

Pioneering report sets the course for nature-positive engineering in coastal and marine environments

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A global engineering coalition has issued an urgent call to action to the industry to solve the climate crisis through ecology-inclusive engineering frameworks.

The [*Foresight of Nature-Positive Engineering*](#), a new report from [Lloyd's Register Foundation](#), in partnership with the International Coalition for Sustainable Infrastructure (ICSI), sets out the blueprint for the safely scaled application of nature-positive engineering (NPE) in ports, offshore renewable energy and in coastal protection and adaptation.

Biodiversity is declining faster than at any time in human history, with average extinction rates 100 to 1,000 times higher than the past ten million of years^[1]. While crucial to human development, the built environment has had a significant impact on the climate crisis, causing high carbon emissions, habitat loss and resource depletion.

Yet, authors argue, infrastructure could serve as a key leverage point for nature recovery by embracing the principles of NPE. The transformative approach, as defined by the report, involves actively protecting, restoring and enhancing natural systems to deliver measurable ecological gains while simultaneously supporting societal wellbeing and need.

Savina Carluccio, Executive Director of the International Coalition for Sustainable Infrastructure (ICSI) and author of the report, said: "Engineering has long driven human progress, but it has also contributed to ecological degradation, biodiversity loss, and climate instability. These changes are having a significant

impact on the maritime system, where rising sea levels and severe weather patterns pose a significant threat to the safe operation of marine infrastructure, and the livelihoods of coastal communities.

Today, engineers face both a responsibility and an opportunity to become stewards of the natural systems we all depend on, which are under immense pressure. This demands a fundamental shift in infrastructure development—moving from viewing nature as a constraint to recognising it as a critical ally in achieving human and planetary well-being.

Nature-positive engineering takes concrete steps to deliver measurable gains for nature, moving beyond “doing less harm” to “doing more good” on a path toward regeneration. It has shown promise in coastal and marine environments, but now is the time to scale it.

This Foresight Review is a rallying call to mobilise the profession to lead the transition to infrastructure that enables both people and nature to thrive.”

Three sectors have already begun to embrace principles of NPE: coastal protection, offshore renewable energy and ports. Solutions like living shorelines reinforced with native vegetation, marine protection structures enhanced with ecological features, or fish hotels incorporated within the design of wind farms to protect fish from predators, featured in the report, have all been successfully implemented across the world.

Drawing on some of these examples, the report goes on to outline its three key recommendations to accelerate the implementation of NPE on a larger scale. These include, the creation of a policy-driven enabling environment, leveraging technology for integrated planning and procurement; the launch of a toolkit to build technical capacity among both professionals and those in education; and the establishment of a global engineering NPE alliance to promote knowledge sharing and showcase examples of best practice.

An estimated \$44 trillion (over 50% of global GDP) is moderately or highly dependent on the ecosystem services that nature provides. As well as preventing the collapse of these services, NPE could also be the key to unlocking significant economic opportunities, as experts estimate that three quarters of the infrastructure that will exist by 2050 is yet to built[\[2\]](#).

Jan Przydatek, Director of Technologies at Lloyd’s Register Foundation, said: “Critical infrastructure is essential to keeping people safe and supporting economic activity, but it doesn’t need to come at the expense of biodiversity. It’s time to go beyond carbon-neutral infrastructure that minimises harm to fundamentally transform the way we approach the built environment for the next generation.

The practice of nature-positive engineering is in the early phase of implementation. The scaling of nature-based solutions at the scale required, will only be possible when it is embedded in engineering practice that builds future infrastructure.

Although the report focuses on coastal and marine environments, its findings are equally applicable to development on land and at sea.”

To download the Foresight review, please visit the [Lloyd’s Register Foundation website](#). The Foundation is also looking for engineers to join our expanding community of practice on nature-positive approaches and safer sustainable infrastructures. Join the mailing list for more information. [here](#).