

Presidential Roundtable Summary: Climate resilience and adaptation – what is the size of the challenge?

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Do we truly know the scale of the climate resilience and adaptation challenge when it comes to infrastructure?

This was the question posed at an ICE-hosted Presidential Roundtable with **Philip Dunne MP, Chair of the Environmental Audit Committee**.

Civil engineers are used to designing infrastructure for extremes, not averages, but the definition of 'extreme' has shifted in recent years. As the world increasingly faces unparalleled extremes of temperature, wetter winters, drier summers and higher winds resulting from climate change, is our infrastructure ready?

What has become clear is that we will need to adapt no matter what. The early consequences of climate change are already becoming apparent, and modelling shows that the impact will become more evident in the future regardless of how well we meet carbon emission reduction targets.

As a result, our infrastructure will need to be designed and operated in a way that copes better with today's extremes and is resilient to the more 'extreme extremes' of the future.

But what of existing assets? Most infrastructure that supports national resilience already exists and will do so for many years, though not all of it is built to modern engineering standards. Without retrofitting and adapting our existing assets, we risk increased repair bills, poorly performing infrastructure, and even a series of failures – with potentially devastating consequences.

Indeed, the recent UK Climate Change Risk Assessment showed that, in England alone, 1,691km of rail and 450 rail stations are currently exposed to a significant risk of surface water flooding, while 444km of rail and 44 stations are exposed to a significant risk of river flooding.

A systems approach

One way of ensuring existing infrastructure can cope is to make optimal use of data and information, using them to better understand the performance of systems and assets and predicting how they will react to climate change.

Infrastructure operates as a system of systems. The discussion homed in on the fact that infrastructure owners and operators must better understand the other networks and systems they are dependent on and interdependent with. Increasingly a failure in one sector will impact another.

For example, if the electric grid fails due to flooding, other flood defences relying on pumps may fail, trains might become stranded, and communications services could become unavailable.

There was support for individual operators developing long-term resilience strategies which take these interdependencies into account. Clear and consistent standards, alongside regular stress tests, will no doubt support this; however, the importance of resilience must be more deeply embedded in processes used by decision-makers – such as the planning system.

Other solutions discussed included back-ups to systems, improved warning capacity, better preparation for repair and recovery, and strengthening assets where possible.

Resilience cannot be relegated

It was recognised that, in a UK context, the Government's Net Zero Strategy has focused all departments on climate change and demonstrated that every arm of government has a role to play.

Some private sector players are ahead of government on developing adaptation, resilience and net zero strategies, which will then place pressure on government to deliver the policies and strategies for the wider private sector to invest.

While these cross-government mechanisms are beginning to settle into place, resilience must not be relegated behind net zero. Instead, the two must go hand in hand.

A global challenge

During the discussion, it was widely recognised that different countries face different challenges. COP27 and COP28 will be held in Egypt and UAE, respectively. Africa and the Middle East are regions facing huge overheating and drought risks, and it was pointed out that many countries in these regions require huge amounts of infrastructure investment regardless of the adaptation challenge. This presents an opportunity to ensure investments are translated into resilient infrastructure services.

One such way is the use of nature-based solutions. Policy makers are in some cases shifting their requirements away from the presumption that infrastructure solutions require building new assets. Nature-based solutions represent an area where climate adaptation and mitigation are aligned and are increasingly seen as a sound return on investment.

Resilience and adaptation need focused resource

A constant theme throughout the discussion was that, while resilience and adaptation are necessary, it is not cheap. At a time when governments globally have dedicated huge economic support packages to cope with the impact of the Covid-19 pandemic, how can they be convinced of the need for further spending?

Infrastructure investment is typically directed into projects and programmes that focus on delivery to time, cost and specification. However, decisions based on 'best value' rather than 'lowest cost' are needed when considering resilience and adaptation.

There was support for a Treasury-commissioned review on the economics of resilience so that we can gain a better understanding of the long-term value that investing in resilience can provide. ‘Best value’ may then be interpreted as the optimum cost that provides robust and flexible performance under a range of future scenarios.

Infrastructure bespoke to local conditions could also be more effective than a blanket approach. Again, this relies heavily on making the absolute best use of data in order to direct investment into the most effective solution.

Ultimately, investment needs to be focused and targeted, but proportionate – it is impossible to adapt every piece of the infrastructure system in every location.

Questions to take away

- There is a disconnect between capital and maintenance investment, making resilience more difficult than it needs to be. How can senior leaders in the public and private sectors build up investment in adaptation measures as opposed to focusing on new infrastructure?
- Where are the weak spots in our infrastructure system, and how can we address them? Where are the biggest data gaps?
- To what extent is the public prepared to pay for resilience, and what risks and volatility do they see as acceptable?