YORKSHIRE & HUMBER CLIMATE COMMISSION

Insight Paper
Climate Adaptation and Resilience: Infrastructure

Background to this paper

The Yorkshire & Humber Climate Commission was established in early 2021, tasked with supporting ambitious climate action across the region. This paper is one of a series[1] of insight papers, each focusing on a different topic and detailing recommendations to promote progress in Yorkshire and the Humber across the Commission's four key aims: rapid emissions reduction, climate adaptation and resilience, nature restoration, and a just transition.

This paper is all about **infrastructure**. It was written in 2023 and considers the most relevant and current themes, concepts and research relating to the role of infrastructure in climate adaptation and resilience for the Yorkshire and Humber region. It draws together insight from Commissioners, panel members, and Delivering Impact session speakers John Dora (Climate Sense), David Dawson (University of Leeds), Claire Thomas (Northern Powergrid) and Amanda Crossfield (Yorkshire Water).

The Commission also invited the region's citizens to critique the draft recommendations through a series of online surveys[2]. A summary of public feedback is included within this paper.

What happened next?

The survey results and updated recommendations helped to shape the 2024 Yorkshire and Humber Climate Action Plan[3], and will feed into the Commission's Accelerated Adaptive Action project[4].

What's the issue?

We often take physical infrastructure for granted. From essential services (eg water, electricity and gas) and communications networks (cellular and broadband) to transport

[1] The full series will be available at: https://yorksandhumberclimate.org.uk/insight-papers
[2] See: https://yorkshirecap.commonplace.is/
[3] Yorkshire & Humber Climate Commission (2024) Yorkshire and Humber Climate Action Plan update 2024. Available at: https://yorksandhumberclimate.org.uk/inspire/climate-action-plan/
[4] See: https://yorksandhumberclimate.org.uk/ourwork/

routes (footpaths, cycle paths, roads and railways) and the built environment (walls, buildings and bridges), infrastructure can be easily ignored until something goes wrong. And as we experience more frequent and severe impacts of climate change – including floods, drought and heatwaves – the risk of disruption increases. Our systems are simply not designed or equipped to withstand these challenges.

In Yorkshire and the Humber, we are home to major transport corridors and key services: we have one of the biggest ports in the UK (Immingham), as well as strategically important power plants such as Drax Power Station, which provides around 5% of the nation's electricity needs. What happens here could therefore have ramifications nationally.

Compound impacts are also an issue, where disruption to one part of our infrastructure triggers knock on impacts in another. Power outages can bring down telecommunications networks, hindering potentially life-saving communications. Power outages can cut supply to water pumping stations, cutting supply to swathes of customers. Signal failures from flooding on trainlines can extend to other areas, bringing trains across the network to a halt.

Infrastructure providers work to different planning and financial cycles, and are held to different standards, therefore it can be difficult to apply adaptive strategies and build resilience across different sectors. It also becomes difficult to fund the investment needed, as it's unclear who should pay for what, and there is no common standard to work towards.

What needs to happen?

The key to building flexible, robust and resilient infrastructure in the region is to take a joined-up approach. There should be:

- clear, cross-sector standards[5] that support high level policy principles (including guidance on natural hazards and infrastructure[6] and the national Resilience Framework[7])
- consistency in outlining the scenarios providers need to be prepared for
- improved systems thinking that encompasses infrastructure holistically across short and long term timescales.

There is already good work happening in the region on adaptation that we can build on, such as the Living with Water partnership improving flood resilience and water management in Hull and East Riding[8]. We also have extremely valuable knowledge from

[5] The National Infrastructure Commission emphasise the need for clear, regularly updated, transparent resilience standards in their guidance on resilient infrastructure. See: National Infrastructure Commission (2020) Anticipate, React, Recover. Available at: https://nic.org.uk/app/uploads/Anticipate-React-Recover-28-May-2020.pdf

[6] Cabinet Office (2011) Keeping the country running: natural hazards and infrastructure. Available at: https://www.gov.uk/government/publications/keeping-the-country-running-natural-hazards-and-infrastructure

[7] Cabinet Office (2023) The UK Government Resilience Framework. Available at: https://www.gov.uk/government/publications/the-uk-government-resilience-framework/the-uk-government-resilience-framework-html

[8] See: https://livingwithwater.co.uk/

first-hand experience of extreme weather events – such as flooding in Calderdale and Hull – that can be shared with other areas. Simple agreements can be made between local authorities and service providers in the region to pilot and scale up strategies that build resilience in a more joined-up manner.

The systems currently in place to support the most vulnerable people when our infrastructure fails (eg the Priority Services Register[9]) have their limitations. Vulnerability shifts as people's circumstances change, and many don't consider themselves vulnerable until they experience the loss of essential services. Strengthening the connections between different service providers, and allowing them to communicate with each other and their customers more effectively could not only streamline operations and reduce workload pressure, but also create better clarity for customers.

This communication could be improved through development of a clear, consistent language across all sectors avoiding industry-specific terminology. Such an initiative could be led by the UK Regulators Network[10], for example.

Public priorities

We asked people from Yorkshire and the Humber to share their views on transport via the engagement platform Commonplace. Engagement was low (32 individuals). Views included:

Grow communities in the right way in the right places

The strongest theme to emerge from the analysis was the need to plan new developments more effectively – avoiding building on flood plains and focusing on growing those communities where infrastructure can be provided.

"The outcomes of successful infrastructure initiatives have to work at the level of the communities in which we all live. Are there enough school places, access to health services. Are the road routes adequate and well maintained and ready to cope with increased volumes? Are pedestrian and cycle routes joined up and safe for all ages? Is flood risk well known and avoided?"

"The provision of water, drainage and power services to new developments can not be ensured without joined-up forward planning."

Maintain existing infrastructure

Existing infrastructure needs to be maintained to reduce flood risk, such as roads, rivers and coastal defences.

"By not addressing the maintenance of the coast line we risk losing upto half of the Holderness area to the sea in a very short period of time."

Climate scepticism

A number of respondents made the case that the report was unnecessary as climate change does not present a threat.

"Remove all references to "climate", "climate change", "net zero", "cycling" and all ideas for invasive coercive control over people's lives and personal freedom."

[9] See: https://www.thepsr.co.uk/
[10] See: https://ukrn.org.uk/

This is a national issue

Scepticism was expressed that there is any value in tackling this issue regionally, with respondents arguing that this is primarily an issue where national action and standards are required.

"Ensuring proper resilience of infrastructure need to be dealt with on a national basis. Some aspects can be addressed regionally but there is limited scope for this region to "go it alone"."

Why is it not happening yet?

One of the key challenges is the difference in regulatory timelines and regimes across infrastructure and service providers. If planning cycles are out of phase, collaboration and coordination become difficult. Similarly, regulation is siloed and focused on the price and service delivered to customers.

The risk here is that compound impacts of an event, that could affect multiple aspects of infrastructure simultaneously, are not considered. For example, it would be possible to plan for backup power generation (eg solar panels or wind turbines) to support water pumping stations during power outages if investment decisions for energy and water were aligned. But while this fails to happen, opportunities for joined-up adaptation measures are being missed.

Another risk is that, in the event of an emergency, the actions from one provider can put additional pressure onto another. For example, where gas supply is cut for vulnerable customers or for an extended period of time, the provider may give electric appliances to its customers for heating or cooking, which puts additional pressure on electricity providers.

Information sharing is also a barrier. Data held by a company is subject to data protection laws[11], which means it can't be easily shared.

What actions can be taken regionally to progress?

The following recommendations are aimed at decision-makers in local authorities, regional bodies and other organisations driving change across Yorkshire and the Humber. Informed by the evidence cited in this paper, they have been collaboratively developed to ensure that infrastructure and service providers across the region are better prepared for the impacts of extreme weather.

Governance

- Agree the scenarios that will be planned for across all aspects of infrastructure in the region (with agreement from regulators) and create a framework with enough longevity that each provider, regardless of their investment cycles, can contribute to the same aims.

[11] See: https://www.gov.uk/data-protection

- Prompt the UK Regulators Network to facilitate better information sharing, partnership working and collaboration across infrastructure providers, and find ways to align timelines and information.
- Challenge existing regulation restrictions to allow more flexibility for service providers to be reactive to opportunities or align with other providers.
- Create a regional pot of resilience funding through a local levy programme.

Spatial planning

- Develop a spatial understanding of which places/communities need to be prioritised for adaptation actions and investments, by addressing risk, vulnerabilities and inequity.
- Make sure planning looks at the source of the problem (eg where water comes from), not just where it ends up (eg where flooding occurs), to develop a picture that is useful for all providers.
- Map the existing response strategies taken by organisations, looking at what is feasible and what the unintended consequences of each intervention might be.

Data management

- Increase coordinated use of the Resilience Direct[12] central data platform to bring together key information from all infrastructure providers, tracing impacts back to their source to see where adaptation will be most effective in building joined-up resilience.

What role could the Commission play in enabling these actions?

The following recommendations are specific to the Yorkshire & Humber Climate Commission. Bringing together representatives from the public sector, the private sector and the third sector, the Commission is uniquely placed to support organisations looking to adopt the actions identified above.

- Facilitate an analysis of the big, systemic roadblocks in infrastructure adaptation and how the region can overcome them, identifying simple agreements for the region to put into place across infrastructure providers.
- Link in the above action with the Regional Policy Forum's regional planning principles work[13] and the emerging thinking around the strategic land use framework[14].
- Convene regulators at an in-person conference to address the issues head on and outline where collaborative and coordinated efforts can lead to improved resilience across infrastructure.
- Facilitate a scenario workshop 'if Yorkshire and the Humber was a country' to develop a solution-focused vision for the future to facilitate resilience planning.

[12] See: https://www.resilience.gov.uk/
[13] See: https://yorksandhumberclimate.org.uk/regional-planning-policy-principles/
[14] See: https://yorksandhumberclimate.org.uk/ourwork/

Recommendations from this series of insight papers will be prioritised by the Commission, as reflected in the updated Climate Action Plan[15], future policy briefings and the Commission's ongoing work programme[16].

Links with other insight papers from this series

There are 20 insight papers in this series from the Yorkshire & Humber Climate Commission[17].

Whilst each one focuses on a specific topic, there are many cross-cutting themes and interrelated issues, not least the overarching goals of this work: to achieve net zero emissions, climate resilience, nature's recovery and social equity across Yorkshire and the Humber.

Most closely related to this topic are:

- All about water: floods, drought, quality and supply
- Emergency preparedness and response
- Energy supply and distribution
- How can nature help us?
- Transport
- New build homes and places.

[15] Yorkshire & Humber Climate Commission (2024) Yorkshire and Humber Climate Action Plan update 2024. Available at: https://yorksandhumberclimate.org.uk/inspire/climate-action-plan/
[16] See https://yorksandhumberclimate.org.uk/ourwork/
[17] See https://yorksandhumberclimate.org.uk/insight-papers