ice

Knowledge

Moving beyond COP26

Putting the pledges of the 2021 UN Climate Change Conference into practice – what next for civil engineers?

ICE Working Paper

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Summary

Last year's UN Climate Change Conference (COP26) ended with global agreement to accelerate action on climate this decade. Nearly 200 countries agreed the Glasgow Climate Pact to finalise the outstanding elements of the Paris Agreement and keep the 1.5C ambition alive. As a civil engineer, what does this mean for you?

With 54% of the UK's total carbon emissions, and some 70% worldwide, being linked to infrastructure, civil engineers are critical to the implementation of solutions to this global problem.

The Institution of Civil Engineers (ICE) has been working with its members to accelerate solutions to the climate crisis. COP26 provided additional impetus. The implications are wide-ranging and encompass several topics that are central to the work of civil engineers:
1. Emission reduction commitments and carbon trading
2. Carbon accounting
3. Financing infrastructure
4. Nature-based solutions
5. Adaptation and resilience

This Working Paper summarises the implications of COP26 for civil engineers and the steps they should be taking to accelerate a resilient transition to net zero.

As an ICE member, you should:
- Be aware that emission reduction commitments are changing the way in which our industry works and be prepared for more dramatic changes in future
- Be aware of the vast sums of capital being directed towards net-zero investments and the criteria that may be attached to project funding moving forward
- Understand the emissions resulting from your projects, both during construction and during their life, and consider innovative solutions that minimise emissions
- Be ready to use data and methods from ICE's Carbon Project, the Built Environment Carbon Database (BECD) and the forthcoming updates to PAS 2080
- Help to drive the required switch to new technologies and more sustainable materials
- Make the case for research and innovation
- Use and share best-practice tools to measure and specify carbon content
- Consider how your role will change in the future transition to net zero and prepare for that change
- Consider climate resilience for all new projects
- Use your influence to ensure that commitments and targets are put into place at all levels and are being delivered in practice
- Look out for more information and continuing professional development (CPD) topics coming soon from ICE

Achieving net zero infrastructure that is resilient to the impacts of climate change is now central to the ICE's mission. The institution will work to:
- Further embed sustainability into all aspects of civil engineering, including supporting innovation in climate-compatible infrastructure through its R&D Enabling Fund
- Continue work through the Carbon Project to set standards for measuring and minimising emissions, including highlighting visionary leaders and examples of best practice through the Carbon Champions programme
- Publish advice and guidance to help ICE members adopt best practices for climate-compatible infrastructure

Your feedback on this paper is welcomed – how can you contribute to any of the above actions, and what else can ICE do to help you with this? Email knowledge@ice.org.uk

With 54% of the UK's total carbon emissions, and some 70% worldwide, being linked to infrastructure, civil engineers are critical to implementing solutions to this global problem

Introduction

This paper aims to provide civil engineers with a summary of key pledges and commitments made at COP26, explain their implications and suggest practical steps to be taken as a consequence. It also identifies areas for further ICE activities to help meet any resulting challenges.

The UN Framework Convention on Climate Change (UNFCCC) came into force on 21 March 1994 and the 197 countries that ratified it are known as Parties to the Convention. Preventing "dangerous" human interference with the climate system is the UNFCCC's ultimate aim and the Conference of the Parties (COP) is its supreme decision-making body. All Parties to the Convention are represented at the COP, at which they review the implementation of the UNFCCC and take decisions necessary to improve its effectiveness. The first COP meeting was held in Berlin in 1995.

The 26th meeting of the COP (COP26) took place in Glasgow in November 2021. It comprised official UN events that generated global pledges and measures to limit global warming, as well as various related side events. The final outcomes from COP26 were encapsulated in the Glasgow Climate Pact.

This paper has been informed by a limited literature review and a roundtable workshop attended by representatives of ICE's Community Advisory Boards and other ICE Fellows (see page 11). It is structured around five main themes:
1. Emission reduction commitments and carbon trading
2. Carbon accounting
3. Financing infrastructure
4. Nature-based solutions
5. Adaptation and resilience

Relevant decisions and commitments made at COP26 are highlighted throughout, with key messages for civil engineers and follow-up actions.

In numbers

1.5C

The Paris Agreement's goal is to limit long-term global warming to this temperature

197

countries are parties to the UN Framework Convention on Climate Change

01 Emission reduction commitments and carbon trading

Key COP26 outcomes

- More than 130 of 197 participating countries at COP26 pledged to reach net zero before 2050 and the need to reduce greenhouse gas emissions by 45% by 2030 was formally recognised.
- Countries will meet in 2022 to pledge further cuts to CO2 emissions.
- More than 2,000 companies have now committed to developing science-based targets for reducing their carbon emissions.
- After five years of negotiations, the world's governments settled on the rules for the global carbon market under the Paris Agreement's Article 6.

In 2020, the Carbon Project (an industry-wide initiative, chaired by ICE) continued to monitor emissions deriving from infrastructure. Research presented in the Unwin Lecture 2020 confirmed that infrastructure was responsible for more than half (54%) of the UK's total carbon emissions, while 70% of emissions worldwide could be linked to it.

This means that civil engineers have an ethical responsibility to change. This is reinforced by ICE's Code of Professional Conduct, which includes a duty to behave ethically. It states that "all members shall show due regard for the environment and for the sustainable management of natural resources" and that members will "have full regard for the public interest, particularly in relation to matters of health and safety, and the wellbeing of future generations".

The next generation is already becoming more demanding in terms of their criteria for selecting employment, so we need to be doing the 'right' thing ethically to attract and retain the best talent. Companies that are ahead of the game in carbon emissions reduction will have a competitive advantage when requirements become more stringent.

The agreements made at COP26 are leading towards consistency and transparency of carbon markets, and the buying and selling of carbon credits (Article 6 of the Paris Agreement) at a national level to achieve net zero. Under Article 6, there will be financial mechanisms in place to penalise or incentivise governments, corporates and large projects to tackle carbon: as the price of high-carbon activities increases, it will become economically advantageous to focus on carbon reduction.

Being able to measure carbon is the critical first step in the carbon reduction process and this is addressed in the next section on carbon accounting. But changes in procurement and legislation are also needed. Through our work, we can influence these changes and set targets and commitments – at a client level and within civil engineering organisations.

These targets and commitments will include Scope 3 emissions (emissions both upstream and downstream of the organisation's activities) and are therefore likely to drive a change in the types of projects we undertake. For example, there will be a further shift away from new-build towards re-use of existing infrastructure and incorporation of technology to achieve outcomes in different ways. There will be more work opportunities for civil engineers in sectors such as renewable energy, energy efficiency, and electrification of infrastructure.

The National Infrastructure Commission has put climate at the heart of its Design Principles. Standards, at national and international level, need to be reviewed against these principles to ensure they are adhered to in the planning and delivery of major projects and to drive efficient design using less resources and green technologies.

As changing standards is often time-consuming, there is also a need for guidance on how best to design within current standards. Concrete is the most-used construction material on the planet and the active ingredient in it – cement – is a potent source of greenhouse gas emissions. The carbon emissions from cement production associated with concrete use could be as high as 8%-9% of global emissions.

The draft Low Carbon Concrete Routemap highlights what we can do today to reduce the carbon in concrete. It demonstrates that it is possible within current standards and practice, through good stakeholder collaboration and consideration of different cement types and content, to produce concretes that have lower embodied carbon.

Concretes that use cement blends or contents outside current standards will also need to be part of the overall solution. These new products should be supported by the industry to allow the development of standards and an increase in commercial readiness and application.

Innovative ways of reducing emissions could potentially qualify for funds from the international carbon markets under the new mechanisms of Article 6, including the incorporation of new technologies, making buildings more energy-efficient or using alternative raw materials.

Action for ICE

- Review published explanations of what civil engineering is to reflect the imperative of net zero.
- Collate and review carbon reduction pledges made by civil engineering companies.
- Publish final Low Carbon Concrete Routemap and establish a taskforce to accelerate its adoption.

Action for ICE members

- Be aware that these commitments are changing the way the industry works and be ready for more dramatic changes in the future.
- Use your influence to ensure that commitments and targets are put into place at all levels and are being delivered in practice.
- Consider how your role is going to change in the future transition to net zero and prepare for that change.

02 Carbon accounting

Key COP26 outcomes

■ All countries agreed to submit information about their emissions and financial, technological and capacity-building support using a common and standardised set of formats and tables.
■ A high-level expert group will be created to establish clear standards for businesses to measure and assess the commitments to net-zero goals.

To know how best to direct net-zero efforts and to begin to reward and penalise via procurement and legislation, we need to know the quantity of carbon emissions associated with civil engineering – 'carbon accounting'. Once we are able to measure and monitor this we will know if our interventions are delivering the desired change and will be better equipped to make carbon management a routine aspect of infrastructure design. Most engineers can quote the unit weight of concrete versus soil – can they do the same for carbon?

In line with the emissions reduction targets and commitments, it is likely that whole-life carbon accounting and management will become contractual. This will include consideration of carbon impacts covering capital, operational and user emissions.

Sharing carbon-related knowledge and best practice is critical for consistent whole-life carbon accounting, and this is one of the aims of the Carbon Project, alongside the measurement, benchmarking and monitoring of carbon impacts. A new report produced as part of the Carbon Project – Meaningful Measurement for Whole-life Carbon in Infrastructure – has highlighted:
■ The data sources for carbon currently available to engineers
■ How engineers can create carbon benchmarks in their work
■ A new capital carbon reporting protocol for engineers and project teams to use

Data sources

Development of a robust carbon assessment is highly dependent on the data used for the analysis. Given the urgent need for accurate measurement and reporting on carbon in infrastructure to meet the UK Government's target of net zero by 2050, organisations should gather and manage data using appropriate, rigorous and interoperable systems.

The Meaningful Measurement report presents a summary of data sources at different stages of the project or asset lifecycle and a new Built Environment Carbon Database (BECD) is under development as a result of a collaboration between ICE and other built environment stakeholders. The BECD aims to become the single source of data by collecting and supplying product data and entity-level data to the industry through a dedicated portal and by interacting with existing databases and software solutions.

The BECD consortium's recent white paper sets out the two sections that are being developed for the database, to be made available in 2022: "The first section contains data at entity level, providing benchmark-type data points to support the feasibility, early design and end-of-life stages. The second contains data at product level to support the evolving and detailed design, construction and operational stages, and provide good-quality product data to conduct reliable assessments." This builds upon and supports the Inventory of Carbon and Energy's embodied carbon database.

Benchmarking

Effective whole-life carbon management of infrastructure can be accelerated through the development, sharing and use of benchmarks, which provide a point of reference and an understanding of what 'good' looks like at a whole-life carbon level. As described in PAS 2080:2016 Carbon Management in Infrastructure, whole-life carbon management requires the collaboration of all value chain members to capture and share carbon emissions information, and to share good practice at a sector level. This process works well when managed and incentivised at an industry level, and led by infrastructure clients.

The recent ICE recommendations have informed a 2021 update to the Best Practice in Benchmarking document published by the Infrastructure and Projects Authority. Clarity over who owns the data and the responsibilities for collecting it at each stage of the lifecycle needs to be established through procurement best practices.

Reporting

Consistent international standards are needed to allow comparison and summing at a national level. Supported by the Government via the Construction Playbook, PAS 2080 is a key reference document that is rapidly becoming the go-to specification for carbon management in infrastructure and the built environment. It looks at the whole value chain, aiming to reduce carbon and cost through intelligent design, construction and use. The Meaningful Measurement report also sets out a proposed standard protocol to help progress towards consistent reporting of project whole-life emissions using lifecycle stages, and to help the industry to report carbon reduction progress.

ICE has led an industry fundraise and is acting as lead technical author on an update of PAS 2080 and its associated guidance. This will align it with the legal obligation of achieving UK net zero carbon by 2050 and make improvements that take into consideration the recommendations identified in the Infrastructure Carbon Review Seven Years On report. The updated PAS 2080 will be made free to use and easier to apply to encourage adoption, and there is an ambition for the revised specification to be upgraded to an ISO standard to widen its application internationally.

ICE is one of 49 organisations that have developed the International Cost Management Standard (ICMS) Global Consistency in Presenting Construction Life Cycle Costs and Carbon Emissions. This covers the lifecycle costs and carbon emissions arising throughout a construction project, for buildings and civil engineering works.

Once we are able to measure and monitor the carbon, we will know if our interventions are delivering the desired change

Action for ICE

■ Deliver the PAS 2080 update and disseminate it widely to industry stakeholders and leadership.
■ Work to make PAS 2080 an ISO standard.
■ Continue work through the Carbon Project, including guiding the shareability of data for baselines and reporting, plus tools and methodologies for benchmarking, measurement and carbon lifecycle costing.
■ Highlight visionary leaders and examples of best practice through the Carbon Champions programme.
■ Publish procurement and contract guidance on delivering net zero and push for the necessary changes to procurement, legislation and consistent international standards to ensure that whole-life carbon management becomes a necessary element of everything we do.

Action for ICE members

■ Be prepared to use data and methods from ICE's Carbon Project, the BECD and the forthcoming PAS 2080 update.
■ Use and share best-practice tools to measure and specify carbon content.

03 Financing projects

Key COP26 outcomes

■ Commitment to align the finance sector with net zero by 2050.
■ Financial organisations controlling $130tn agreed to align their portfolios to net zero by 2030, back 'clean' technology and direct finance away from fossil fuel-burning industries.
■ Finance and funding will be key topics at COP27 in November 2022.

With the finance sector agreeing to align with net zero, financial institutions and investors will be scrutinising the environmental implications of infrastructure investments. Private financing of projects will become more dependent on meeting carbon targets.

In 2017, the Global Infrastructure Hub (GIH) estimated that there would be an infrastructure financing gap of US$15tn by 2040. One thing that can close the gap is the mobilisation of private capital. The GIH's Infrastructure Monitor 2021 describes how green private investment in infrastructure projects has risen from US$58bn in 2014 to US$87bn in 2020, representing about half of all private investment in projects. Most of this investment is in renewable energy, particularly wind and solar, and that is set to continue as global wind and solar capacity must still quadruple by 2030 to reach net-zero targets. Similar efforts are needed in sectors such as transport, where green private investment is low.

Companies will need to disclose their exposure to assets using fossil fuels as well as physical climate risks. The international Financial Stability Board established the Task Force on Climate-related Financial Disclosures to develop recommendations for more effective climate-related disclosures that could promote informed investment, credit and insurance underwriting decisions. This, in turn, would help stakeholders to understand the concentrations of carbon-related assets in the financial sector and the financial system's exposure to climate-related risks. The Coalition for Climate Resilient Investment was launched at the UN Climate Action Summit 2019 as a private sector-led initiative to help investors and policy-makers to manage physical climate risks.

In the UK, the Infrastructure Bank is providing £22bn of infrastructure finance. It was established by the Government in 2021 with a mission to partner with the private sector and local government to finance a green industrial revolution, deliver net zero and climate resilience and drive growth across the country.

Internationally, organisations such as the World Bank Group and regional development banks are increasingly directing their investments towards climate change mitigation and adaptation in developing countries. The Green Climate Fund has a particular focus on innovative solutions to mitigate and adapt to the effects of climate change. Civil engineers will find some of the demand for their expertise coming from these organisations.

Investors will be putting money into green technologies. To secure these funds, civil engineers need to demonstrate that they are switching to sustainable and greener materials, decarbonising the value chain, integrating carbon-neutral services and products and embracing new technologies. There may be a greater recognition of the need to take risks to accelerate innovation.

Development and implementation of these new technologies and innovations will require investment in R&D. ICE's R&D Enabling Fund was set up more than 20 years ago to help civil engineers to develop new ideas and is available to support innovation related to net zero and adaptation. The fund welcomes proposals that will contribute to the transition to net zero.

Action for ICE

■ Publish practical guidance around existing investment tools to finance low-carbon, resilient projects.
■ Support innovation in climate-compatible infrastructure through the R&D Enabling Fund.

Action for ICE members

■ Be aware of the vast sums being directed towards net-zero investments and the criteria for project funding.
■ Help to drive the required switch to new tech and more sustainable materials.
■ Make the case for research and innovation.

04 Nature-based solutions

Key COP26 outcomes

■ Declaration on Forests and Land Use reaffirms commitments to sustainable land use, to strengthen efforts for the conservation, protection, sustainable management and restoration of forests, and other terrestrial ecosystems.
■ Leaders from 141 countries – with about 90% of the world's forests – promised to halt and reverse forest loss and land degradation by 2030.

Nature-based solutions involve working to restore and enhance nature so that it yields multiple benefits – including flood alleviation, water purification, urban cooling, biodiversity and slope stabilisation. Nature ('green infrastructure') can substitute for, or complement, many aspects of conventional 'grey infrastructure' and these nature-based solutions are an area where climate adaptation and mitigation are aligned.

While the term 'nature-based solutions' was ultimately removed from the draft of the Glasgow Climate Pact, to be replaced with text about emphasising 'the importance of protecting, conserving and restoring nature and ecosystems', nature-based solutions remained a key part of COP26. The term found its way into the titles of numerous COP side events, and there were big commitments to scale up in this area and drive more funding.

There are some signs that policy-makers are shifting their requirements away from the presumption that infrastructure solutions always require building new assets. Considering that the role of the civil engineer is to design, create and connect the world around us so that places work for the people that live there, it is important to consider the purpose of the built environment as enabling people and nature to flourish together for generations. We should be encouraging a focus on these bigger-picture aims and how we can find systems-based solutions using the natural world to help us.

As engineers, we are good at getting performance out of a complex set of systems and materials, and in many respects that is exactly what nature-based solutions are. Increasingly, civil engineers should consider themselves to be 'engineers of nature' to enable these solutions to be found to either substitute for, or complement, hard infrastructure.

While nature-based solutions are not the whole answer, they can be part of it and are increasingly seen as delivering sound returns on investment. According to the UK Green Alliance's Jobs for a Green Recovery report, nature investments have a high cost-benefit ratio, with an estimated £4.60 return for every £1 invested in peatland, £2.80 for woodland and £1.30 for salt marsh creation. Organisations such as the UNFCCC's Green Climate Fund are keen to have larger amounts of nature-based solutions in their funding portfolio.

An online investment platform for nature-based solutions was launched as a pilot at COP26 by climate finance investment platform Capital for Climate. It aims to help institutional investors to understand why and how they should allocate their capital to nature-based solutions to climate change.

Civil engineers can help by educating themselves and applying rigour in understanding what nature-based solutions can and cannot do to help build understanding among clients. Sharing best-practice examples of such solutions will aid the push to achieve take-up at scale. Best-practice sharing is already taking place – the UK Environment Agency has produced guidance in the use of nature-based solutions to reduce flooding, while the University of Oxford has launched an interactive global map of best-practice solutions.

Action for ICE

■ Shift the focus to look more closely at how nature-based solutions can be part of the toolkit alongside traditional hard-engineered solutions within a holistic systems-based approach.
■ Publish an initial report into the use of nature-based solutions in flood management.

Action for ICE members

■ Understand the emissions that will come from projects, during construction and during their life, and consider innovative solutions that minimise emissions.
■ Look out for more information and CPD topics coming from ICE soon.

05 Adaptation and resilience

Key COP26 outcomes

- The Adaptation Fund reached unprecedented levels of contributions, with new pledges for US$356m that represent almost three times its 2022 mobilisation target.
- The UK announced £290m in new adaptation funding.
- The Least Developed Countries Fund, which supports climate change adaptation in the world's least developed countries, received a record US$413m in new contributions.
- A total of 88 countries are now covered by Adaptation Communications or National Adaptation Plans to increase preparedness to climate risks.

While infrastructure has always been designed for extreme conditions, the definition of 'extreme' is shifting – in relation to extreme heat, wind, floods and droughts. Modelling shows that consequences of climate change are now inevitable, regardless of how quickly we meet emission reduction targets. Resilience and net zero therefore need to be addressed simultaneously.

Different countries face different challenges. Globally, the most urgent need may be in the south and there is a need to build capacity here to face these challenges, but the recent UK Climate Change Risk Assessment showed that, in England alone, 1,691km of rail and 450 rail stations were exposed to a significant risk of surface water flooding.

Better understanding of the impacts of climate change on infrastructure will lead to a different way of thinking, which will result in our infrastructure being designed and operated in a way that is more resilient to the extremes of the future.

More future scenario planning will allow risks that have not yet occurred at a location to be considered, for example flood implications if the sea level is higher, flooding extremes with changing rainfall, or the effect on water storage of more severe droughts. These climate change impacts can then be incorporated more consistently when undertaking risk assessments for large infrastructure projects and climate resilience can be included in the scope, brief, design and consent for all new projects, as well as being incorporated into design standards and guidance.

Infrastructure operates as a system of systems and collaboration is needed to understand these systems' interdependence: increasingly, failure in one sector will affect another. We need to provide integrated solutions where the system boundary is wider than just the project itself. This point was also made at ICE's recent Presidential Roundtable, which discussed the size of the climate resilience challenge. With good use of data, we can better understand the performance of systems and assets, predict how they will react to climate change and direct investment to the best solutions.

With the theme of COP27 in November 2022 being 'climate resilience and finance', there is likely to be more emphasis on the topic of resilience in the coming months. As one of the founding organisations of the International Coalition for Sustainable Infrastructure (ICSI), ICE is committed to supporting its mission to make resilience and sustainability a cornerstone of every decision in the infrastructure lifecycle in every community worldwide.

ICSI is also an official partner of the Race to Resilience global campaign, launched at the Climate Adaptation Summit in January 2021. The campaign aims to help frontline communities to build resilience and adapt to the impacts of climate change.

Action for ICE

- Collaborate with ICSI to produce guidance on embedding climate resilience into all infrastructure projects, especially in relation to flooding risk, but also risks such as extreme heatwaves, droughts and storms.

Action for ICE members

- Consider climate resilience for all new projects.
- Look out for more information and CPD topics coming from ICE soon.

Conclusions

There was an incredible level of energy and commitment shown at COP26 to move things forward. Climate change is not just one country's issue – it is a global issue and we all need to help each other and share best practice and expertise for the benefit of humanity. If we continue this collaboration in our daily work we can achieve big things. As David Attenborough said at COP26: "If working apart we are a force powerful enough to destabilise our planet; surely, working together we are powerful enough to save it."

As outlined in this paper, ICE will look to:

Further embed sustainability in all aspects of civil engineering through:
- Reviewing published explanations of what civil engineering is to reflect the imperative of net zero
- Collating and reviewing carbon reduction pledges made by civil engineering companies
- Shifting its focus to look more closely at how nature-based solutions can be part of the toolkit alongside traditional hard-engineered solutions within a holistic systems-based approach
- Pushing for changes to procurement, legislation and consistent international standards to ensure that whole-life carbon management becomes a necessary element of everything we do
- Supporting innovation in climate-compatible infrastructure through the R&D Enabling Fund

Continue work through the Carbon Project, including:
- Publishing the final version of the Low Carbon Concrete Routemap and establishing a taskforce to accelerate its adoption
- Delivering the PAS 2080 update and disseminating it widely to industry stakeholders; working to make PAS 2080 an ISO standard
- Highlighting visionary leaders and examples of best practice through the Carbon Champions programme
- Guiding the shareability of data for baselines and consistent reporting, as well as tools and methodologies for benchmarking, measurement and carbon lifecycle costing

Publish advice and guidance around:
- Procurement and contracts for delivering net-zero carbon
- Existing investment tools to finance low-carbon and climate-resilient infrastructure projects
- The use of nature-based solutions within flood management
- Embedding climate resilience into all infrastructure projects, especially in relation to the risk of flooding but also including risks such as increasingly extreme heatwaves, droughts and storms

This is an exciting time to be a civil engineer as the industry evolves to solve these challenges. We will need to be on top of our game if we are to lead these changes and increase our influence. We are natural problem solvers, and the problem that now needs solving is how we mitigate and adapt to the effects of climate change – what action will you take today to move us another step in the right direction? Tell us what you think at knowledge@ice.org.uk

Roundtable attendees

Jim Hall (chair) Professor of climate and environmental risks, University of Oxford
Andy Alder Programme director, Tideway/Jacobs
Fiona Barbour Global practice leader for water resources and flooding, Mott MacDonald
Lewis Barlow Sustainable development manager, regional economic development division, Scottish Government
Jenny Cooke Programme engineering manager, Central Route, Capital Delivery, Network Rail
David Cotton Technical director, Atkins; member, SNC-Lavalin Group
Mark Enzer Executive advisor, Mott MacDonald; head of the National Digital Twin programme
Phil Holliday Bid director, Ontario Line South Civil, Tunnels and Stations, Aecon Group
Darren James Chief executive, Keltbray Group
Sabih Khisaf Infrastructure lead engineer MENA region, Hyperloop Transportation Technologies, UAE
Marissa Looby Home energy lead, Liverpool City Region Combined Authority
Ian Parke Civil engineer, EDF (retired February 2022)
Jo Parker Vice-president, engineering, Institute of Water
Manpreet Singh Partner, KPMG
Samantha Stratton-Short Head of strategic initiatives, infrastructure and project management, UN Office for Project Services (UNOPS)
Davide Stronati Director of sustainability, Nuclear Decommissioning Authority
Asil Zaidi Engineer, London Bridge Associates; ICE President's Future Leader 2021-22

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