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Engineers are at the heart of the net-zero challenge, which requires industry-wide collaboration.

Climate change is one of humanity's most urgent challenges. It poses immense risks but also enormous opportunities to address social inequalities, redress environmental damage and build back biodiversity, and stimulate new economic activity through a green industrial revolution. In short, addressing climate change offers the opportunity to create a better world.

To succeed, we must transform our social and economic infrastructure – our built environment, industry, services and natural environment. How we create, operate and manage these systems holds the key to cutting emissions and building resilience to the physical impacts of climate change.

We, professional engineers, have a critical role to play in addressing this challenge. Concrete alone is responsible for 7% of global carbon emissions and the infrastructure we create influences operational emissions from sectors such as transport and energy which together are responsible for over 70% of global emissions.

To achieve net-zero, total emissions must be cut to as close as possible to zero with any residual emissions removed from the atmosphere. Infrastructure professionals own the lion's share of that challenge.

The COP26 international climate summit will be key in developing national route-maps to net-zero carbon. With limited time to act, it is vital that long-term emissions reduction commitments are translated into short-term actions, and that infrastructure owners, operators, investors, and the whole of the infrastructure value chain, develop and implement their own action plans.

It will be vital to employ innovative new digital solutions to identify and chase out carbon from new and existing assets and operations, influence user behaviour to reduce demand, and adopt circular business models which emphasise the reuse of materials and elimination of waste. At the same time, we must ensure the built and natural environments continue to work for the good of society by adapting them to withstand the impacts of a changing climate.

We need to work together. Through collaboration between governments, businesses, cities and communities, we can and must take action now to help secure global net-zero by 2050. It involves identifying, copying and upscaling best practice within and between sectors, and prioritising where innovation and investment should be focused for the greatest and fastest carbon reductions.

Organisations must recognise their connections and interdependencies. If organisations fail to collaborate, those interdependencies can block progress. When they collaborate, progress is enabled.

Achieving net-zero is a huge challenge in itself. But many are concerned that it is not enough, and that offsets provide a way out of meaningful emissions reduction. If done properly by everyone, net-zero should be enough to avert catastrophic climate change. For Mott MacDonald, this means focusing on deep emissions reductions in line with science-based targets, and removing from the atmosphere all residual emissions. But we are on a knife edge and not all countries, organisations and individuals are fully committed to a genuine net-zero.

That is why going net-negative should be considered seriously. Because unstoppable, progressive climate change will ultimately make our planet unlivable – and bring untold social and economic disruption and hardship on the way.

Net negative would require us to develop and implement at scale technologies that don't yet exist. Engineers can describe what is required and are capable of designing, building and operating it – if society is willing to pay for it. Potential solutions include bioenergy linked with carbon capture and underground storage, and direct air capture and underground storage. They are fascinating engineering challenges – but the financial and social cost could be immense, and it would be better for everyone if we can avoid relying on them.

Achieving net-zero and anything beyond it represents a huge challenge – but it is also an unprecedented opportunity to deliver positive benefits for people and the natural environment. Engineers are uniquely placed to drive the change. I am proud to be part of our profession at this historic and exciting time.

