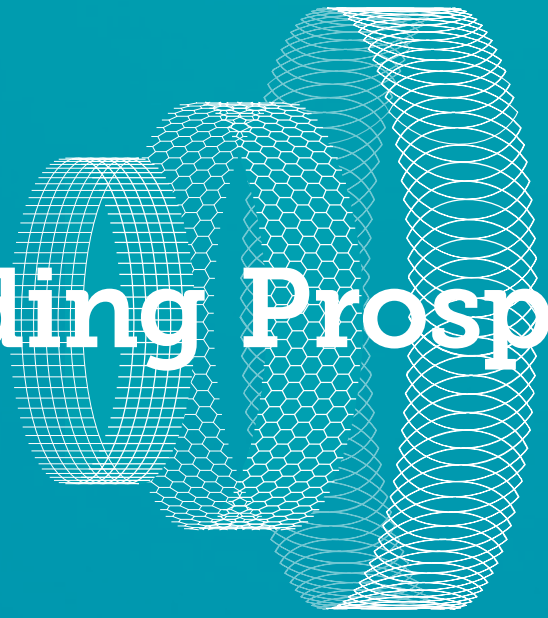
ELLEN MACARTHUR FOUNDATION

BRIEFING FOR POLICYMAKERS



Building Prosperity

Unlocking the potential of a nature-positive, circular economy for Europe

Overview of key insights:

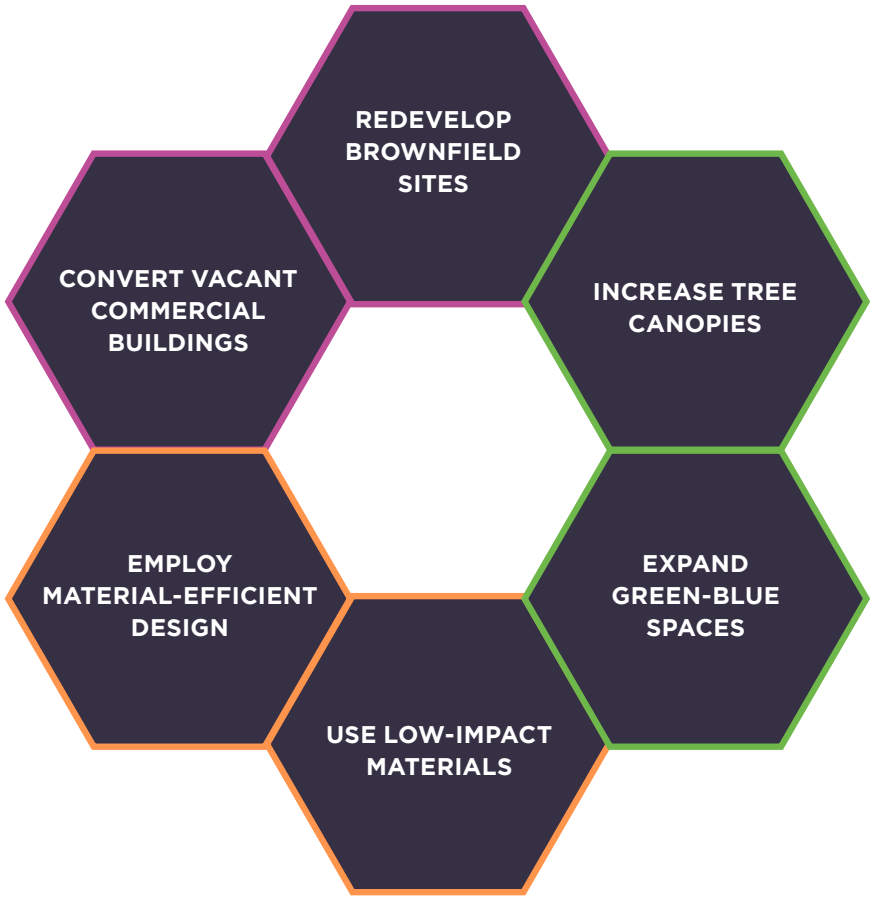
- A set of nature-positive, circular strategies can unlock **more than half a trillion euros** annually across the built environment value chain by 2035
- With low barriers to implementation, these strategies can also generate **several hundred billion dollars of wider economic benefits** for businesses, municipalities, and citizens by 2035
- Beyond economic gains, the adoption of these strategies can yield a **broad set of nature, climate, and social benefits** for all stakeholders
- To reap these benefits, policymakers at every level can **create the necessary frameworks, make the economics work, and stimulate innovation** to enable the transition

Over the past 10 years, circular economy strategies have risen up the agenda, providing solutions to gradually decouple economic activity from its negative impacts. While its material savings benefits and its contribution to reducing emissions are well documented,[1] the circular economy can also help rebuild natural capital and contribute to ecosystem health — a dimension too often overlooked. With more than half of the world's GDP relying on nature,[2] now is the time to make the case for the regenerative potential of the circular economy.

Focusing our analysis on the built environment offers the opportunity to illustrate how the benefits of a nature-positive, circular economy can be realised in a tangible, high-impact way. Europe's built environment is central to its economic vitality, yet it stands at a critical juncture, requiring immediate and concerted action. While efficient compared to other high-income regions, this material-intensive sector still consumes vast amounts of materials and emits significant amounts of greenhouse gases (GHG). With a demand for millions of new homes and over 30 million buildings in need of renovation,[3] the time is ripe for transformation. The Ellen MacArthur Foundation's report Building Prosperity: Unlocking the potential of a nature-positive, circular economy demonstrates that the built environment sector's future contribution to the European economy does not have to be a choice between economic growth and nature preservation.

A nature-positive, circular built environment can generate substantial economic, environmental, and social benefits for European businesses and citizens by 2035

The report highlights six circular strategies with prominent potential to concurrently drive economic and nature-positive gains, and to achieve wider environmental and social outcomes. Covering the entire value chain, these six interventions, all identified as mature and scalable with low barriers to implementation, can reinforce each other and amplify benefits when applied as an integrated system.



SYSTEM-WIDE BENEFITS OF A CIRCULAR AND NATURE-POSITIVE BUILT ENVIRONMENT, BY 2035

EUR 575 billion

Potential annual revenue distributed across the built environment value chain

EUR 101 billion of revenue can be derived from revitalising urban land and assets

EUR 363 billion of revenue from optimising design and material sourcing

EUR 111 billion of revenue comes from maximising nature in cities

EUR 117 billion increase in annual revenue to city-centre shops, restaurants, bars, and cafés, driven by more vibrant and attractive cityscapes

EUR 22 billion of annual benefits to households and businesses from more efficient infrastructure networks and reductions in energy and water charges

EUR 632 billion of properties and business value safeguarded through maximising nature in cities and employing nature-based climate adaptation strategies

1°C - 3°C reduction in average urban peak temperatures in cities by increasing tree canopies and expanding green spaces

EUR 158 billion

Wider economic benefits realised annually for businesses, municipalities, and citizens

EUR 19 billion worth of benefits from improved health and productivity

Nature, climate, and social benefits

Increased job creation potential

Properties adjacent to new green spaces and regenerated brownfield sites will benefit from improved liveability

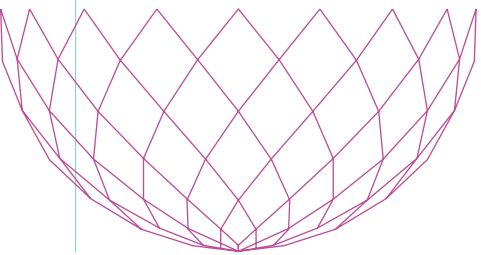
5% reduction in EU CO_2 emissions from lower demand for carbon-intensive building materials, more compact urban centres, and expansion of green space

16,000 km^2 of green space in Europe created or protected by applying six circular economy strategies

Together, the six strategies can unlock EUR 575 billion of potential revenue distributed across the built environment value chain

Revitalise land and assets to minimise further pressure on nature

Revitalising Europe's abandoned plots and buildings could usher in a new wave of urban development that makes the most of available land without encroaching further on valuable natural habitats. Focusing on **brownfield site redevelopment** and the **conversion of vacant commercial buildings** can help the EU deliver on its targets to halt the net loss of urban green spaces by 2030, and simultaneously address the need for housing. **EUR 101 billion** of annual revenue can be derived from revitalising urban land and assets for those involved in repurposing these sites. These benefits can be unlocked even when applying the strategies across a relatively small area (see Table 2). At the same time, these strategies combined could help address Europe's housing needs depending on the spatial distribution of brownfield sites relative to housing demand.

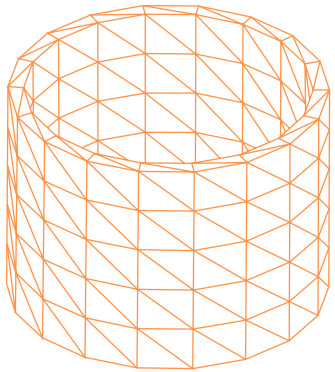


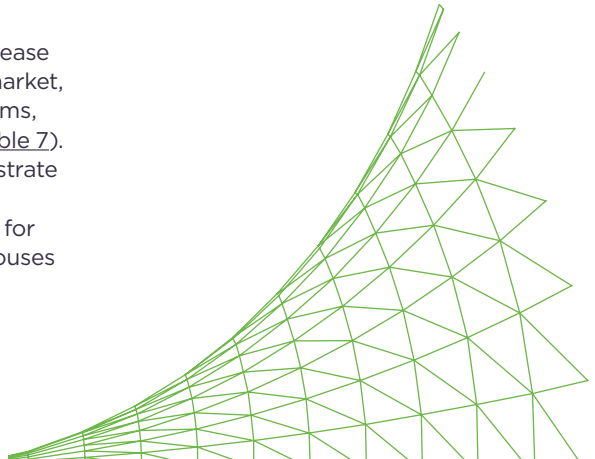
Maximise nature in cities to create resilient and vibrant urban landscapes

The principal ways in which European cities can maximise nature are through strategically **increasing tree canopies** and **expanding green-blue spaces**[4] by adding areas of native vegetation and water well-suited to local conditions throughout the cityscape. Maximising nature to a minimum threshold of 45% overall green cover across all EU cities could generate **EUR 111 billion** of potential annual revenue by 2035, with more than half benefiting the landscape construction sector (see Table 5). A high proportion of the greening will target areas of cities that are both sealed and underutilised thereby providing a double benefit, not only revitalising neglected spaces but also enhancing the cooling, infiltration, and other ecosystem services associated with these areas. Besides the highly beneficial strategic integration of tree canopies into streetscapes, urban planners and landscaping companies also have a vast palette of potential nature interventions that can be applied in a locally-attuned way to increase ecosystem integrity depending on the local climatic context, scale, and the ecosystem function that is needed. Cities such as Turku in Finland and Ljubljana in Slovenia have already started employing these methods as part of their revitalisation strategies.

Optimise building design and material sourcing to capture economic value, and achieve climate targets

Optimising building design can drive economic benefits by reducing the material and carbon footprint of Europe's future building and infrastructure construction and positively impact nature. This can be achieved through **material-efficient design** and the use of **low-impact material** substitutes,[5] including reused or recycled materials, regeneratively sourced bio-based alternatives, and materials produced using low-carbon manufacturing processes.[6] These two strategies can unlock **EUR 363 billion** of direct economic benefits. In particular, material and component suppliers will reap a significant benefit driven by an increase in the prefabricated construction market, demand for modular building systems, and lower-impact materials (see Table 7). Frontrunners in this market demonstrate that these design and construction practices can be adopted widely — for example, in Sweden, 84% of new houses comprise prefabricated elements.[7]





Case study: **Ginkgo**

Ginkgo specialises in the remediation and regeneration of brownfield sites and abandoned built environment assets across Europe. In Lyon, on a 4.5-hectare plot, a former factory site, Ginkgo is developing over 40,000 m² of housing, featuring 35% green space and 200 trees, with plans for an additional 9,000 m² of greenery and an urban farm. The project required more than EUR 7 million of initial funding for site remediation and has already returned more than three times the equity invested, with an internal rate of return of over 20%. Meanwhile, the project is contributing EUR 10 million to urban development taxes and infrastructure including roads, green spaces, and schools.

Ginkgo Advisor

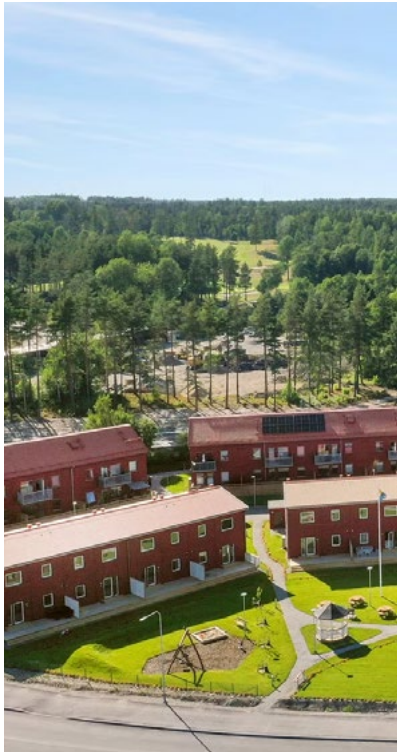
Case study: **Copenhagen**

The city of Copenhagen, in response to an extreme rainfall event that left around EUR 1 billion of property damage in 2011, established nature-based solutions as a key approach to urban water management. To relieve pressure on the traditional sewage system, the city extended permeable areas through maximising green spaces, wetlands, and drainage corridors to absorb and retain runoff water. The delivery of the plan required localised, collaborative efforts between engineers, utility providers, investors, and municipalities. Analysis showed that these solutions reduced mitigation costs by over USD 200 million versus conventional piping. Inspired by Copenhagen's example, other cities have embraced nature-based solutions for water management, for example New York City has launched a USD 400 million infrastructure programme.

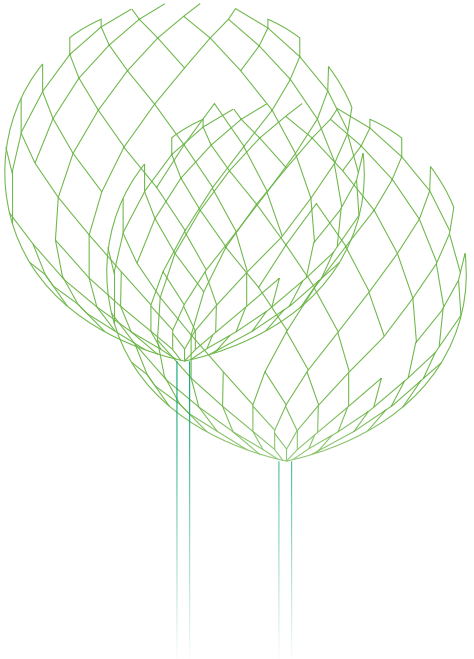
Troels Heien

Case study: **BoKlok**

BoKlok, a joint venture between construction giant Skanska and IKEA, focused on delivering affordable, material-efficient housing across Europe, creates prefabricated modular homes with streamlined and shorter construction processes, and reduced waste and emissions. There are already 12,000 BoKlok homes across Sweden, Finland, and Norway, with plans underway to partner with regional housing providers into new markets such as the UK.



BoKlok Golfklubban



EUR 158 billion can be realised annually in wider economic benefits for businesses, municipalities, and citizens

City-centre shops, restaurants, bars, and cafés can benefit from a EUR 117 billion increase in annual revenue driven by more vibrant and attractive cityscapes. The presence of trees in commercial areas provides shade, reduces heat, and improves air quality. This vibrant and welcoming environment encourages people to visit and linger longer in the area, which increases foot traffic to shops and businesses. Achieving an average urban green cover of 45% in European cities could result in up to EUR 37 billion in additional business for retail stores located on tree-lined streets by 2035. More significantly, an ambitious office-to-residential conversion programme could counter the 10–20% Covid-related reduced foot traffic near stores located in downtown metropolitan areas, generating an additional EUR 80 billion for Europe's brick-and-mortar businesses (see Table 8).

Households and businesses can benefit from EUR 22 billion annually through more efficient infrastructure networks and reductions in energy and water charges. Prioritising brownfields over greenfield development replaces urban sprawl, with higher density city-centre development. These central locations can save on infrastructure development costs, through the rehabilitation of existing roads and pipes as well as more resource-efficient networks. For our analysis, we estimated that prioritising brownfield site redevelopment could avoid EUR 16 billion in infrastructure costs compared to business-as-usual greenfield home building. Households and businesses located in tree-lined streets or close to green spaces could also benefit from more than EUR 6 billion of economic savings through a reduction in heating, cooling, or water drainage costs (see Table 8).

Citizens can benefit from improved health and productivity, equivalent to EUR 19 billion. Maximising nature in cities can help mitigate the urban heat island effect, leading to improved health, more comfortable working conditions, and lower rates of absenteeism, with an estimated EUR 11 billion in productivity benefits. Exposure to nature has been shown to reduce stress, improve mental health, and increase creativity and focus — leading to improved overall wellbeing, job satisfaction, and even staff retention.[8] If an additional ~11% of workplaces have a view of green space by 2035, the economic benefits from avoided sick leave could amount to EUR 8 billion. Since the incorporation of a green wall on Venlo Town Hall in the Netherlands in 2016, the number of reported staff sick days has reduced by 2%,[9] which could provide a productivity increase equivalent to EUR 1 million annually for the Town Hall[10] (see Table 8).

Properties adjacent to new green spaces and regenerated brownfield sites will benefit from improved liveability. Green spaces offer recreational opportunities, improve air quality, contribute to noise abatement, attract more wildlife, and reduce urban heat island effects — all contributing to the overall 'liveability' of the area. For example, the gradual expansion of green spaces and elimination of motorised vehicles in Ljubljana's city centre in Slovenia has resulted in a 58% reduction in carbon black air particulates. Brownfield site redevelopment can lead to the introduction of new businesses and amenities, residential units, and green spaces — stimulating urban economies as a whole, boosting business activity, attracting higher-value industries, and increasing citizen income.

In addition, these strategies can boost job creation. It has been estimated that, in a nature-positive economy, 117 million jobs could be created globally in the building and infrastructure sector.[11] While it is not possible to pinpoint precisely the type and number of jobs that will arise from the scaling of our selected strategies, we can speculate that new job areas will emerge. For example, the push for more efficient structures and lower-impact materials could increase demand for specialists in digital design, material and equipment manufacturing, circular supply chains, and advanced construction technologies. In parallel, urban greening initiatives could lead to new roles in landscape design, tree maintenance, horticulture, and urban ecology.

Photo by CHUTTERSNAP on unsplash.com

Beyond economic gains, the adoption of the six strategies can yield a broad set of nature, climate, and social benefits for all stakeholders

Maximising nature in cities and employing nature-based climate adaptation strategies could safeguard billions of properties and business value. Greening and protecting land could deliver an additional EUR 632 billion in benefits through the avoidance of downside risk.[12] For example, more permeable surfaces could reduce flood intensity by 10–20% and help recharge groundwater aquifers, mitigating future droughts. Studies have shown that increasing tree canopy together with other nature-based solutions, such as permeable pavements and green roofs, are both more cost-effective than 'hard infrastructure' solutions and far more effective at building resilience to the intensifying impacts of climate change.[13]

**Applying these six strategies could create new and protect existing green space in Europe, totalling over 16,000 km², ** the equivalent of half the size of Belgium. Maximising the integration of nature so that all EU cities achieve a threshold cover of 45% could create an additional 8,500 km² of urban green space — helping to achieve the objectives for urban ecosystems set out in the Nature Restoration Law. By designing higher density, mixed-use multi-family home developments, and prioritising underused land and assets over greenfield development, an estimated 7,700 km² of natural land (primarily farmland) can be protected (see Table 10).

A nature-positive built environment helps reduce GHG emissions, thereby supporting climate goals. By 2035, 131 $MtCO_2$ could be avoided or captured through a reduced demand for carbon-intensive building materials, more compact urban centres, and an expansion of green space. One of the tallest timber hybrid buildings in the world — HAUT, in Amsterdam — achieves a 50% reduction in carbon emissions compared to a conventional building, and stores approximately 1,800 tonnes of CO_2 when taking into account sequestration. It should be noted, however, that while timber buildings offer many benefits, the choice of this material must take into account the potential impact on nature, biodiversity, and land use (see Table 10).

European citizens can reap numerous physical and mental health improvements. An increased connection with nature can make a substantive contribution to the improved future health and wellbeing of European citizens. For example, increased tree canopies can result in stress and blood pressure reduction, fewer premature deaths, longer life expectancy, and enhanced community interaction and an enhanced sense of civic pride.[14]

To maximise the social benefits of a circular built environment, the conditions for a just transition need to be put in place and prioritised

The environmental crises of climate change, biodiversity loss, and pollution are inextricably linked with the social crises of inequality and poverty, which could lead to increased polarisation. An effective response to these interconnected challenges requires key stakeholders to address environmental, social, and economic issues together.[15] For example through ensuring:

- **Affordability** – strategically supporting affordability is key to ensure social fairness and continued vibrancy of places. Policymakers have the lead responsibility here through rental policies. Developers and investors can also better value the long-term benefit of mixed-price/mixed-income neighbourhood design ensuring vibrancy.

- **Upskilling over a million workers** – a significant programme of skills and knowledge development will be needed to upskill Europe's future workforce.[16] This will entail significant investment in education and capacity-building programmes across all types of jobs.

- **Access to green space** – fair and equitable access to urban green spaces is a key consideration, such as the inclusive green space planning policy '3-30-300' guideline for urban forestry.[17] This stipulates that every home, school, or business should have a view of three trees, every neighbourhood should have at least 30% tree canopy, and every resident should be within 300 m of a park.

- **Fair distribution of economic gains** – in particular where investment comes from the public purse. This is particularly relevant in the case of property value increases in proximity to new green spaces, infrastructure, or brownfield site conversion.

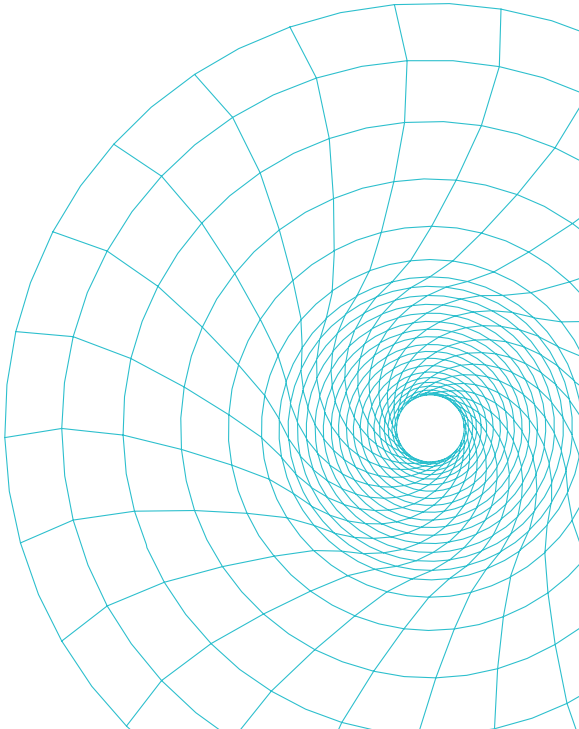
Policymakers at every level can create the necessary frameworks, make the economics work, and stimulate innovation

EU and national level

- **Continue to encourage the broader application of well-designed economic instruments** — such as green public procurement, taxation, and subsidies — to incentivise nature-positive construction projects in the long term. For example, the voluntary EU Green Public Procurement criteria for office building design, construction, and management can support these endeavours, including uptake at the national level.[18]
- **Ensure further interventions to accelerate the transition by expanding the scope of targets within the existing policy frameworks beyond waste collection and recycling**, including, targets for nature-positive, circular product design, material efficiency, and the lifespan of components applied in the built environment. For example, the EU Construction Products Regulation and the revised Energy Performance of Buildings Directive, both adopted in 2024, can offer a chance to explore such targets.[19,20]
- **To support the above targets, ensure robust and responsive monitoring frameworks are in place both at the EU and national level**, building on the EU Circular Economy Monitoring Framework and its future reiterations.[21]
- **Invest public funds in research, development, and innovation for systemic solutions**, in particular towards nature positive, circular solutions for the built environment as part of the next EU multiannual financial framework (MFF) 2028 – 2034.
- **Allocate funding to help cities and stakeholders develop innovative finance models to scale implementation**, including by blending public and private funding, with support from the EU MFF (above) and European Investment Bank.

City level

- **Ensure publicly funded construction projects set the standard for nature-positive outcomes across the industry**, including through identifying concrete nature-related targets and establishing a framework for monitoring the outcomes. The voluntary EU Green Public Procurement criteria for both building and road design provide references to nature-based solutions, enabling cities to set such standards.
- **Embed nature-positive and circular criterion in city-owned land management, through updating zoning regulations**, in particular with a view to achieving the 2024 EU Nature Restoration Law's objective of no net loss of green urban space and tree cover by 2030.[22]
- **Establish methods to streamline, fast-track, and simplify local planning processes for nature-positive initiatives**, including by reviewing the existing impact assessment processes and establishing specific application processes or prioritisation criteria.



Now is the time to scale the nature-positive, circular economy

The built environment is a compelling example of how deploying nature-positive, circular economy principles can promote economic opportunity, climate resilience, and better outcomes for people's health and wellbeing.

Beyond Europe, comprehensively applying this solutions framework to other regions, but also to other key systems — such as food, fashion, and industrial sectors — has the potential to concurrently drive economic and nature-positive gains. With digital technologies and material innovation in place, and success stories showing the way, the time is right to make the circular economy vision a reality at scale.

To read more detail about our quantitative modelling that supports the economic, social, and environmental benefits presented in the report, see the Technical Appendix.

Acknowledgements

ELLEN MACARTHUR FOUNDATION

The Ellen MacArthur Foundation is an international charity that develops and promotes the circular economy in order to tackle some of the biggest challenges of our time, biodiversity loss, climate change, and waste and pollution. We work with our network of private and public sector decision makers, as well as academia, to build capacity, explore collaborative opportunities, and design and develop circular economy initiatives and solutions. Increasingly based on renewable energy, a circular economy is driven by design to eliminate waste, circulate products and materials, and regenerate nature, to create resilience and prosperity for business, the environment, and society. Further information: www.ellenmacarthurfoundation.org

SYSTEMIQ

Systemiq, the system-change company, was founded in 2016 to drive the achievement of the Sustainable Development Goals and the Paris Agreement, by transforming markets and business models in five key systems: nature and food, materials and circularity, energy, urban areas, and sustainable finance. A certified B Corp, Systemiq combines strategic advisory with high-impact, on-the-ground work, and partners with business, finance, policymakers, and civil society to deliver system change. In 2020, Systemiq and The Pew Charitable Trusts published Breaking the Plastic Wave: a comprehensive assessment of pathways towards stopping ocean plastic pollution, an evidence-based roadmap that shows how industry and governments can radically reduce ocean plastic pollution by 2040. Systemiq has offices in Brazil, France, Germany, Indonesia, the Netherlands, and the UK. Further information: www.systemiq.earth

ARUP

Dedicated to sustainable development, Arup is a collective of 18,000 designers, advisors, and experts working across 140 countries. Founded to strive for humanity and excellence, Arup collaborates with clients and partners, using imagination, technology, and rigour to shape a better world. Arup is a longstanding knowledge partner to the Ellen MacArthur Foundation, working together over nearly a decade to enhance recognition of the circular economy in the built environment. In 2022, Arup and the Ellen MacArthur Foundation launched the Circular Buildings Toolkit, a practical tool designed to bring the circular economy into the mainstream for real estate players, helping asset owners, developers, and investors to future-proof assets as sustainability policies redraw the industry. Further information: www.arup.com

Endnotes

1 Ellen MacArthur Foundation, Growth Within: a circular economy vision for a competitive Europe (2015); Ellen MacArthur Foundation, Completing the picture: How the circular economy tackles climate change (2021)

2 World Economic Forum, Scaling Investments in Nature, The Next Critical Frontier for Private Sector Leadership (2022)

3 The European Commission wants to start a Renovation Wave, upgrading 35 million buildings by the end of this decade. Achieving this will mean tripling renovation rates and increasing the depth — that is the energy improvement of each renovation — by a factor of six. Source: Green Finance Institute, Unlocking the Trillions: Public-private innovation to deliver the EU's Renovation Wave ambition (2021)

4 Includes urban parks and 'pocket parks', nature-based solutions also known as 'blue-green infrastructure', SuDs (Sustainable urban Drainage Systems), and permeable roads or paving

5 Material-efficient design describes a range of strategies that reduce the material volumes in building components without compromising the structural integrity including prefabrication, biomimetic design, modular construction, and 3D printing. Low-impact materials are non-toxic, low-embodied carbon material substitutions such as low-emission steel and cement, engineered timber, and other bio-based materials.

6 Low-emission cement processes include replacement of coal with hydrogen (e.g. Cambridge Electric Cement), reverse calcination where carbon dioxide is reinjected into the curing process (e.g. CarbonCure), electric external kiln heating (e.g. Calix), and the use of microalgae in a 'biomineralization' process (e.g. Prometheus). Most low-emission steel processes are based on the replacement of coking coal with hydrogen in the oxidation process (H2 Green steel)

7 Forbes, Extraordinary Prefab Houses Around the World (2019)

8 BBC, Why you can't afford to ignore nature in the workplace (2016)

9 For a building housing 1,000 employees, each working on average 250 days a year, a 2% reduction in sick days means 5,000 sick days avoided which, at EUR 200 a day, equals EUR 1 million in salary costs. Source: Veldhoen Company, ABW Case Study: City Hall of Venlo, Netherlands (2020)

10 Work in Mind, Workplace wellbeing: A shining example from The Netherlands (2020)

11 World Economic Forum, The Future of Nature and Business (2020)

12 This calculation is based on the total EU real estate value of EUR 38.7 trillion (2021), with approximately 10% (EUR 3.87 trillion) currently at risk from extreme weather events. Our analysis indicates that implementing the six nature-positive, circular strategies could effectively mitigate approximately 15% of this risk exposure, protecting EUR 632 billion in property value that would otherwise be vulnerable to climate-related damage.

13 World Economic Forum, BiodiverCities by 2030: Transforming cities' relationship with nature (2022)

14 Donovan, G.H., et al., The association between tree planting and mortality: A natural experiment and cost-benefit analysis (2022)

15 International Labour Organization, Guidelines for a just transition towards environmentally sustainable economies and societies for all (2015)

16 A comprehensive report by the International Trade Union Confederation estimates that by 2030, 1.5 million additional workers need to be attracted and retained to achieve the ambitious climate and resilient growth targets set out by the EU, adding that "investments in green construction have strong knock-on effects with millions of additional jobs being created along the value chain"

17 Nature Based Solutions Institute, The 3-30-300 Rule for Healthier and Greener Cities (2024)

18 European Commission, Green Public Procurement Criteria and Requirements, Green Business

19 Council of the European Union, Building materials: Council adopts law for clean and smart construction products, Consilium (2024)

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21 Eurostat, Monitoring framework for the circular economy, European Commission

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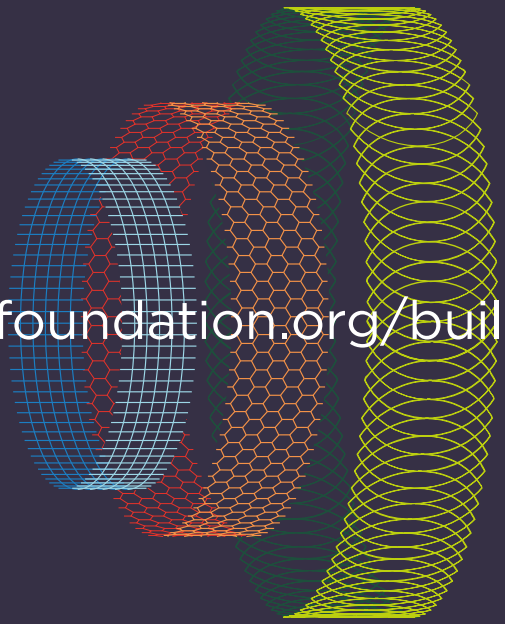

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The ***Building Prosperity: Unlocking the potential of a nature-positive, circular economy report*** is available in: English, Español, and Português.