

Connect to change

**Unlocking the value of systems
thinking in the built environment**

**Systems thinking helps us find effective solutions
by focusing on the right problems.**

**By applying systems approaches, we can achieve better
outcomes with fewer resources in more lasting ways.
It makes great economic sense.**

Choosing to get this right requires long term, strategic,
joined-up policy and governance, and it promises improved
environmental, social and economic outcomes.

Continuing to get it wrong threatens society's resilience,
security and sustainability, and it will result both in lost
opportunities and higher costs.

**Now is the
time for positive
systems change**

We urgently need systems thinking

Our current approach is wasteful and inefficient.

We fail to realise the value of the existing built environment because we make siloed decisions that do not take account of its interconnected nature. Capital investment is prioritised over asset management, reducing asset lifespans, increasing whole-life costs and impairing service delivery. Siloed and short-term planning produces unpredictable fluctuations in investment, reduced resilience and greater environmental impact.

Our fragmented approach results in wasted resources, missed opportunities and unintended consequences. It hinders our ability to achieve a sustainable, resilient and equitable future.

We face interconnected challenges that cannot be solved in isolation.

Climate change, resource limitation and biodiversity loss are interconnected challenges that demand a systemic approach. Our current approach, characterised by siloed decision-making and focused on individual new projects, is inadequate.

Without addressing connected issues in a connected way, we are at best missing opportunities, and at worst headed towards multiple systems failures, economic damage and widespread hardship. Without systems thinking, which helps us to grasp interconnectivity and complexity, we expose ourselves to risks that could compromise our security – energy, food, health and even national security. The cost of inaction is too high.

The way we manage the built environment is not set up to meet these challenges.

The organisations that regulate and operate the built environment are not well connected. Sector silos run from government departments, through regulators, to owners and operators. There is no body that provides a joined-up view of the existing built environment or how new developments impact the outcomes of the overall system.

The information required to run the built environment is poorly connected.

We miss opportunities to gain more value from our existing assets due to inadequate data management, limited interoperability and insufficient information flows across organisation and sector boundaries.

Positive systems change is an urgent necessity.

The time for action is now. It will become impossible to meet society's evolving needs unless we address the connected challenges we face. We are living on borrowed time.

We must act now and we must act together.

We must focus on improving outcomes rather than simply delivering the outputs of individual projects

It's time that we saw the built environment differently – not as a series of construction projects, but as a system of systems with the explicit purpose of delivering the services that will enable people and nature to flourish together for generations.

At an individual level, we require a shift in mindset and, at an industry level, a shift in culture. We need visionary, boundary-spanning leadership that embraces complexity. Effective industry leadership is systems leadership.

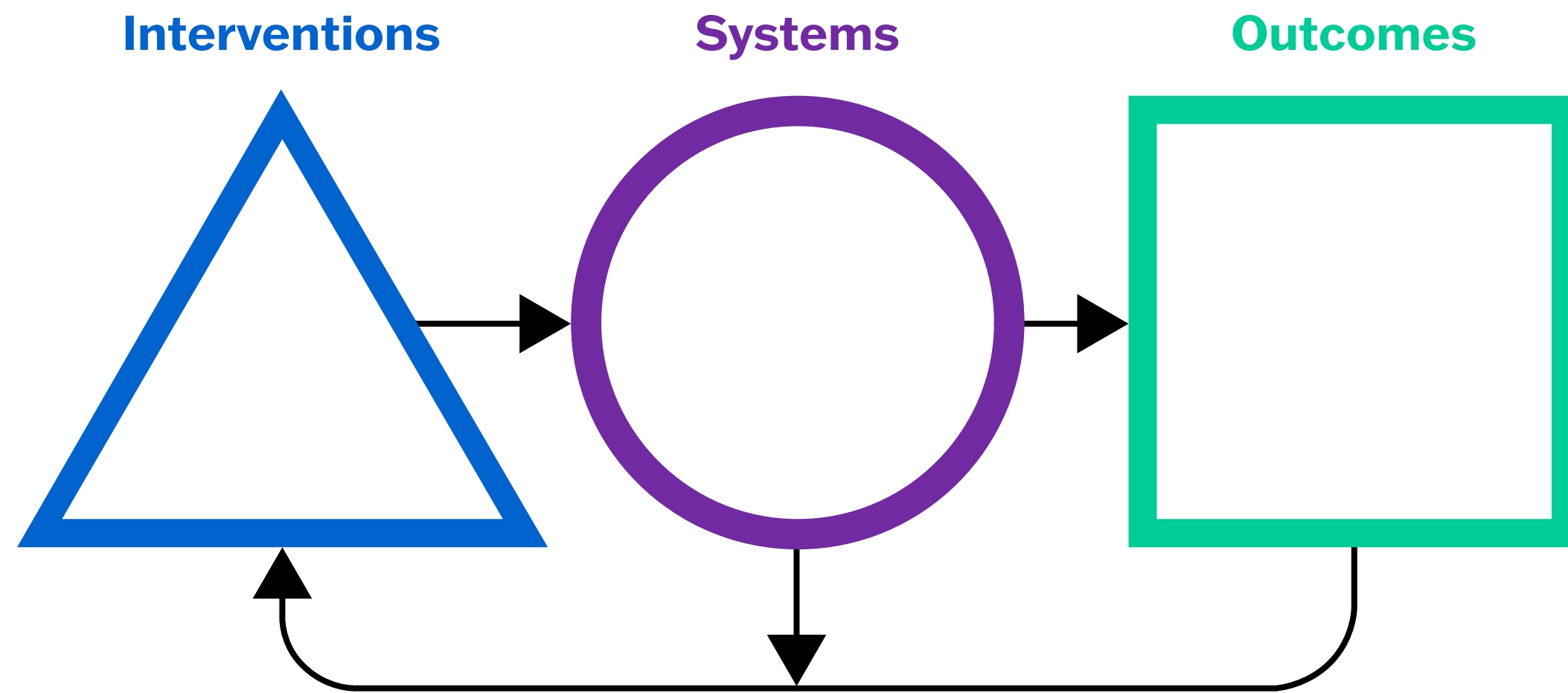
Imagine

By applying systems approaches we can revolutionise the way we make decisions about our built environment, creating better outcomes for people and planet.

- **Cities resilient to climate shocks**, powered by renewable energy and designed to enhance, not destroy, the natural world.
- **Buildings and infrastructure that are not just functional but regenerative**, creating a circular economy that eliminates waste and maximises system value.
- **Stakeholders empowered to co-create and manage their built environment**, ensuring it meets their needs and reflects their shared values of sustainability, equity and wellbeing.

This is the promise of systems thinking.

To improve outcomes for people and nature, we must understand our built and natural systems better, so that we can deliver more effective interventions



Interventions

Interventions are actions taken to modify or maintain a system, ranging from small operational adjustments to large-scale construction projects. While complex systems cannot be ‘controlled’ or ‘optimised’ in the traditional sense, we can understand them better and use interventions to guide them towards delivering desirable outcomes.

Systems

Systems consist of interconnected elements that work together to achieve a purpose. In the built environment, these include physical systems (infrastructure and buildings), human systems (organisations and institutions), and digital systems (data and information). Any ‘system of interest’ will encompass some combination of these systems, which come together to affect people and nature in a place. Understanding their structure, behaviours and interrelationships is crucial for designing effective interventions.

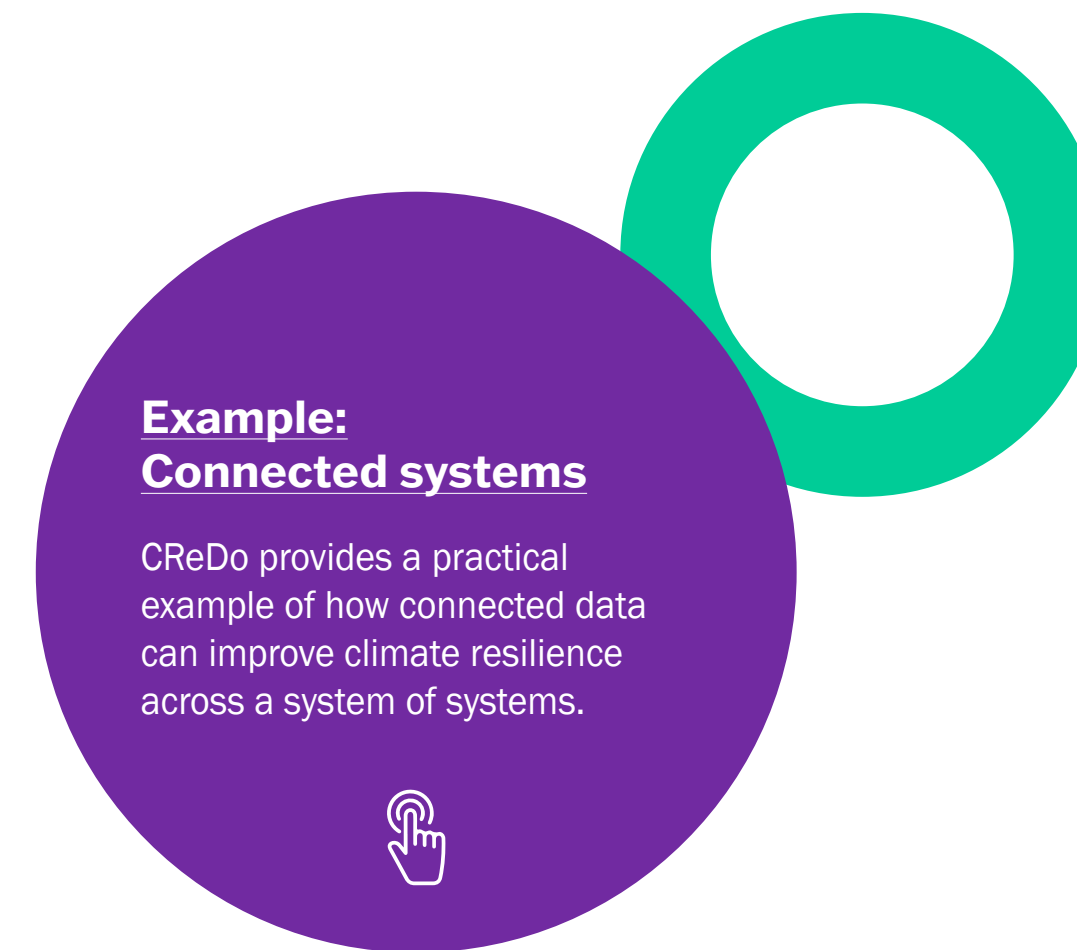
Outcomes

Outcomes are the results produced by systems, as experienced by the users. In the built environment, outcomes include wellbeing and health achieved through services such as shelter, security and mobility provided by built systems – as well as clean air and water mediated by natural systems. The services that the built environment provides connect the outcomes we desire with the systems we use to achieve them. Outcomes can be seen as emergent properties of complex systems. Systems thinking can help us avoid undesirable outcomes and achieve desirable ones.

The built environment is a complex system of systems.

Our built environment consists of interdependent systems that provide essential services for society. It includes our economic and social infrastructure, together with their interfaces with our natural environment. And the built environment is the host for all the other essential systems that operate within it, such as the financial, health, education and justice systems.

The built environment exists within and depends on the natural environment. Therefore, we must ensure that our activities in creating and managing it respect the Earth’s resources and work within recognised planetary boundaries. Systems thinking approaches enable this.



Systems thinking helps us to see connections.

Buildings and infrastructure are not isolated entities but exist in a complex web of relationships with other systems. While individual components have their own value, far greater value and meaning are derived from their function within the larger system and their contribution to achieving desired outcomes for people and nature. The value of the whole is far greater than the sum of the parts.

Applying systems approaches in the built environment:

- **Maximises value.** It is a means of intelligently getting more from what we have already built, going beyond ‘sweating the assets’.
- **Multiplies benefits.** It allows us to see the bigger picture and understand how interventions in one area can affect others. It enables us to develop integrated solutions that address multiple challenges together, delivering co-benefits across sectors.
- **Improves the process of improvement.** It provides a practical framework for action and change because it better represents how the real world works.

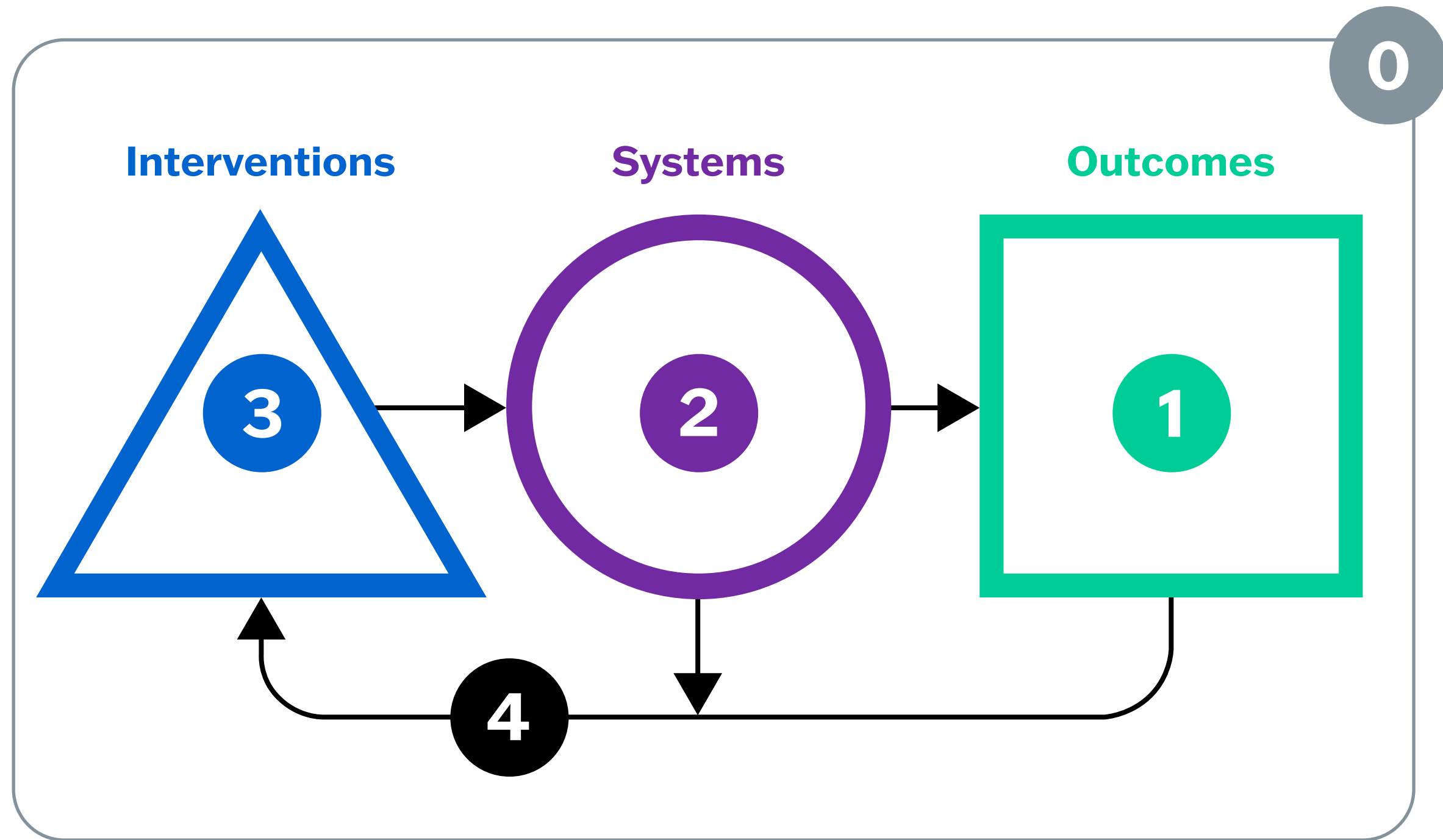
Established approaches exist. We must apply them in the built environment.

Over the years, many different systems-based approaches, methodologies and tools have been developed and proven in diverse sectors. Now is the time to bring the best of what they have to offer to the built environment. The essence is to adopt a more holistic, interconnected way of understanding, architecting and managing our surroundings.

Here's how to apply systems approaches at any level in the built environment

While the challenges we face and the route to achieving better outcomes can be complex, the process of applying systems approaches can be broken down into straightforward steps. These can be applied to any system at any level, such as a city, the interface between energy and transport, or a major project's supply chain.

Adopting a shared approach enables effective collaboration and helps us to align our efforts towards improving outcomes at local, regional, national, and global levels.



0 Know your scope

Start by outlining what it is that you want to influence and at which level. Understand the scope of your system of interest and the related outcomes, recognising that this is an iterative process. Draw an exploratory system boundary to help clarify what is in and what is out of scope, and who the stakeholders are.

1 Focus on the outcomes

At the highest level, desirable outcomes will be a mix of environmental, social and economic benefits. Pay particular attention to understanding the gap between the desired outcomes and the actual outcomes from the existing system, because this difference will be the key driver for systems change. Outcomes are experienced by people and nature in a place. Therefore, it is essential to involve all stakeholders, giving those that are unrepresented, including nature, a voice. This is vital for identifying and agreeing the desired outcomes that a system is intended to achieve, and when considering potential trade-offs between different outcomes.

2 Understand the systems

Analyse the systems to understand how they can deliver the desired improvement in outcomes. Find the root causes of any issues that need to be addressed and identify potential leverage points for effective interventions. These will often be in the gaps between organisational or informational silos. Use established tools and techniques to map, model and visualise the systems. It will help to distinguish between physical, organisational and digital systems, but it is important to focus on understanding the connections between them. When mapping the systems, remember that there will be connections that cross the boundary because systems are always parts of larger systems; no system is completely isolated from everything else. Listen to stakeholders who understand the system from different perspectives.

3 Drive effective interventions

Use interventions to nudge the systems towards delivering the desired outcomes. There are many different types of intervention, both large and small: operational interventions, maintenance interventions, and various types of construction interventions, including building new assets and modifying or removing existing ones. Within this framing, encourage initiatives to improve project delivery and construction productivity. However, the much bigger prize is to improve the performance and effectiveness of the existing built environment to achieve better outcomes, including national productivity.

Example Effective interventions

The systems-based approach on the TransPennine Route Upgrade ensures that an improved operational railway is delivered.

Example Understanding systems

Mapping Anglian Water's strategic resource options with stakeholders helps to identify opportunities in the landscape as a system.

4 Observe, learn and repeat

Systems thinking is an iterative process, so regular reflection and refinement are essential. Monitor and evaluate the impact of the interventions on both systems and outcomes. Develop meaningful metrics to help understand performance from end to end – from the interventions, through the systems, to the outcomes – but avoid the metrics becoming a target that replaces the actual outcomes. Pay particular attention to understanding the performance of the systems and the achievement of outcomes because these are least well measured at present, even though 'value' is ultimately related to achieving the desired outcomes. Foster a culture of learning and curiosity, using evidence to drive improvement.

We must connect to change

Momentum exists. There is a growing consensus that now is the time for positive systems change. Given the diversity and autonomy of the stakeholders, the overall approach must be to convene, connect, and coordinate aligned communities, rather than run a traditional top-down change programme.

The key is to connect **communities** of action with a **consensus** to drive **change**:

Communities

Inclusion is fundamental to the success of this approach, so we must shift from heroic individualism to collective endeavour. This means:

- **Fostering connections** between existing initiatives and communities of action.
- **Coalescing new communities** where needed across government, industry, academia and civil society.
- **Driving change** that aligns with the goals of each community, and our shared vision and objectives.

Consensus

Building consensus involves developing a shared understanding of systems thinking in the built environment that allows communities the flexibility to tailor their approaches to their specific contexts. We are building consensus by:

- **Articulating a compelling shared narrative** that highlights the urgency for change and the capacity of systems thinking to deliver benefits.
- **Establishing a common vocabulary** to enable effective communication that connects communities.
- **Creating and sharing resources**, including case studies, tools and methodologies, that demonstrate the practical application of systems thinking to improve outcomes.

Change

Driving connected change requires a dynamic, iterative approach that emphasises learning by doing and progressing by sharing. This process is supported by:

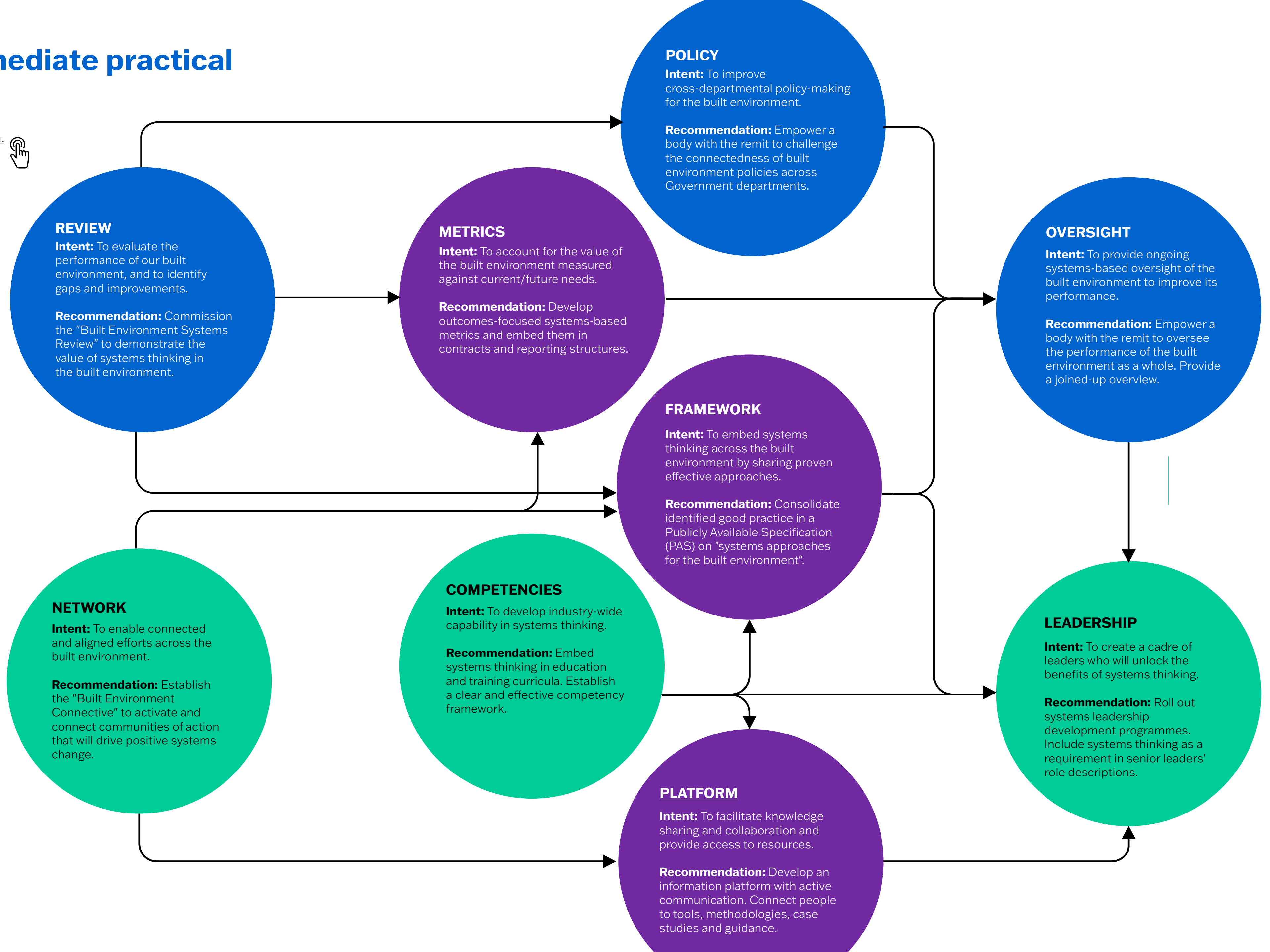
- **Building effective governance** using meaningful metrics to monitor progress towards our shared vision.
- **Sharing good practice** and developing frameworks, guidance and industry standards.
- **Establishing feedback loops** and reflective processes to facilitate learning and adoption.

This is a call to all change-makers to be part of the movement to mainstream systems thinking and unlock its value.

Here's how to take immediate practical steps to get started

Follow this link to see more detail about each recommendation. 

- Policy and governance
- People and capabilities
- Frameworks and methodologies



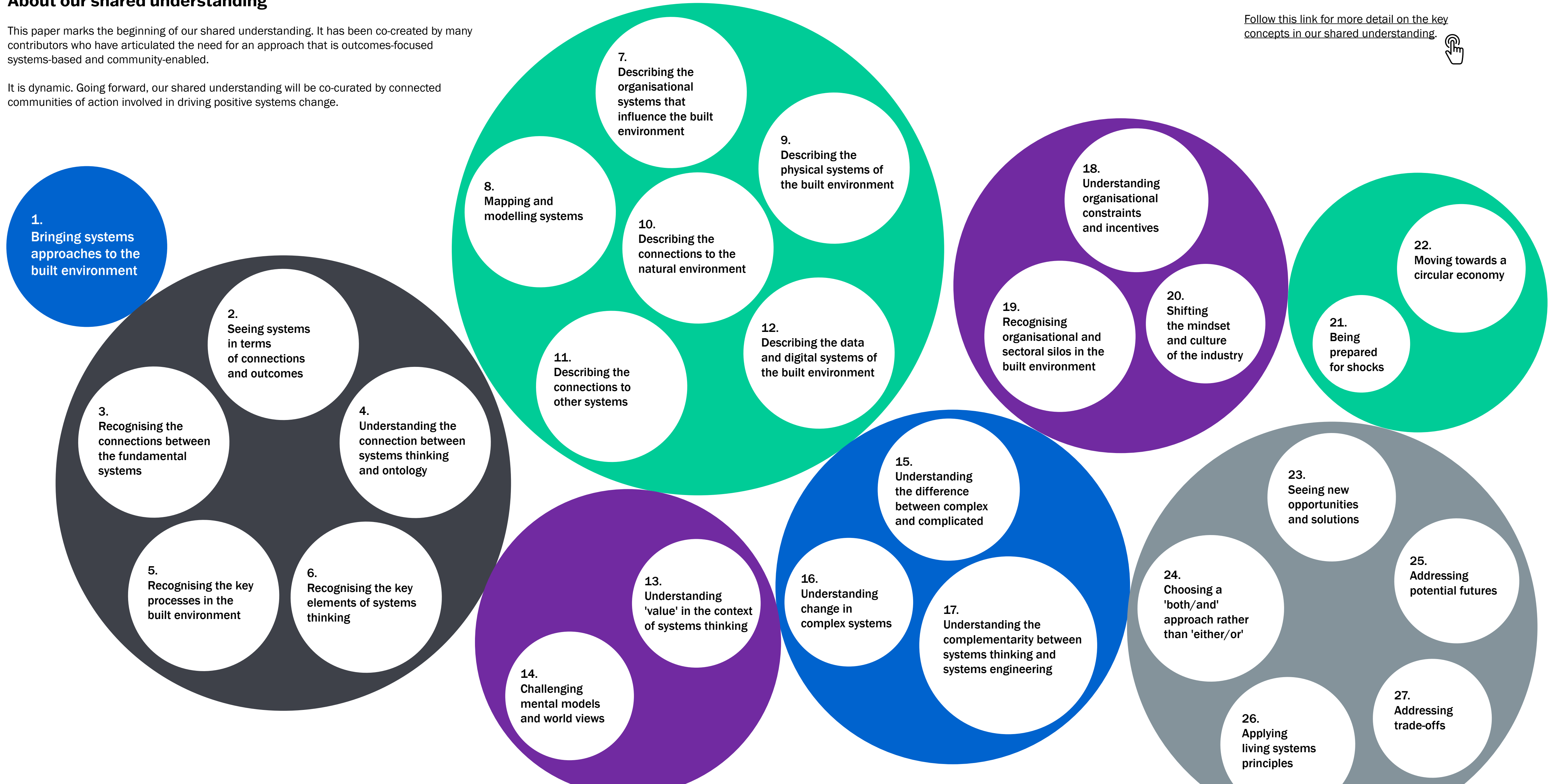
We need a shared understanding for positive systems change

About our shared understanding

This paper marks the beginning of our shared understanding. It has been co-created by many contributors who have articulated the need for an approach that is outcomes-focused systems-based and community-enabled.

It is dynamic. Going forward, our shared understanding will be co-curated by connected communities of action involved in driving positive systems change.

[Follow this link for more detail on the key concepts in our shared understanding.](#)



Systems change involves us all

Systems thinking doesn't require everyone to be an expert.

What it does require is a shared understanding and a commitment to work together.

Everyone who wants to make a positive difference in the built environment has a part in this. Policy-, strategy- and decision-makers have particular power to make this happen.

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Join us

This is a call to be part of the movement to drive positive systems change. As individuals, as organisations, and as an industry, we must take forward the recommendations in this paper.

This means systems thinking and systems doing.

We must connect to change.



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www.be-connective.com