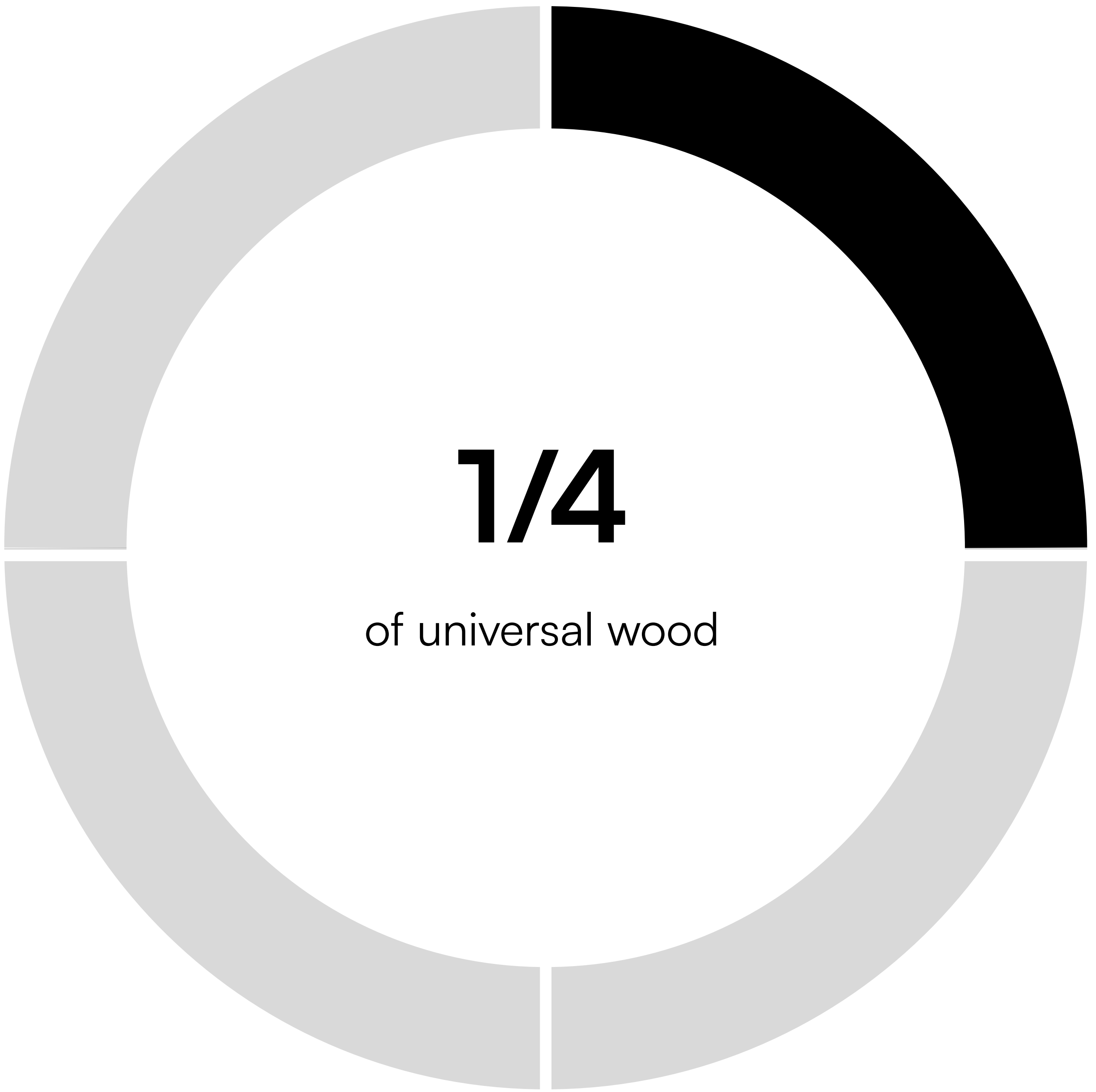
Construction and demolition waste

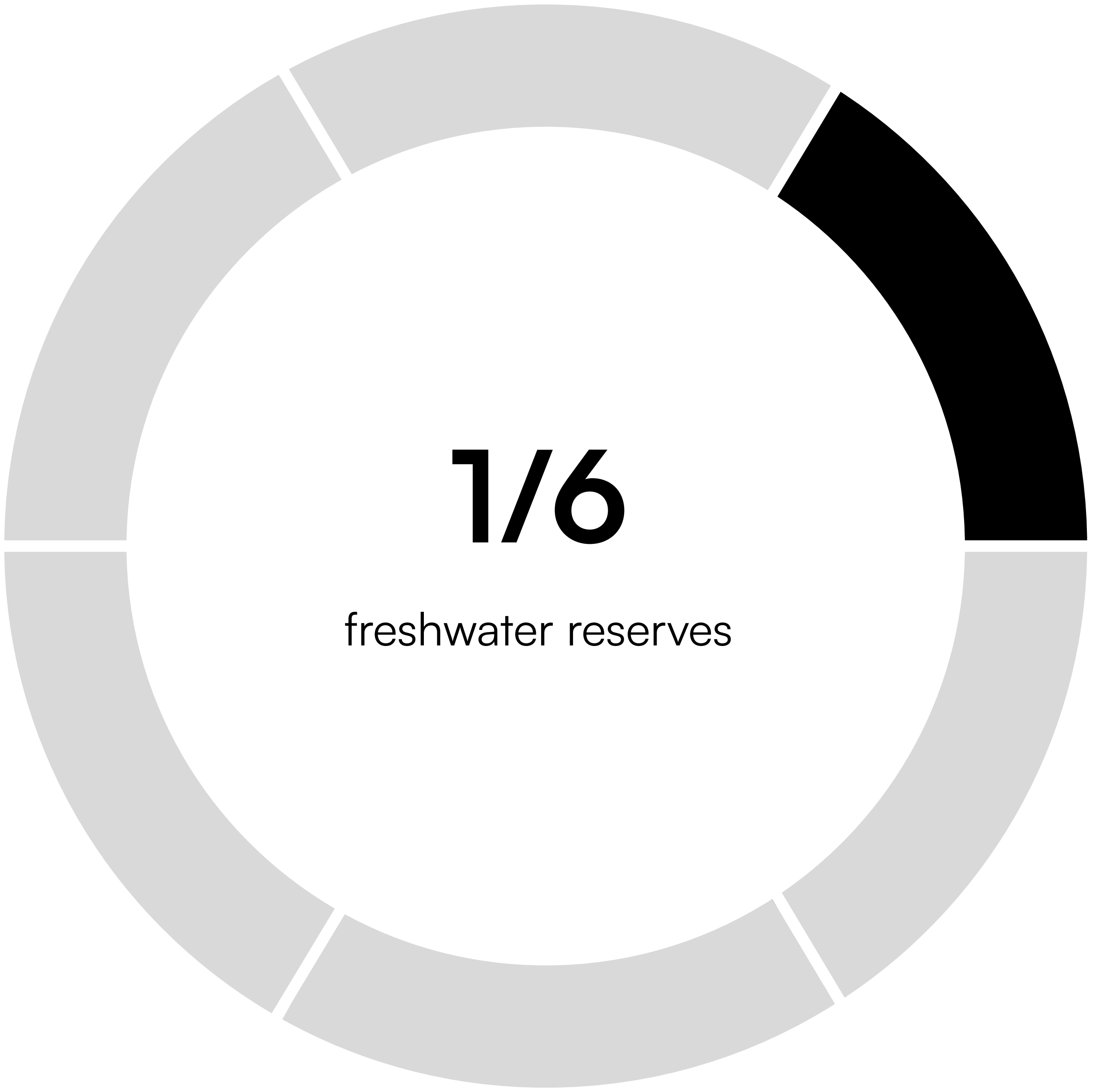
Rowcon recycling

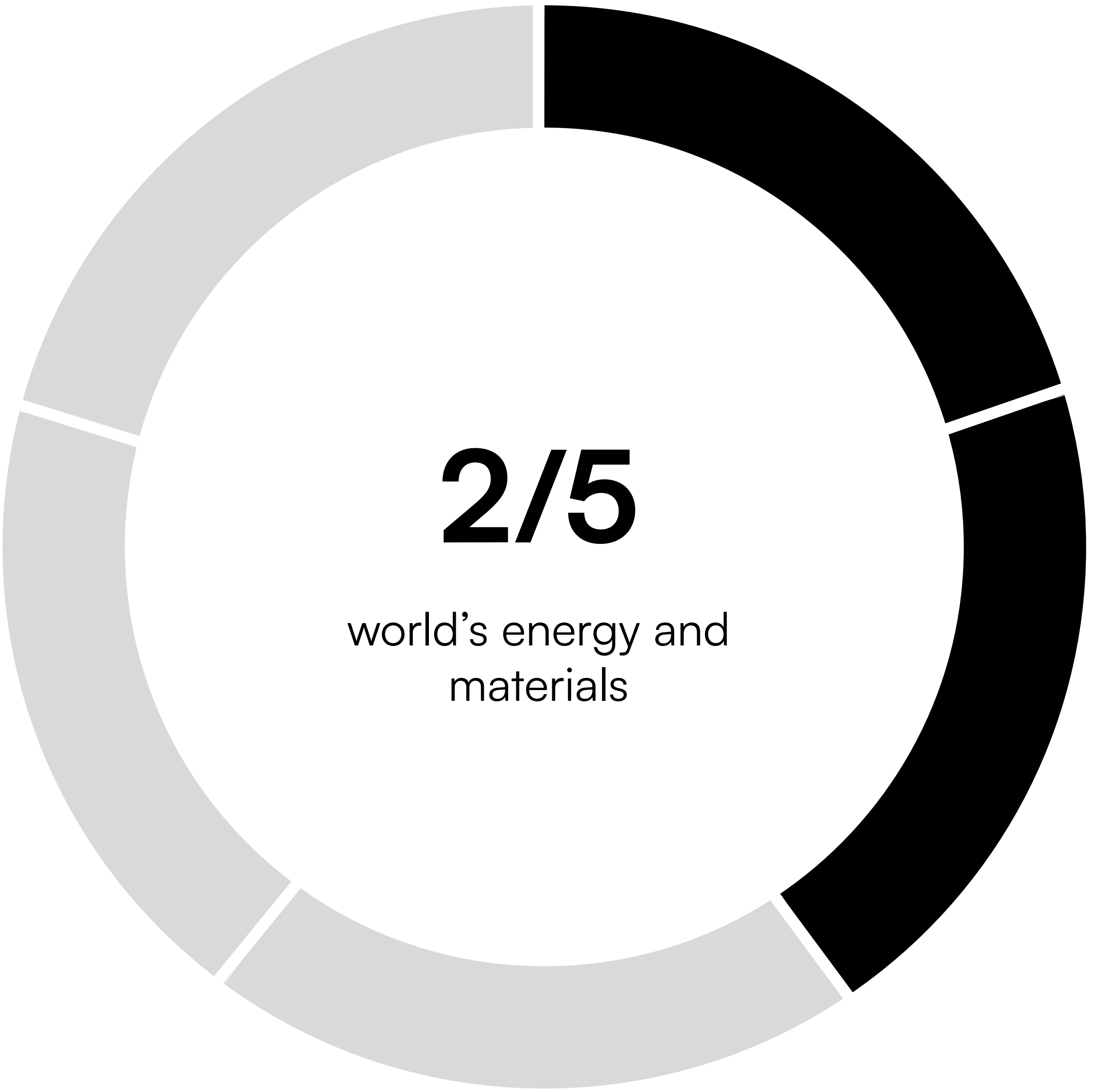
The built environment consumes more natural resources than necessary and therefore generates a large amount of waste. A large quantity of construction and demolition (C&D) waste is generated every year, much of which has the potential to be recycled (EC, 2016).

In other hand, over 10 billion tons of C&D waste are generated worldwide every year, among which the United States contributes about 700 million tons (Jain et al., 2015); the European Union contributes over 800 million tons (Ajayi et al., 2016); and China contributes around 2300 million tons (Zheng et al., 2017).

Global construction uses

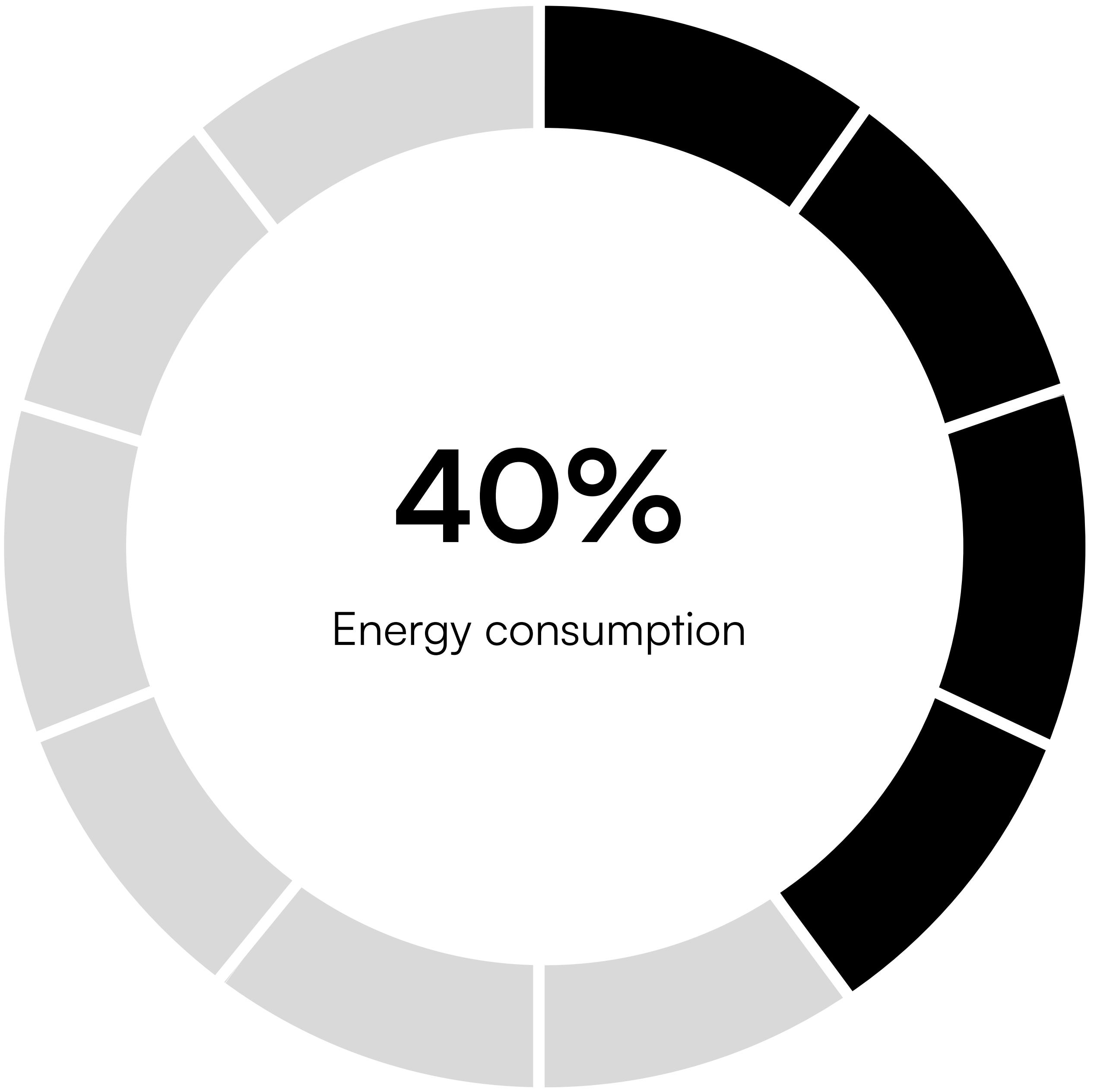


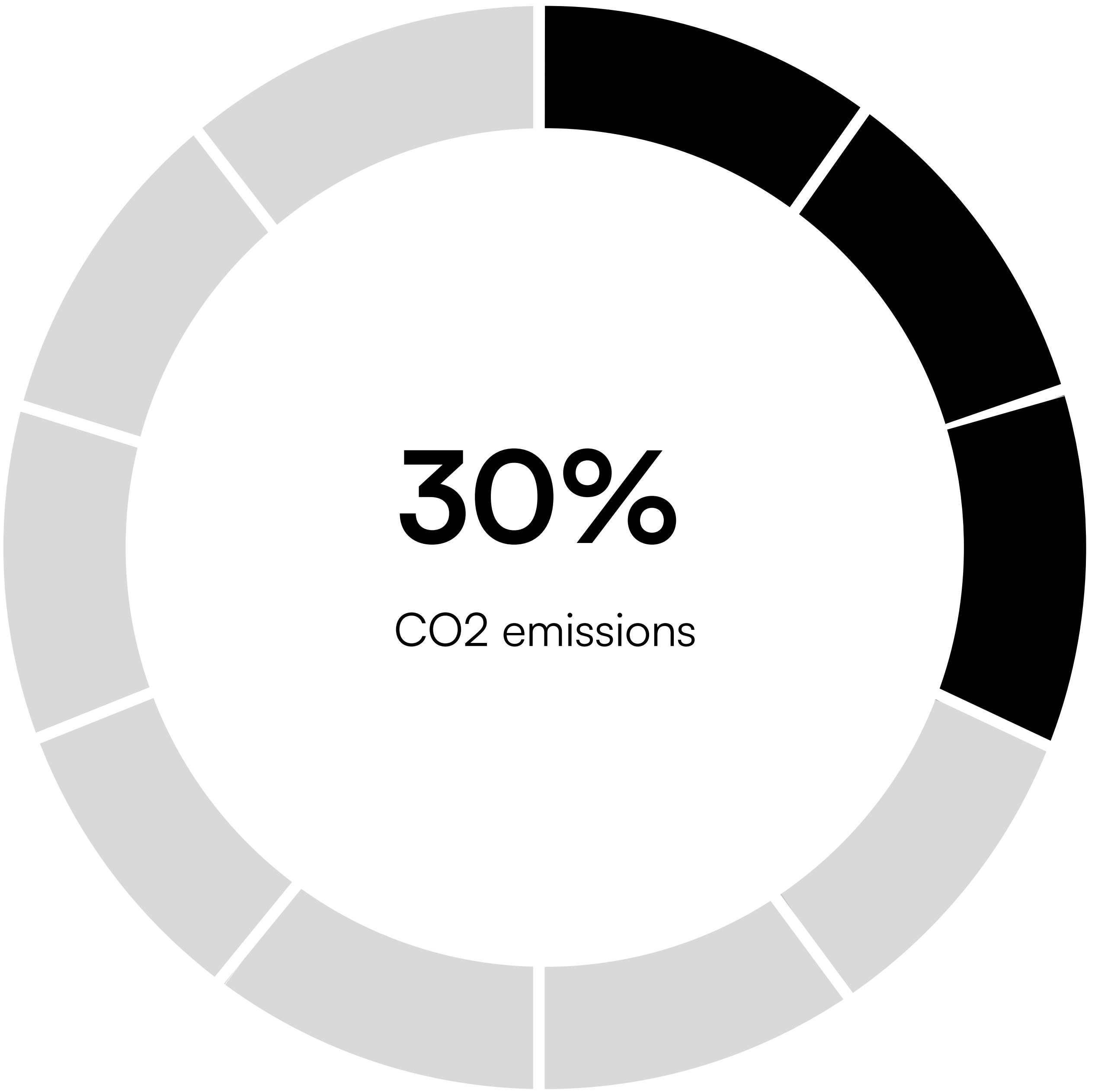


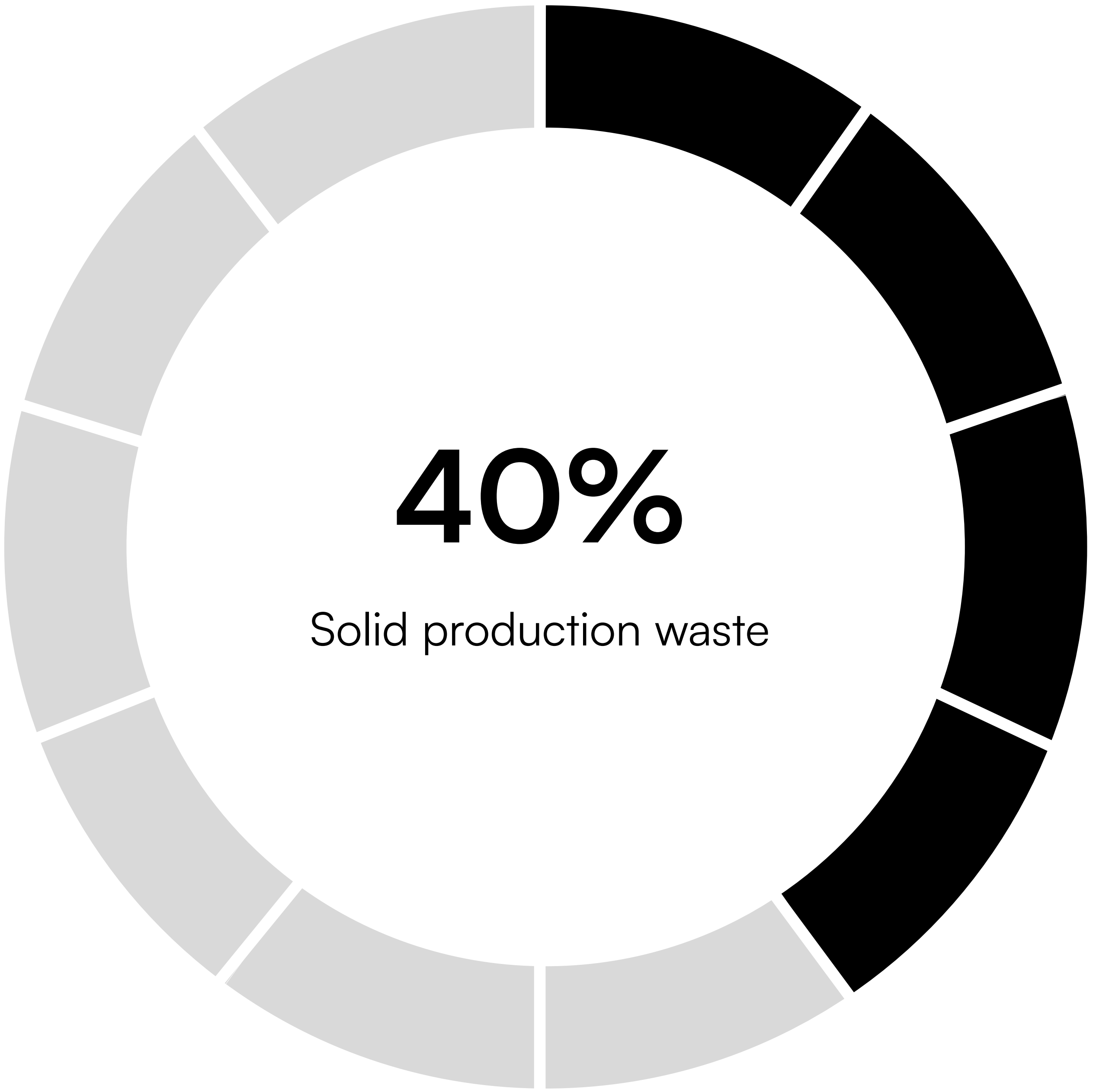


Thongkamsuk et al., 2017.

Global construction







Thongkamsuk et al., 2017.

Global construction waste

2.2 billion tons

Annual construction waste is
expected to reach globally by 2025.

Transparency Market Research

Buildings life cycle

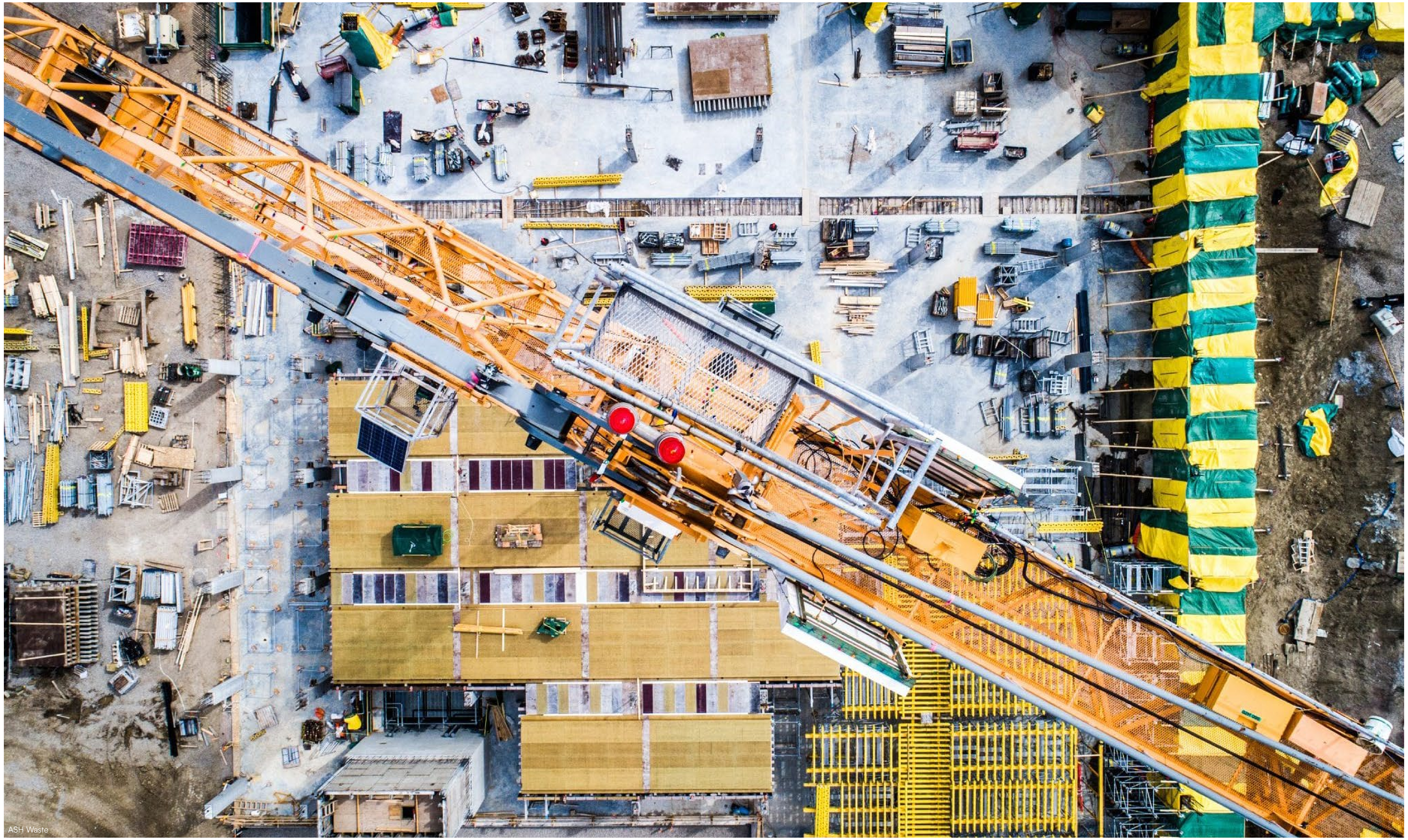
Currently, the building and construction sectors account for nearly 40% of the overall carbon emissions generated by humankind. The relentless demand for finite resources like sand, water, stone, and steel necessary for rapid urbanization is causing irreversible depletion in entire regions. This depletion is fundamentally altering the character of these areas, rendering them unsuitable to sustain human and animal life.

As the pressing reality of our environmental crises becomes increasingly evident, it is imperative that architecture undergoes a fundamental transformation. The long-held assumption that the construction industry must inexorably deplete our environment, exploit human resources, and compromise our future demands a reevaluation.

All valuable things eventually reach their end, including buildings. When this occurs, what follows? Usually, buildings are torn down, their materials destroyed, with a significant portion ending up in landfills.

But how can we construct a sustainable future?

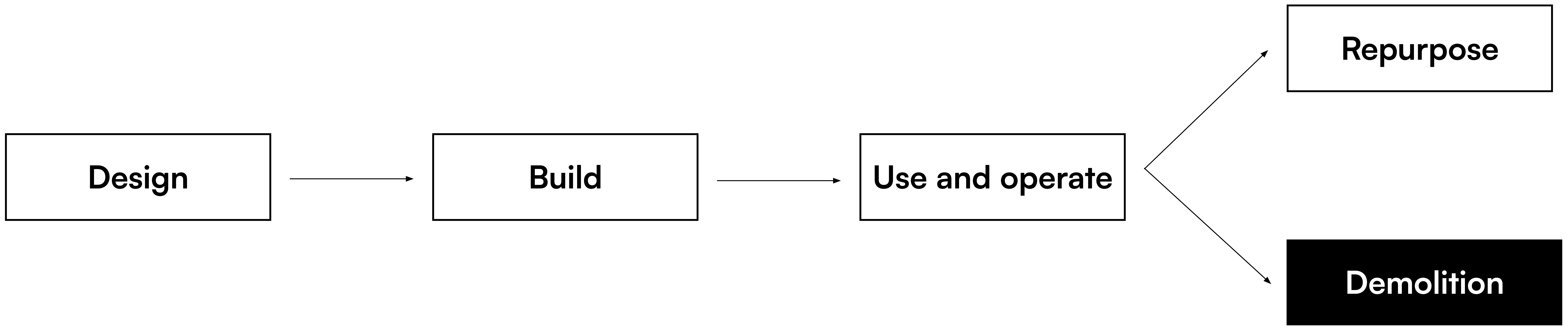
Building for Change (rethinking construction)


ASH Waste

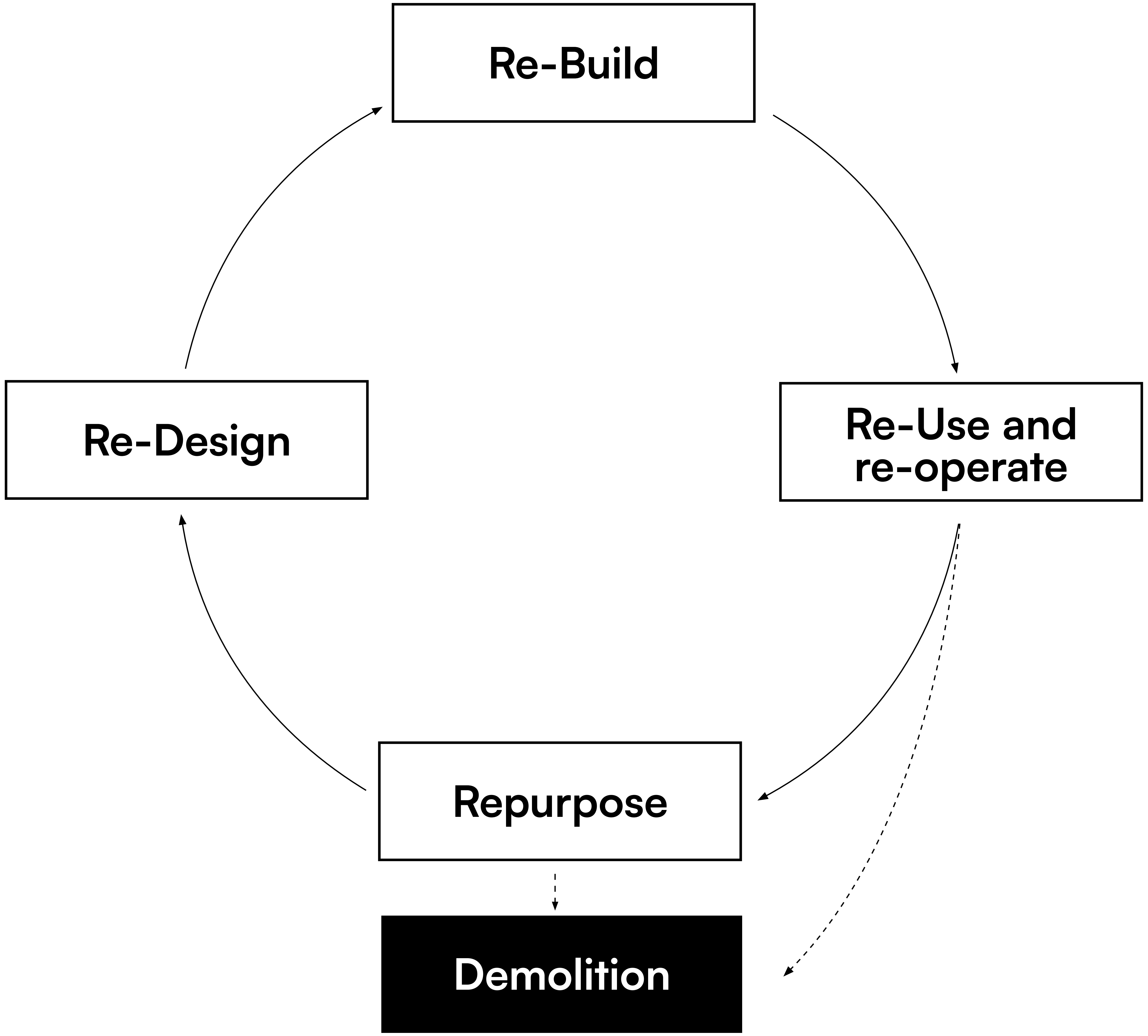
Very few buildings are designed to be easily adaptable. They are typically planned, funded, constructed, managed, maintained, regulated, and taxed with no consideration for adaptability.

As our spatial requirements undergo swift changes, architects are delving into innovative approaches for repurposing and repurposing existing structures, leading to a remarkable metamorphosis of our established urban environment. Considering that 87% of existing buildings are projected to remain in use by 2050, renovation and repurposing initiatives are crucial in reducing carbon emissions in the built environment. Our proficiency empowers us to repurpose and transform buildings in innovative and eco-friendly manners.

Linear model



Circular model



Shift from a linear to a circular economy (Peters M. et al. 2016)

02

Design for adaptability

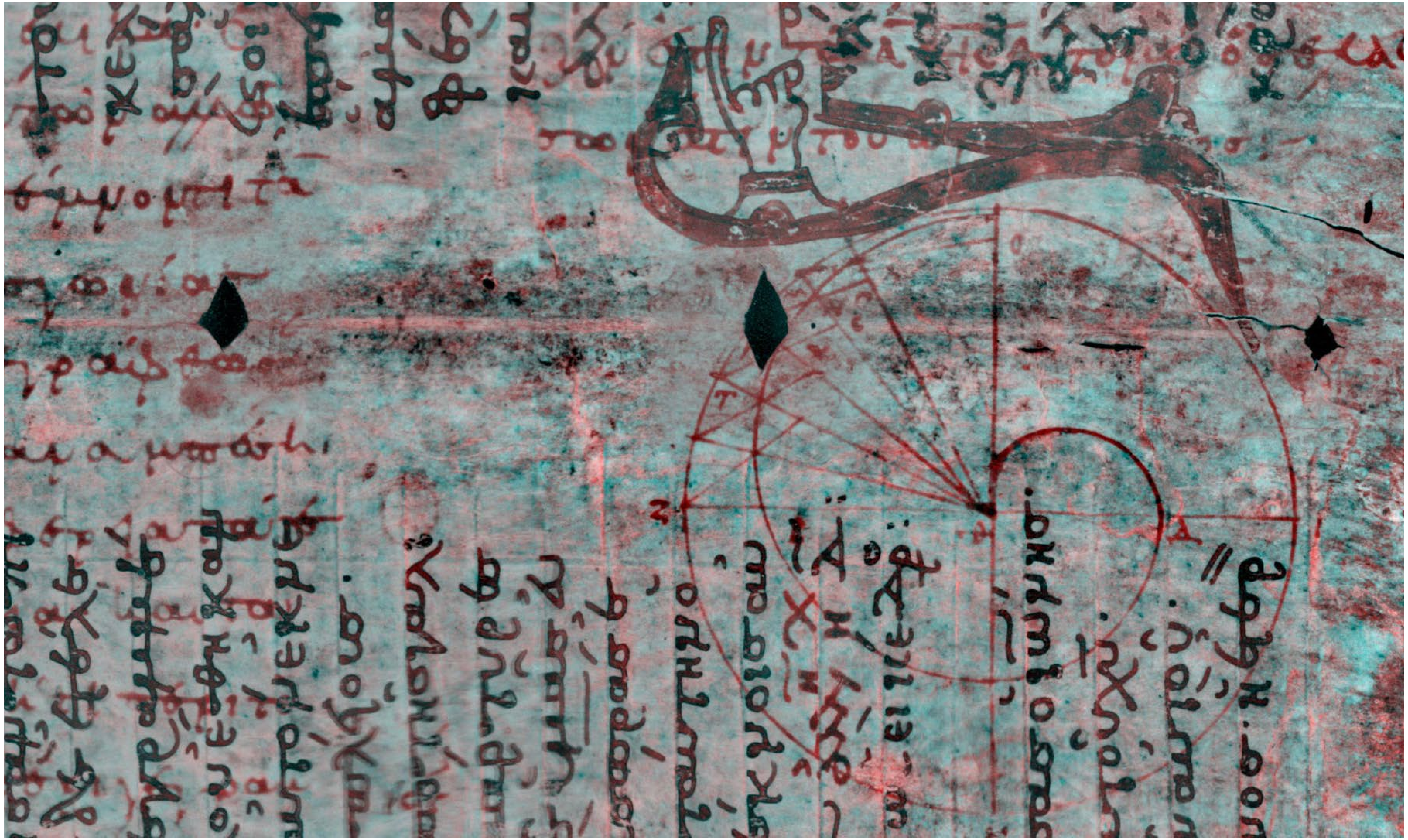
Palimpsest:

- “A manuscript or a piece of writing material in which the later writing has been superimposed over deleted previous writing.”
- “Something reused or altered, but still with visible traces of its former form.”

What is the point using the word “palimpsest”?

It is a metaphor to suggest the processes of transformation through time.

Architecture as a Palimpsest



In essence, the term “palimpsest” is synonymous with the idea of layers. More precisely, when historically used, palimpsest pertains to an ancient manuscript, typically inscribed by monks or scholars on parchment or vellum. In this process, the initial writing was erased, making way for new content to be written on the same surface.

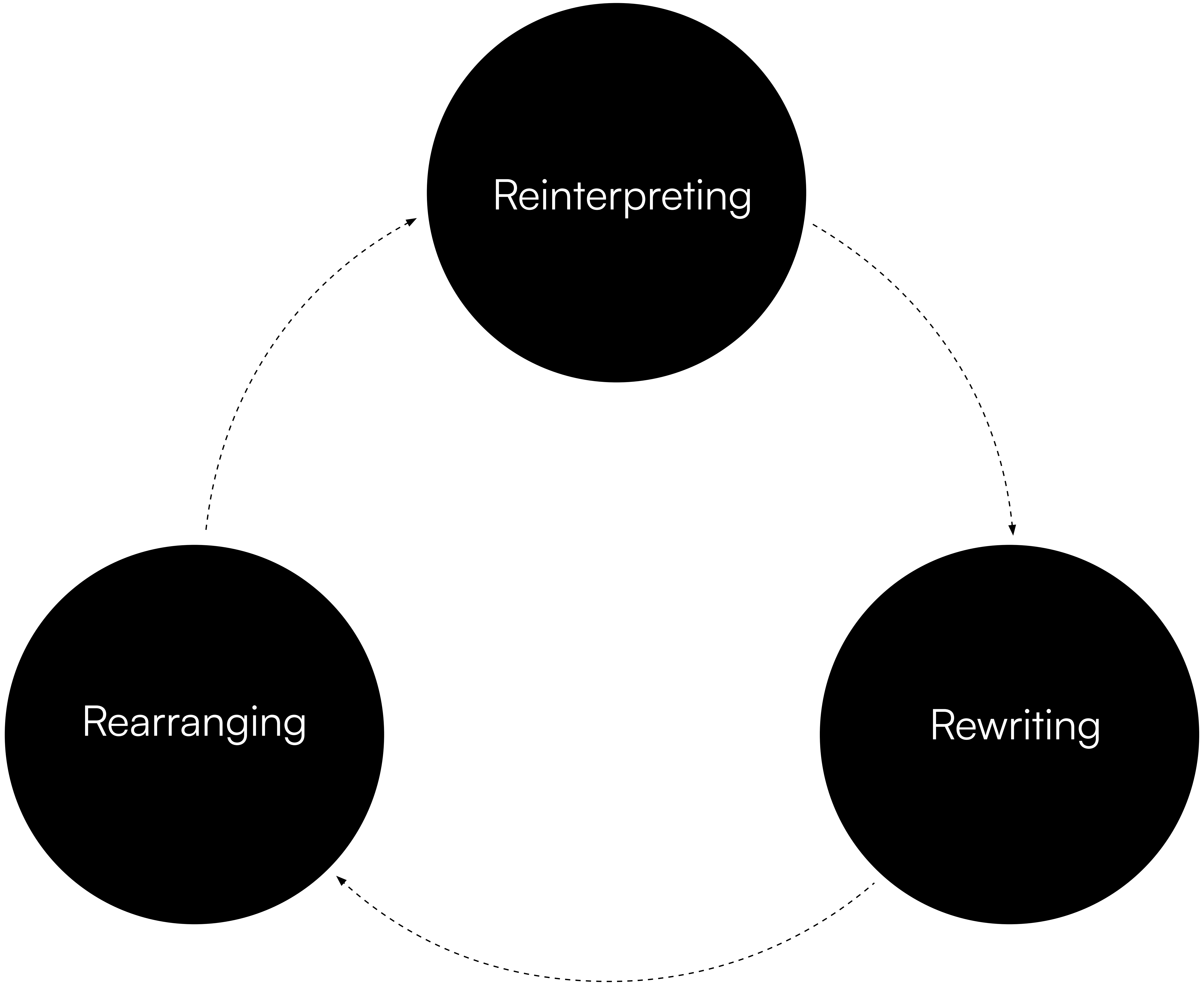
An architect, when making alterations to a drawing using multiple overlaid sheets of tracing paper, effectively creates a palimpsest. Similarly, an existing building that can evolve to accommodate new uses and designs over time can be likened to a form of palimpsest. This palimpsest metaphor elucidates the concept of metamorphosis in building design.

One can perceive a palimpsest as possessing at least three connotations:

- The original meaning.
- The new interpretation.
- The merge of the original meaning and new interpretation.

We should accept that in time our environment transforms, and thus also our buildings and places. Architecture is not only about a “making” but rather a “remaking”

Architecture as a Palimpsest



“The greenest building is the one that is already standing”
AIA 2018 President Carl Elfante

Architecture's 'Political Compass'

Zaera-Polo's framework outlines seven architectural positions, each with distinct and specific political orientations.

- "Activists" challenge architecture's market dependence, prioritizing community projects and unconventional funding.
- "Populists" reconnect with the public via media-friendly designs.
- "New Historicists" embrace historically-informed design in response to neoliberalism.
- "Skeptics" combine postmodern discourse with playful, colorful designs.
- "Material Fundamentalists" focus on tactile material use.
- "Austerity Chic" emphasizes performance and production processes.
- "Techno-Critical" architects delve into speculative designs with a critical edge.

These categories showcase diverse political and design perspectives within architecture.

Architecture's "Political Compass" (Version 0.1) produced by Alejandro Zaera-Polo & Guillermo Fernandez Abascal

Architecture’s ‘Political Compass’

Based on this insightful information, our studio, Park Associati, seeks to provoke a thoughtful dialogue within the realms of architecture, particularly among those categorized as Material Fundamentalists and New Historicists.

We propose the introduction of a new perspective “Transformationist” This concept invites us to consider the pressing issues of climate change and sustainability as integral components of our design ethos. It encourages us to reflect on how we can merge the worlds of climate change, sustainability, and design to revitalize and repurpose existing buildings and materials. By embracing adaptive reuse, we can forge a more resilient and design for the future of architecture.

Architecture’s “Political Compass” (Version 0.1) produced by Alejandro Zaera-Polo & Guillermo Fernandez Abascal + Park Associati adaptation

Adaptive re-use

Adaptation has emerged as a primary focus in contemporary architectural practice, driven by the urgent imperatives of the 21st century, notably climate change and the rapid pace of urbanization. With the current global population already exceeding the halfway mark in residing within urban settings, and projections indicating that by 2050, over 70% of the world's inhabitants will be city dwellers, societies worldwide are confronted with the dual challenge of accommodating growth while simultaneously curbing excessive consumption. As a result, the existing building stock must undergo a transformation to become both more efficient and resilient to address these pressing concerns.

- Any work to a building over and above maintenance to change its capacity, function, or performance. James Douglas, 2006
- Adaptation means the process(es) of modifying a place for a compatible use while retaining its cultural heritage value. Adaptation processes include alteration and addition. Icomos New Zealand, 2010
- Adaptation means changing a place to suit the existing use or a proposed use. The Burra Charter, Icomos Australia, 2013

Types of adaptive re-use

Infill

Referred to as land recycling is critical for accommodating growth, and helps to redesign cities to be more environmentally friendly and socially sustainable.

Re-skin

Aims at developing an integrated and multifunctional system for energy retrofit of existing buildings, organized in two main subsystems, roof and façade.

Re-Program

Process of redefining the existing functions, uses. Reprogramming can involve changing the purpose of a building, modifying its layout, or adapting its design to better suit the evolving needs.

Expand

Enlarging or extending an existing structure to accommodate new or additional functions. Expanding a building involves modifying the existing structure to create additional square footage or volumes.

Benefits of adaptive re-use

Material usage

The materials required for a project, from the initial foundation-laying process to the completion stage get reduced due to the presence of an existing structure.

Construction cost

Adaptive reuse as a process does not require a new structure to be built from scratch hence the cost of construction is low.

Low-time consumption

In comparison to building a new structure from the initial process, adaptive reuse is a much faster process.

Energy conservation

Less energy, labor, and materials required to complete an adaptive reuse project.

03

Building Deconstruction

Designing without Depletion

Non-extractive architecture is an architecture that does not produce externalities. In economics, externalities are costs that are imposed on a third party who did not agree to incur those costs. This approach seeks to create built environments that have a positive impact on the surrounding natural and cultural context, rather than depleting resources and, causing harm.

- Non-extractive architecture emphasizes repurposing existing structures rather than demolishing and rebuilding.
- Relies on locally sourced building materials and craftsmanship to minimize the carbon footprint associated with transportation.
- Prioritizes sustainability by minimizing resource consumption, reducing waste, and using eco-friendly materials and practices.

Reversible building design

The externalities of architecture aren't limited to material resources. They extend to the procurement of labor, often causing imbalances in society and the environment.

A structure can be reversed if its elements, component and systems are defined as independent parts of a building structure, and if their interfaces are designed for exchangeability. Independence of parts is determined primarily by functional design domains, which deal with design of material levels of technical composition of building and specification of independent material.

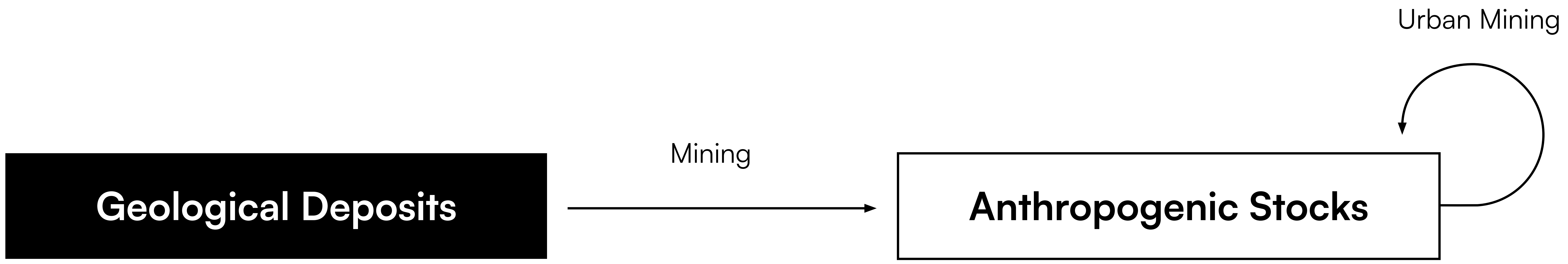
Reversible Building Design enables resource efficient repair, re-use and recovery of building materials, products, and components since different layers like floors, windows, electric cords, ventilation, inner walls can be accessed without damaging other parts of the building and components can easily be removed or replaced. Reversible Buildings by design eliminate waste and enable a circular building sector when used together with reusable materials, and products.

Urban mining

The statistics paint a clear picture: buildings are responsible for a staggering 39% of global carbon emissions, with operational emissions accounting for 28% and materials and construction contributing 11%. Notably, the peak in emissions during the construction process is primarily driven by the production and transportation of building materials. Considering the projected doubling of urban construction by 2060, resulting in a staggering 230 gigatons of embodied carbon from building materials, it becomes evident that urban mining can and should play a pivotal and important role in cities.

It stands as the most effective tool to address the European Union's ambitious goal of achieving a zero-carbon building stock by 2050. To achieve this significant milestone, the International Energy Agency (IEA) estimates that direct CO2 emissions from buildings must be reduced by 50% by 2030, while indirect emissions from the building sector need to decrease by 60%. This translates to an annual reduction in emissions from the construction industry of approximately 6% until 2030.

Urban mining



Retrofitting

Retrofitting, as defined in "Retrofit 2050: Critical challenges for urban transitions," involves the addition of components or features that were not initially present during the manufacturing or construction process. It often pertains to the integration of new building systems, such as heating systems, and can also encompass modifications to the building's structural elements, such as the addition of insulation or double glazing.

In recent years, retrofitting has gained prominence due to the growing emphasis on enhancing the thermal efficiency and sustainability of buildings. This approach serves several key purposes, including reducing carbon emissions, lowering operational costs, addressing ventilation and dampness issues to enhance occupant health, and improving a building's adaptability, durability, and resilience.

Opting for reutilization and retrofitting instead of constructing new structures represents the most influential approach for curbing embodied carbon emissions, all the while meeting the needs of a burgeoning population.

Steps of retrofitting

Step 1: Initial Assessment and Material Testing

- Begin with an initial assessment of the structure and façade.
- Conduct material testing to evaluate the condition and quality of building materials.

Step 2: Structural, Seismic, and Acoustic Evaluation

- Perform structural and seismic retrofit and alterations if necessary.
- Analyze and enhance the acoustic performance of the building.

Step 3: Building Services and Systems Enhancement

- Assess and upgrade building services, including energy efficiency measures.
- Conduct service life prediction, return on investment studies, and MEP system condition.

Step 4: Safety and Environmental Considerations

- Analyze and model smoke dispersion, conduct analysis for safety, and evaluate fire safety systems and design improvements.

Step 5: Heritage Preservation

- Provide heritage consultancy and conservation architecture services if necessary.

Step 6: Modeling and Management

- Conduct modeling of pedestrian flow, develop plans for building maintenance and facilities management, undertake thorough due diligence assessments, and analyze the performance and efficiency of the building portfolio.

04

Reversible building design

Is it possible to redefine architecture as a custodial practice, responsible for safeguarding both the physical and social environment, rather than contributing to depletion?

Effective adaptive reuse extends beyond mere building recycling; by enhancing its value, functionality, and performance, it undergoes a positive upcycling process. Consequently, it serves as a catalyst for urban regeneration, driving positive transformation.

Building Decomposition

Reinvigorating existing buildings can be more attractive than demolishing and rebuilding them. 'Reversibility' is defined as a process of transforming buildings or dismantling its systems, products and elements without causing damage.

The model of building layers is probably the most common approach in the literature, being an important design enabler of adaptability. It assumes that a building system is made up of several layers, each defined by elements and functions of similar lifetime.

- Shell (structure, 50 years)
- Services (e.g., heating, plumbing, 15 years)
- Scenery (fittings, decorations, 5—7 years)
- Set (e.g., furniture, daily).

(Duffy, 1992)

Buildings layers

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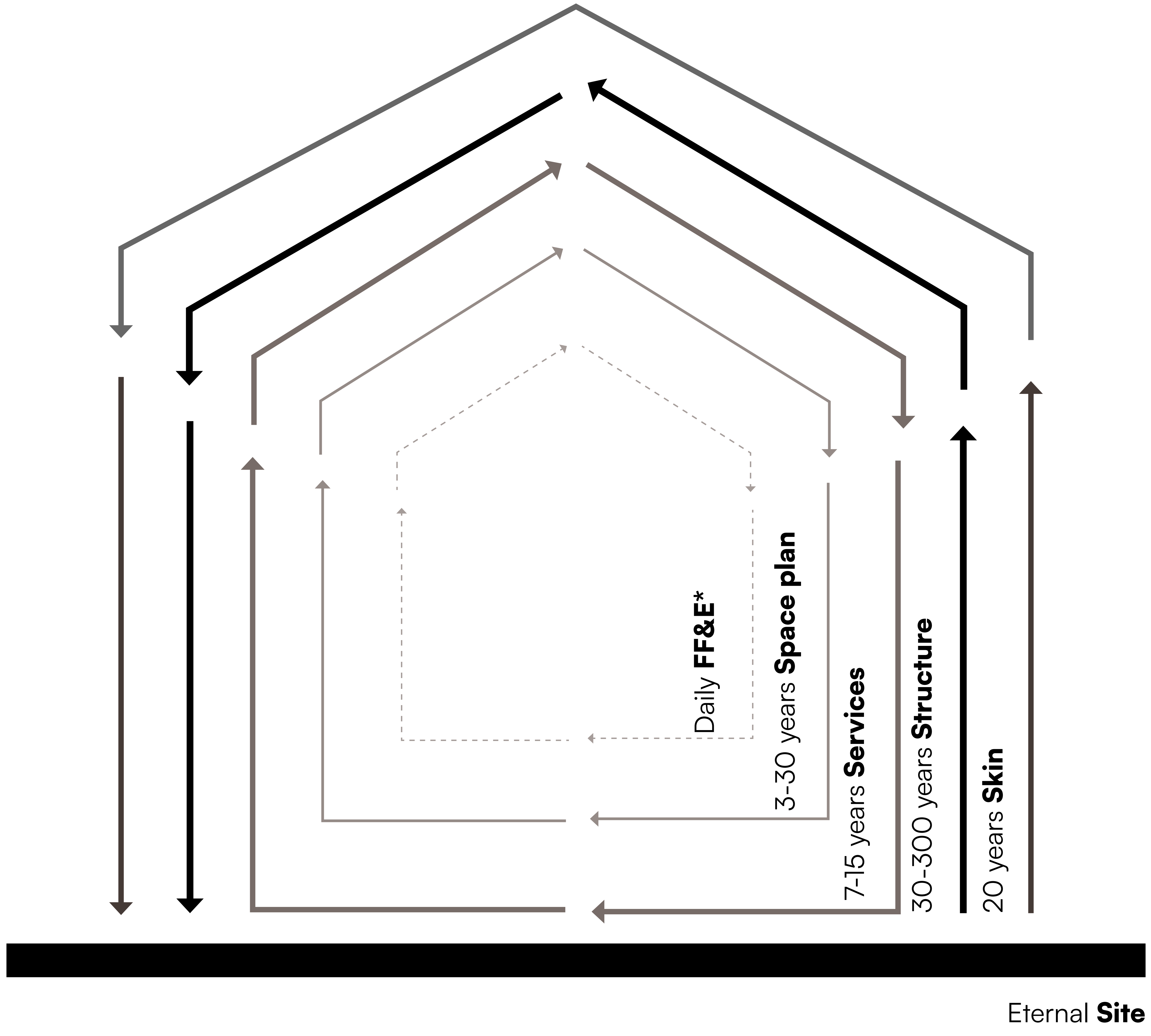
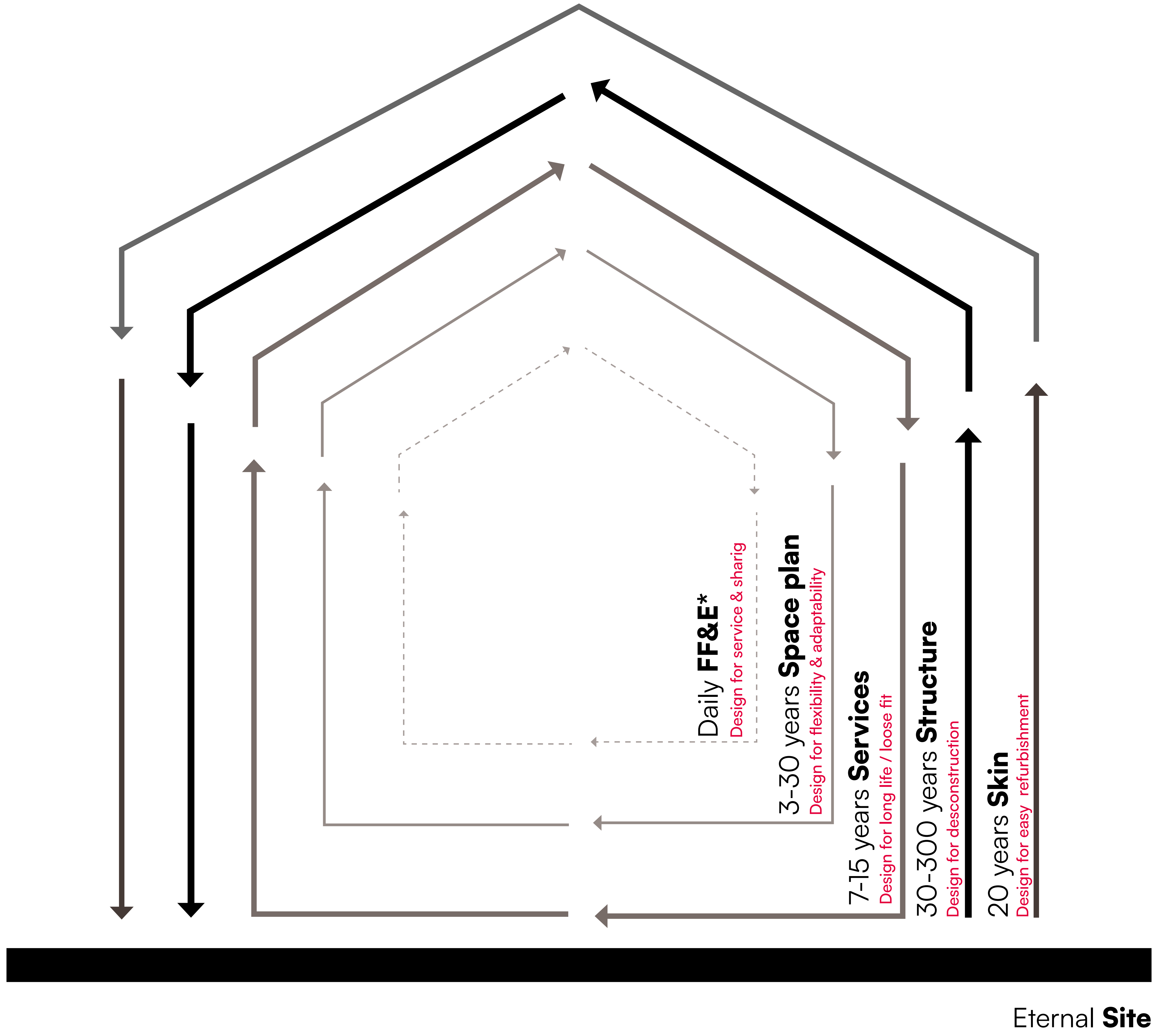


***(FF&E) The furnishings, fixtures, and equipment**
Stewart Brand
"Shearing Diagram"
How buildings Learn. 1994

Buildings layers



***(FF&E) The furnishings, fixtures, and equipment**
Stewart Brand
"Shearing Diagram"
How buildings Learn. 1994

Reversible building design

Reversible building design, or circular design, revolutionizes the construction and product development landscape by prioritizing adaptability and sustainability. This approach ensures that buildings and products can be effortlessly disassembled, modified, and repurposed without compromising their structural integrity or the quality of materials.

Furthermore, it preserves value by extending the lifespan of structures and products and mitigating risks related to end-of-life options. Second-life opportunities and material loop closure become possible, contributing to a more sustainable and cost-effective future. Circular design aligns with broader sustainability objectives, enhancing resilience and promoting responsible resource use in an era of increasing resource scarcity and environmental awareness.

Reversible building design

Build nothing

- Refuse unnecessary new construction

Build for long-term use

- Increase building utilisation
- Design for Longevity
- Design for Adaptability
- Design for Disassembly

Build efficiently

- Refuse unnecessary components
- Increase material efficiency

Build with the right materials

- Reduce the use of virgin and non-renewable materials
- Reduce the use of carbon-intensive materials
- Design out hazardous/pollutant materials

Reversible building design

Clear spans

- Create open, flexible spaces for future uses.
- Avoid costly structural alterations for future adaptations.
- Enable open-office design through clear spans.

Floor-to-floor heights

- Use them for flexibility in switching between commercial and residential uses.
- Leverage them for better daylighting and natural ventilation.
- Consider their usefulness in adding or upgrading building services.

Flat floors

- Choose designs with minimal floor height transitions.
- Increase flexibility for renovations and changes in usage.
- Promote universal design principles for accessibility and inclusivity.

Interior non-load-bearing partitions

- Ensure adaptability without compromising the building's structure.
- Consider partitions that can be disassembled and moved for added flexibility and adaptability.

Reversible building design

Regularly spaced structural elements

- Plan for simplicity and flexibility.
- Prepare for future adaptations by using a reasonable column grid that's slightly larger than conventional.

Stronger structural system

- Reinforce load-bearing supports to enable the easy relocation of interior openings.
- Strengthen the foundation for potential vertical expansions.
- Enhance structural flexibility for the incorporation of future systems like photovoltaics and green roofs.

Separation of systems

- Keep a physical separation between building services to allow for their maintenance, replacement, or upgrades without harm to the building or other services.
- Plan for future upgrades and repairs to the building's exterior skin.

Use of durable materials

- Opt for durable materials that can potentially serve another purpose.
- Consider climate change when evaluating durability, as extreme weather conditions.

Circularity

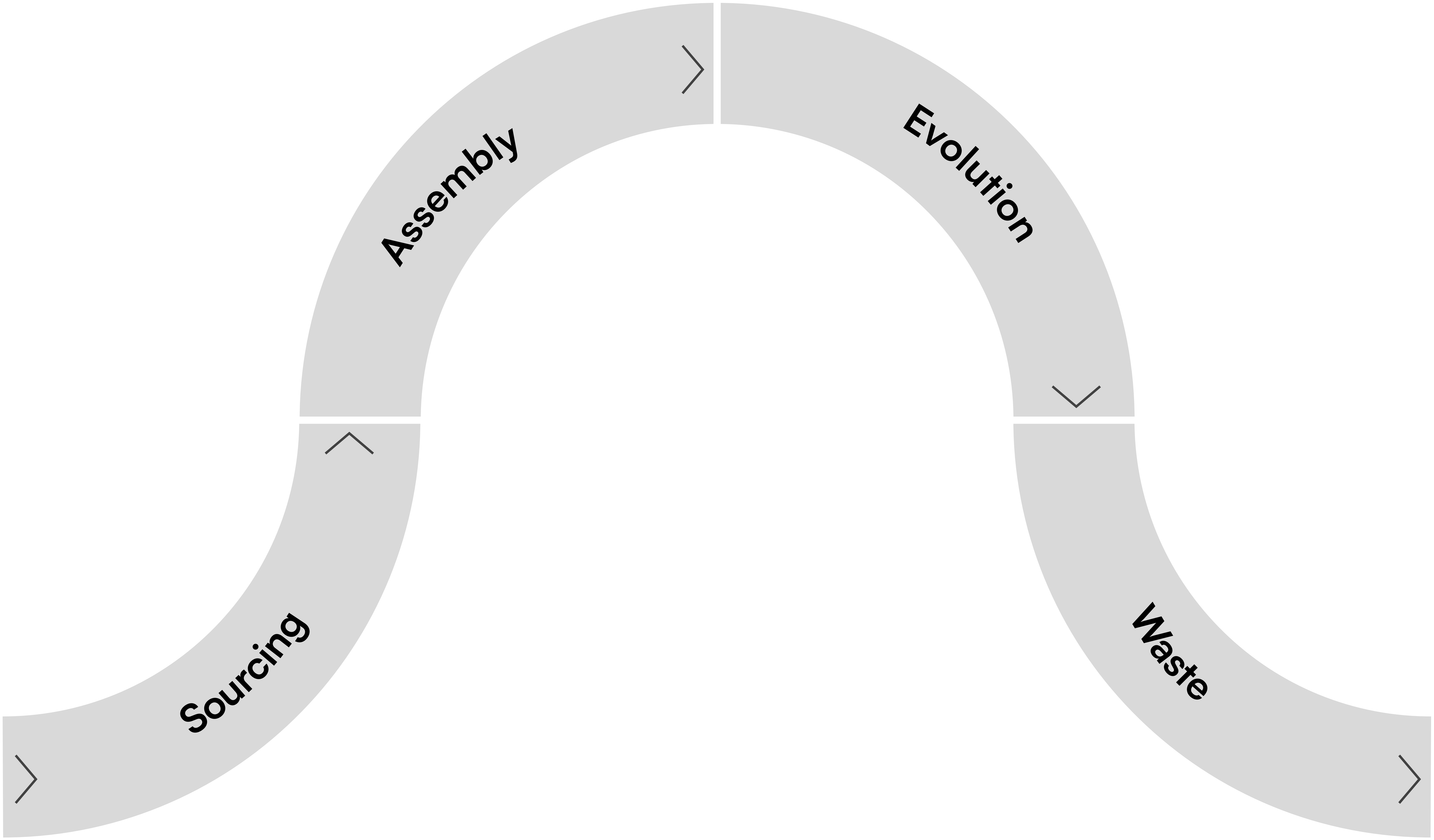
The concept of the circular economy within the construction industry has not traditionally held a central place in the priorities of architects. This is primarily due to factors such as project timing, strict schedules, and budget constraints.

It's important to recognize that the circular economy model seeks to redefine the notion of economic growth, with a primary focus on delivering broad societal benefits. In fact, this model has given rise to sustainable design principles that prioritize reduced material usage, recyclability, and the long-lasting technical and aesthetic qualities of architectural structures. The predominant economic model that has historically influenced architecture is linear, aligning with the extractive industrial approach of take-make-waste. This linear model has contributed to the built environment sector's significant consumption of natural resources.

Now, more than ever, there is an urgent need to integrate circular economy principles and resource efficiency into architectural practices to curtail resource consumption in the future. The essence of the circular economy involves gradually decoupling economic activities from the finite resource consumption and focusing on designing processes that offer a second life to materials and waste.

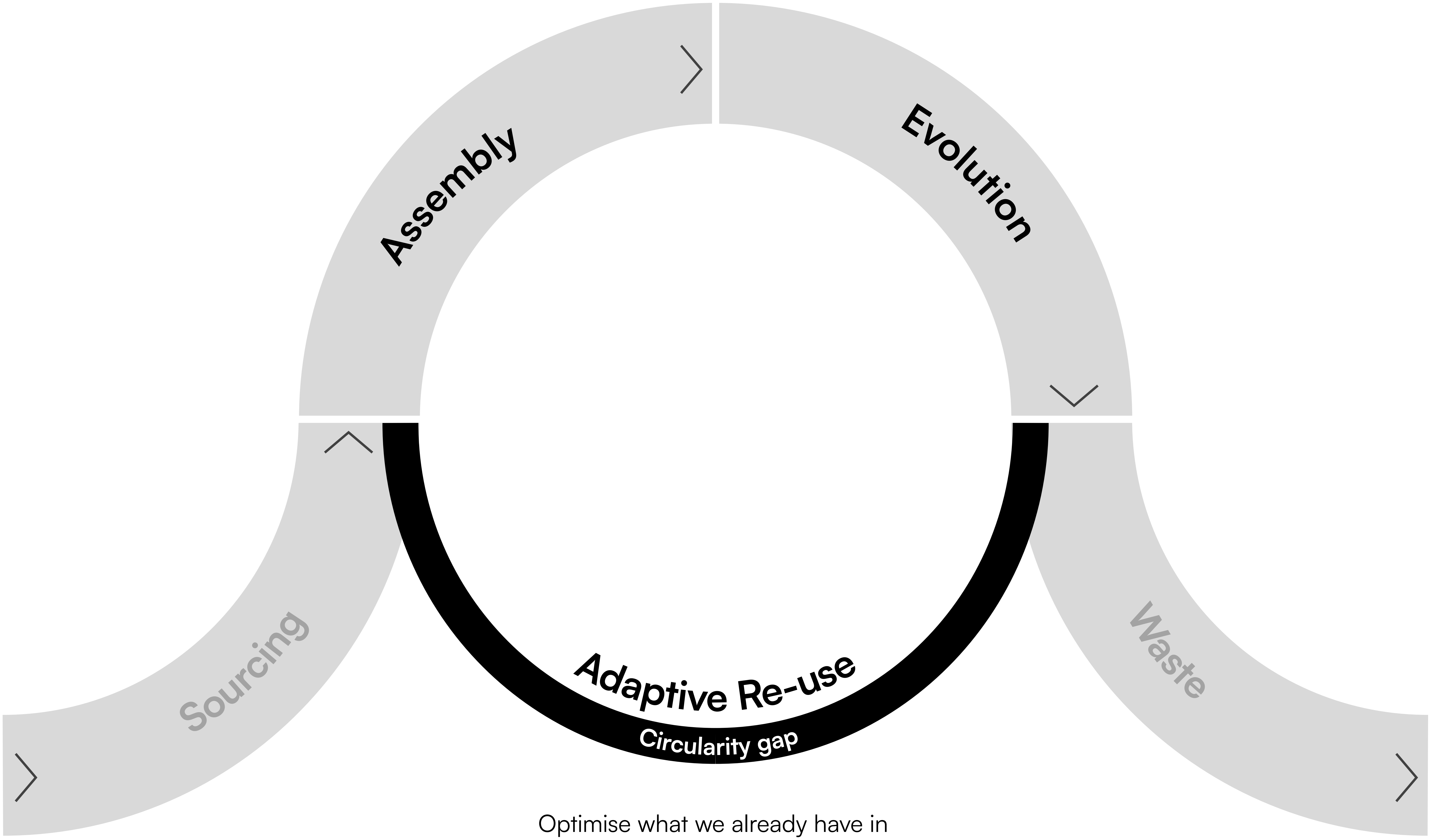
Germanedge

Circularity



World Economic Forum.

Circularity



Optimise what we already have in
the urban stocks

World Economic Forum.

In the design of new structures, it is crucial to prioritize considerations for maximizing the potential for adaptive reuse as buildings age. This approach serves to alleviate the impacts of evolving climate conditions and the unpredictability associated with social, economic, and environmental factors.

Design

Sourcing

Assembly

Evolution

Disassembly

Repurpose

Design

Design is not just about what a building looks like, but also how it functions and adapts to changing needs.

Sourcing

Assembly

Evolution

Disassembly

Repurpose

Design

A circular building represents more than a mere physical structure designed for providing space and shelter; it embodies a forward-looking approach that anticipates future adaptability. This circular approach envisions buildings that can easily evolve through remodeling, or even disassembly when their original purpose change.

This transition towards circularity is closely tied to the adoption of open-source design as a standard practice. Architects, engineers, and designers will increasingly embrace collaboration and knowledge sharing. They will build upon each other's work, fostering a sense of community and collective innovation in the field. This new perspective transforms the traditional mindset of building designers.

In this paradigm shift, the focus of design extends beyond mere aesthetics, form, and spatial arrangements. Instead, the design process will prioritize the operational and performance aspects of buildings. Energy-efficient principles, such as passive design and the minimization of externalities, will become integral to the design.

☰

Design

Sourcing

The process of acquiring materials is poised for a significant transformation in response to the increasing scarcity of resources. In the era of circular construction, modularity and adaptability will play a pivotal role in shaping design philosophies.

Assembly

Evolution

Disassembly

Repurpose

Sourcing

This shift will usher in an era where buildings are no longer static, monolithic structures, but dynamic, evolving entities, constructed from versatile, recycled, and reutilizable components.

Furthermore, the legacy of the linear economy, characterized by non-standardized materials and components, will be revisited. Instead of being discarded, these elements will be seen as valuable resources to be maximally reused. A prime example of this approach involves the repurposing of in-situ concrete components, giving them a new lease on life as essential building modules. This strategic utilization of existing materials not only conserves resources but also reduces waste and supports the circular economy's principles.

The adaptability, reusability, and sustainable sourcing of materials will be the cornerstones of circular design, ensuring that structures are not just resilient and functional but also environmentally responsible and resource-efficient. This transformation signifies a crucial step in the journey towards a more sustainable and resilient built environment.

☰

Design

Sourcing

Assembly

In a circular paradigm, the term “assembly” will take on an entirely new connotation, emphasizing the act of assembly over traditional building methods. The landscape is evolving towards greater flexibility and adaptability.

Evolution

Disassembly

Repurpose

Assembly

The concept of “assembly” is undergoing a profound transformation in the context of the circular economy. It is evolving from traditional, resource-intensive practices into an era of assembly and efficient material use.

Moreover, the introduction of resins and substrates derived from renewable or reusable materials offers a promising avenue for sustainable construction. With 3D printing, the creation of complex structural components becomes a streamlined process, one that not only enhances design freedom but also aligns with circular principles by reducing waste and promoting material efficiency.

To further bolster resource efficiency, off-site manufacturing and prefabrication will play a pivotal role in the construction industry. These practices will significantly reduce waste generated at construction sites. Designs will be meticulously crafted with the goal of minimizing material usage, ensuring that each component serves its purpose with utmost efficiency. This approach is in alignment with the overarching circular concept of extracting the most value from every resource while simultaneously curbing waste generation.

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Design

Sourcing

Assembly

Evolution

In a world where the functions and requirements of buildings and structures are in constant flux, it becomes evident that our current architectural designs, with their inherent static and inflexible nature, are becoming increasingly outdated. In this circular world, buildings will transcend their conventional rigidity.

Disassembly

Repurpose

Evolution

The call of the hour is for a paradigm shift, where buildings are not just structures but dynamic platforms, facilitating adaptability and flexibility.

Designs will be forward-looking, allowing for seamless access to building services and incorporating demountable and reconfigurable façade systems. These innovations will empower structures to evolve and adapt to changing needs and technologies. Circular buildings will no longer be static entities but retrofit-ready and upgradeable. This forward-thinking approach will not only minimize the time and cost associated with renovations but also contribute significantly to waste reduction and the reduction of other environmental impacts.

A critical aspect of this transformation involves the establishment of policies and industry standards that ensure interchangeability of components from different manufacturers and providers. By facilitating compatibility, these measures will promote a more dynamic and sustainable built environment. It is through these principles that buildings will cease to be static entities, becoming versatile platforms that harmonize with the dynamic demands of a circular world. This shift is a testament to our commitment to reducing waste and enhancing the longevity and adaptability of our built environment.

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Design

Sourcing

Assembly

Evolution

Disassembly

The practice of demolition should be significantly reduced. This shift stems from innovative design approaches that not only facilitate novel building designs but also accommodate future changes and disassembly.

Repurpose

Disassembly

Disassembly is emerging as a concept that is redefining the vision of what buildings can be. This envisions buildings not only as functional spaces but also as dynamic and adaptable entities that should be flexible, modular, and sustainable.

At the heart of this transformation lies the integration of Lifecycle Building Information Modeling (BIM), which empower to seamlessly deconstruct, expand, contract, or re-design buildings using the same components.Structural components can be transported using standard vehicles and containers, making buildings highly mobile and adaptable. This transportability ensures that buildings become highly mobile, versatile, and flexible. Their adaptability and mobility not only extend their functional lifespans but also contribute to sustainability by minimizing waste and resource depletion.

This transformative approach is a testament to the circular economy's commitment to resource efficiency and longevity in the built environment. It envisions a future where the process of disassembly becomes as integral to construction as assembly, allowing structures to evolve, adapt, and serve a multitude of purposes throughout their extended lifecycles.

Timber construction of c13, Kaden Klingbeil Architekten © Bernd Borchardt

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Design

Sourcing

Assembly

Evolution

Disassembly

Repurpose

A paramount objective is to maximize the utilization of building components and materials. These resources should circulate between various buildings and projects, meticulously maintained to retain their highest possible value and performance.

Repurpose

To achieve resource efficiency, every material component should be subject to tracking throughout its lifecycle and documented within Lifecycle Building Information Modeling (BIM) models. Well-established value networks and second-use strategies should ensure that these components find purpose in other applications, thereby minimizing the loss of their inherent value and enabling multiple cycles of repurposing.

Within the circular economy, buildings will be designed with a focus on their entire lifecycle, not just their initial use. Circularity should permeate every aspect of a structure, ensuring that individual assets are flexible, interchangeable, highly customizable, and ultimately enhancing the overall user experience of the built environment. Key design decisions, such as optimizing disassembly and reuse from the project's inception, will have far-reaching implications for the operation, renewal, and repurposing of the building and its components.

This exemplary shift exemplifies the circular economy's potential to transform the ecosystem and value chain across the entire lifecycle of buildings, spanning design, construction, operation, renewal, and repurposing.

Shutterstock circular economy material passport reuse bank

05 Material passports

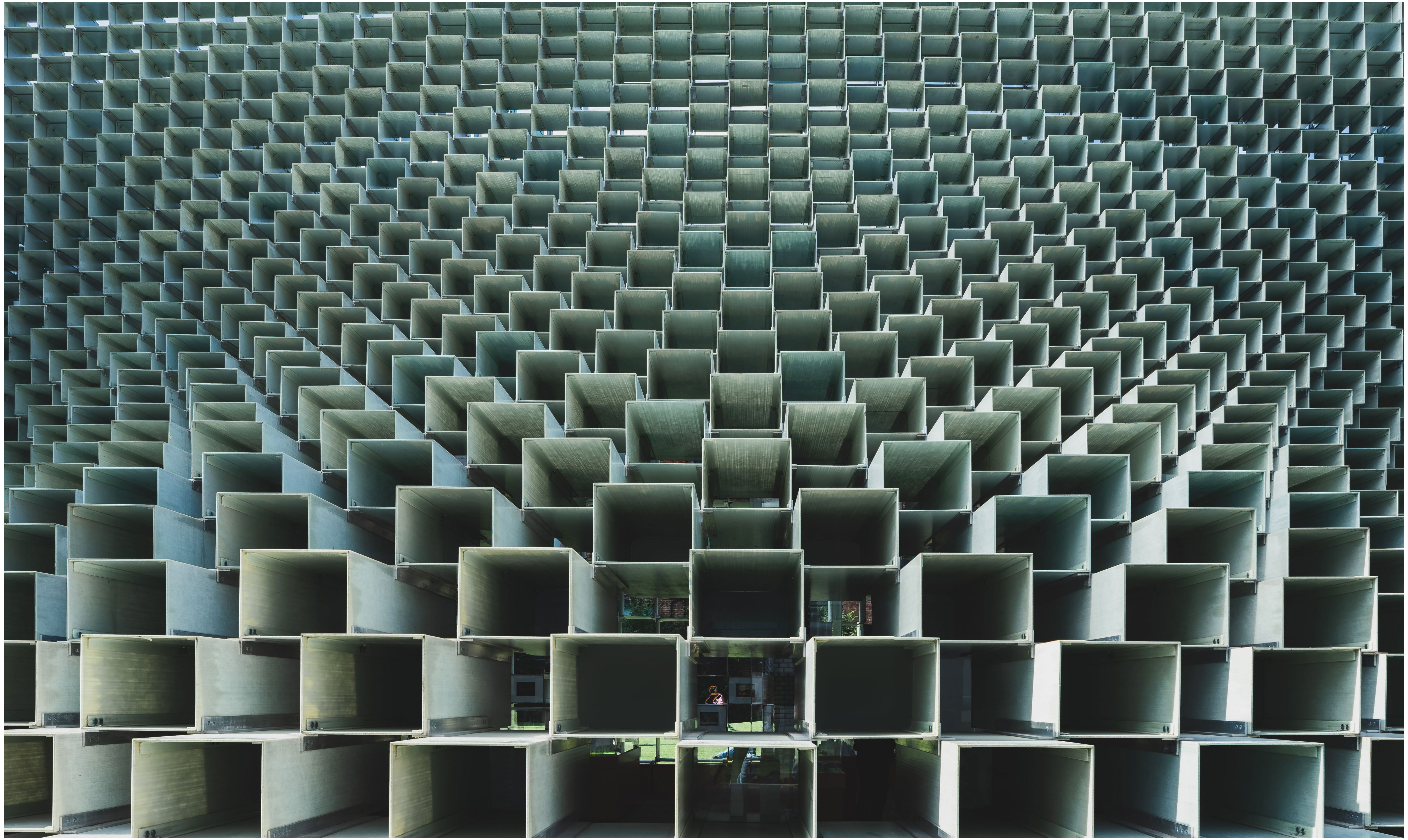
Approximately 80% of the buildings that exist today are expected to still be standing in 2050, so it is crucial that we make the most efficient use of the materials already in existence

The Material Passport serves as the materials' identity document and plays a foundational role in guiding decisions for a circular construction.

Material passport

A material passport is essentially a digital record that comprehensively catalogs all the materials incorporated into a product or construction over its entire lifecycle. The primary aim of a material passport is to simplify and enhance the process of making strategic decisions related to circularity within supply chain management.

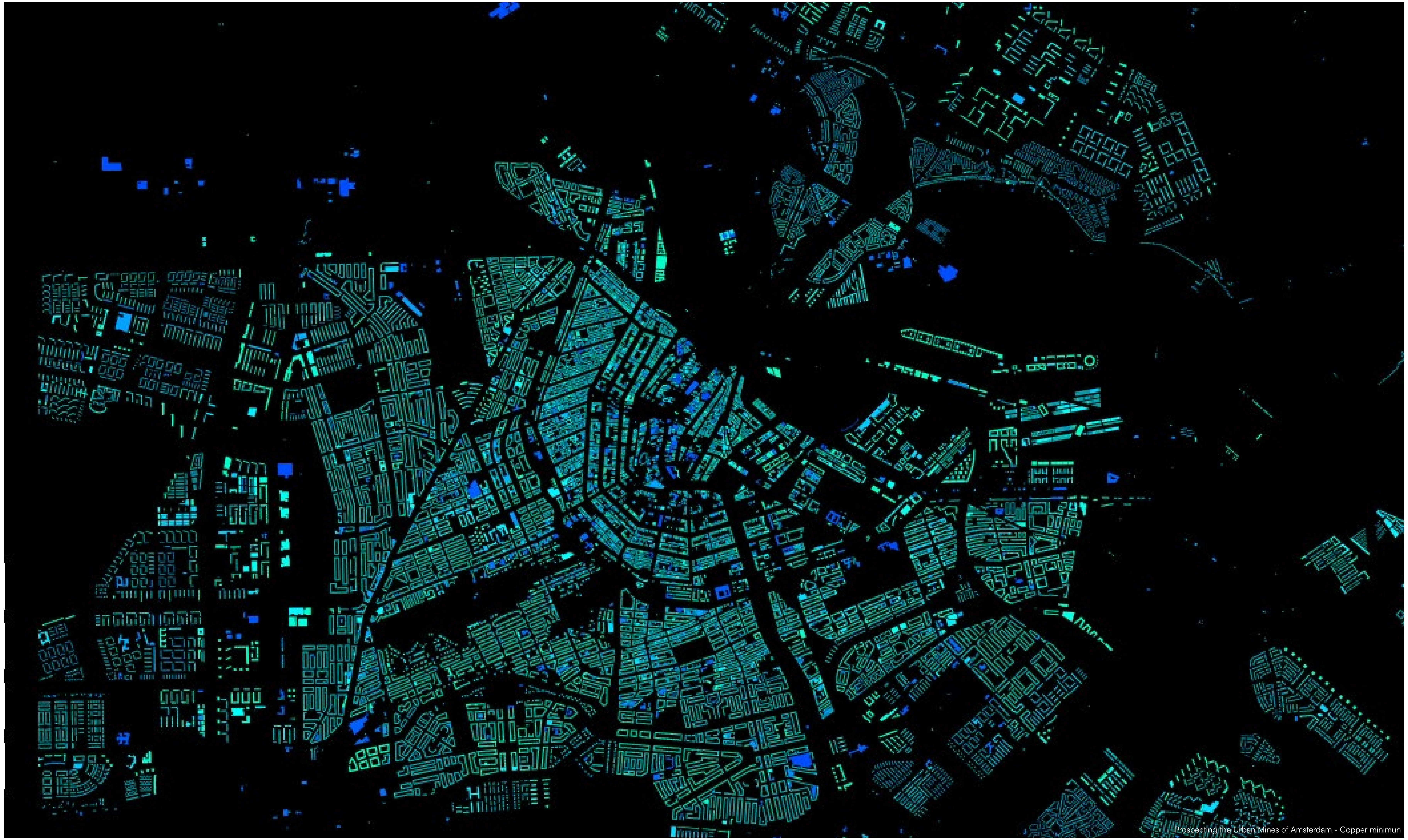
These passports typically include a dataset that meticulously outlines the specific characteristics of the materials used in various products. This detailed information empowers businesses and stakeholders to readily identify the potential value associated with the recovery, recycling, and re-use of these materials. In essence, material passports serve as valuable tools in advancing sustainable practices, resource efficiency, and circular economy initiatives.



Material passport

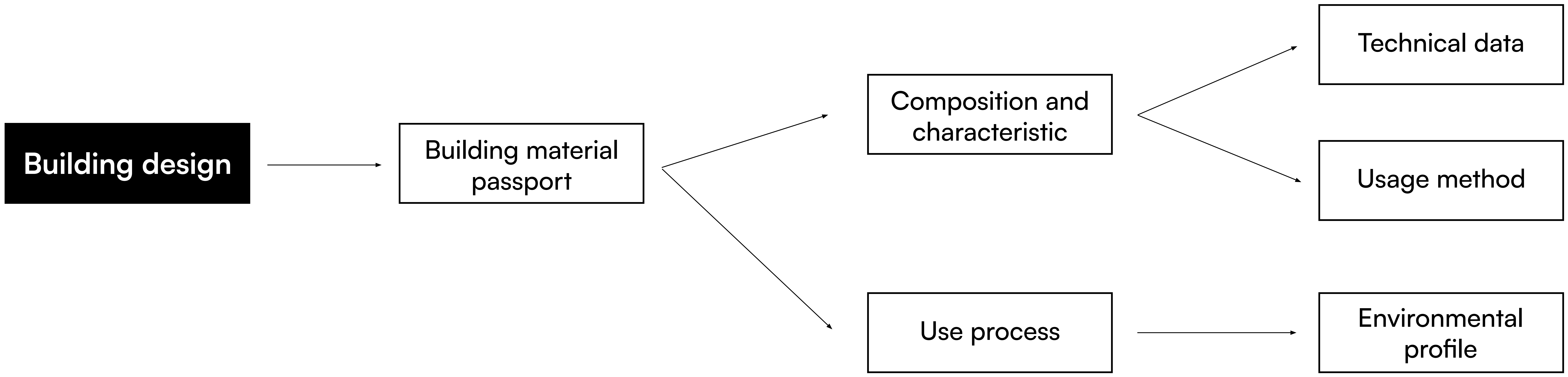
In an ideal scenario, a materials passport is established prior to the construction of a building. Nevertheless, they can also be generated for existing structures, utilizing methods like plan analysis and digital 3D scanning. These assessments serve to provide building owners with valuable insights into the quality of materials currently incorporated in their buildings, as well as the expected durability of individual materials. This information can guide them in making well-timed maintenance decisions.

On a broader urban scale, the collective data derived from thousands of materials passports can culminate into an exceptionally comprehensive comprehension of the available materials within a city. This wealth of information simplifies the task for municipalities and developers who aim to utilize materials from deconstructed or dismantled buildings. By synchronizing the demolition schedule with the construction/development schedule and having a profound awareness of the materials at hand, it significantly enhances the potential for reusing these materials at their utmost value.

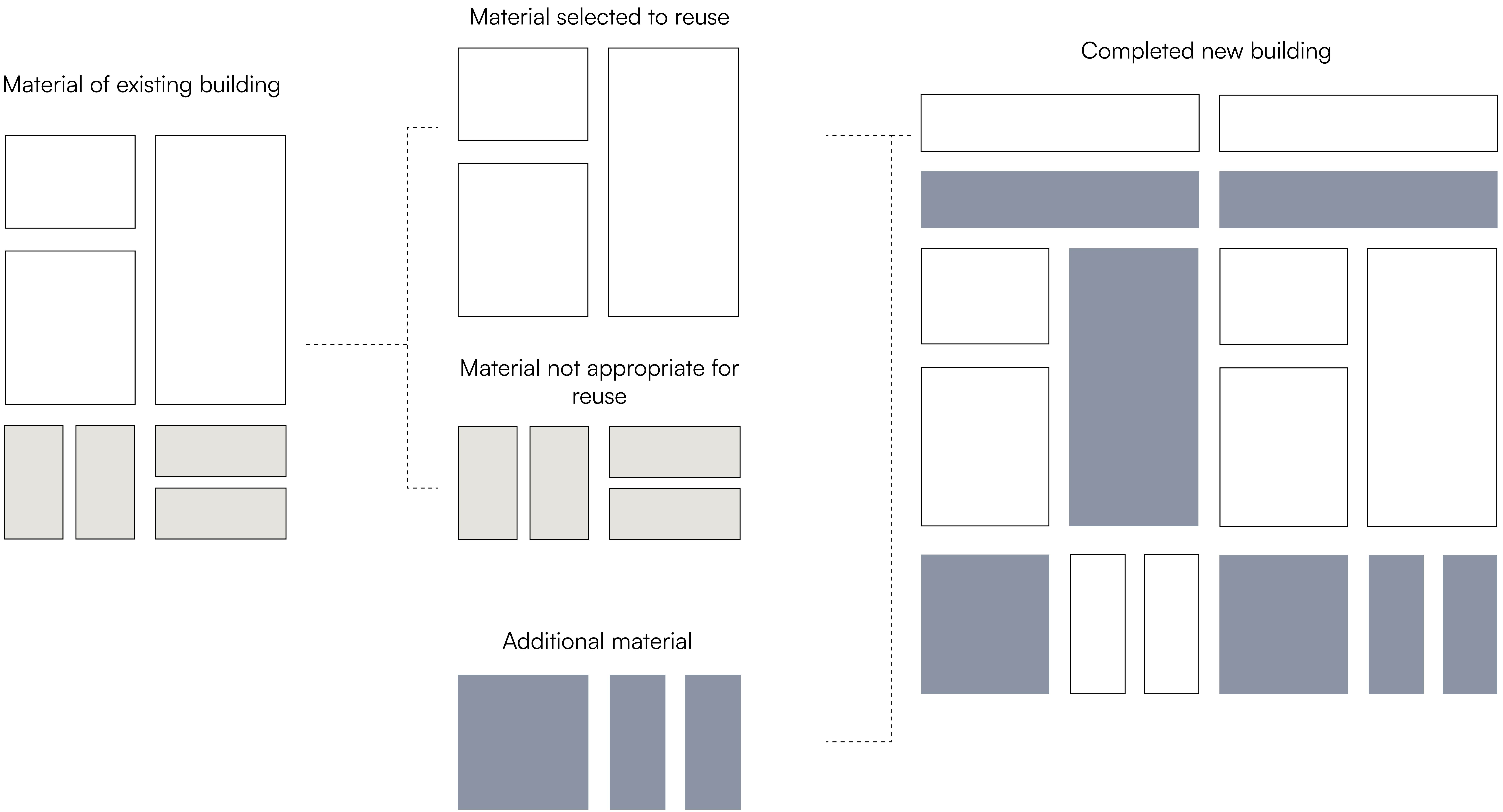


Prospecting the Urban Mines of Amsterdam - Copper minimun

Material passport



Material passport



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Benefits of the Material Passport

Transforming Buildings into Material Reservoirs

Convert buildings into reservoirs of high-quality, endlessly reusable materials.

Waste Minimization

Prevent waste generation.

Raw Material Extraction

Decrease the need for raw material extraction.

Mitigate Material Risks and Toxicity

Address material toxicity and regulatory concerns proactively.

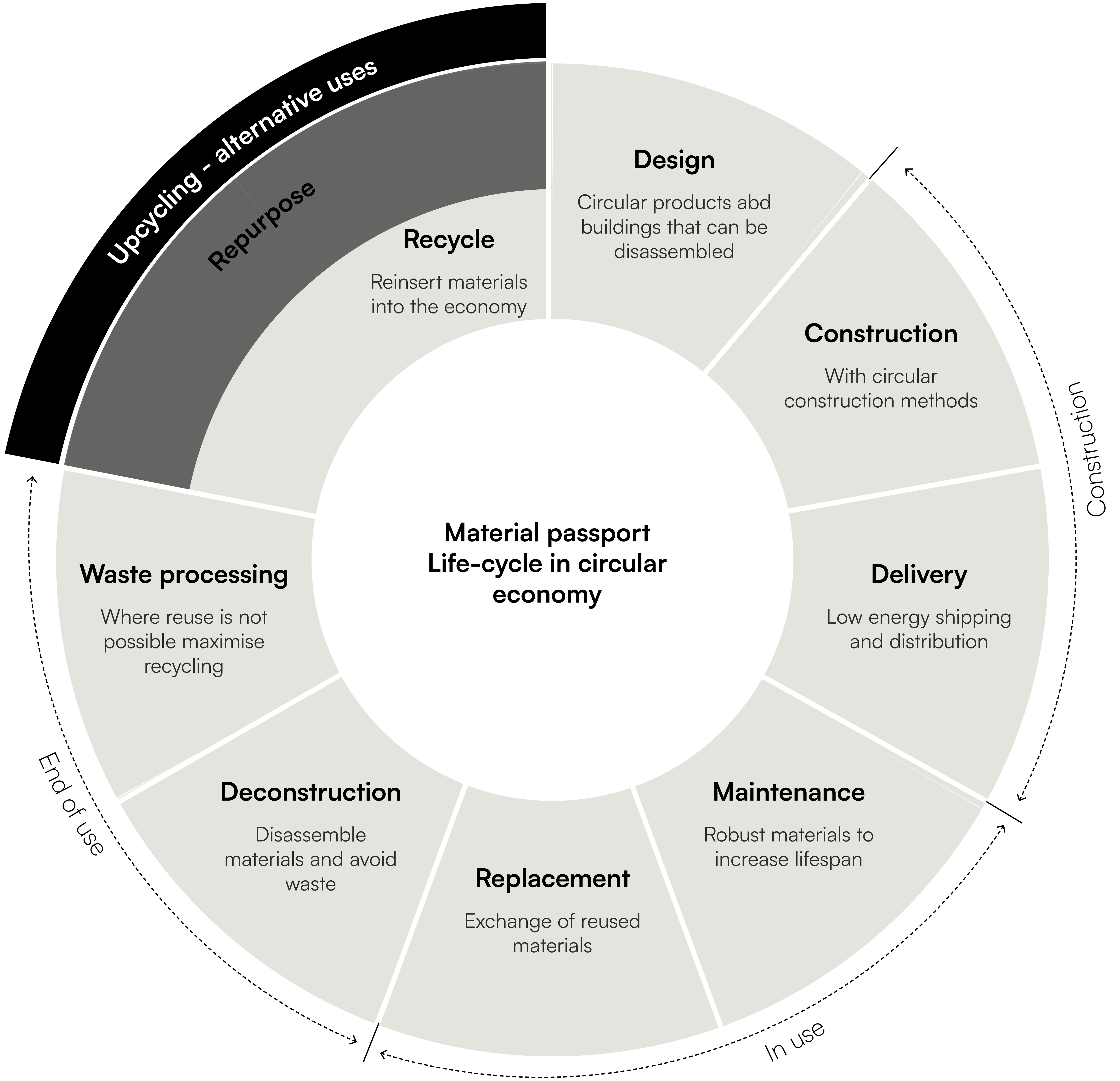
Preserve Material and Component Value

Maintain the long-term value of materials, and components.

Promote Sustainable Supply Chains and Material Selection

Encourage the supply chain to produce, circular construction materials and simplifying material selection.

Material passport Life-cycle



Waterman Group/Fletcher Priest Architects

Material passport designing

Resource-Centric Design

Designing with a focus on available resources through material passports.

Integration of Material Passports

Integrate material passports into newly constructed elements.

Update materials passports

Ensure the precise updating of materials passports to mirror modifications and adjustments.

Marketplace

Utilize material passports within a material exchange marketplace to facilitate their reuse.

End-of-Life Data

Document end-of-life information within material passports.

When creating new buildings, it's important to consider their potential for future adaptive reuse. This helps address the challenges posed by changing weather patterns and the uncertainties in social, economic, and environmental conditions.

Futher reading:

- Non-Extractive Architecture
- Design strategies for reversible buildings
- Adaptability of Buildings
- Adaptive reuse: Extending the Lives of Buildings
- Circular Economy of Construction and Demolition Waste
- Adaptive Reuse
- Buildings that last: Design for adaptability, desconstruction, and reuse
- Status quo and future directions of construction and demolition waste research
- Prospecting the Urban Mines of Amsterdam

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