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1 November 2025

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Keywords

Infrastructure, climate change, investment.

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Climate Change and Infrastructure: Investment Implications for the Next 20 Years

Prepared by Anisha Bilala for Infrastructure Working Group, Institute and Faculty of Actuaries (UK)

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Abstract

Infrastructure assets are indispensable to economic and social systems, but their long life spans and capital intensity make them acutely exposed to climate change. Over the next two decades, physical risks (flooding, heat stress, drought, storms) and transition risks (regulation, disclosure, stranded assets) will reshape infrastructure investment dynamics. Crucially, large institutional investors—such as pension funds—are uniquely positioned to mitigate these risks not only through capital allocation but via active governance and board engagement. This paper reviews climate risks facing infrastructure, explores resilience as an investment opportunity, and argues for investor-driven climate governance (e.g. board representation) as a necessary mechanism to align infrastructure firms with long-term climate stability.

1. Introduction

Infrastructure assets (transport, energy, water, digital networks, social infrastructure) underpin modern economies. For institutional investors—especially those with long horizons such as pension funds and insurers—infrastructure offers stable, inflation-linked cash flows and low correlation with equities. Yet these same features make infrastructure particularly vulnerable to climate change: it is hard to exit, highly capital-intensive to adapt, and often regulated.

Over the coming 20–25 years, climate change will intensify both physical and transition risks. While many asset owners have begun to consider climate in portfolio construction, a deeper frontier remains: influencing the governance of infrastructure firms to ensure they embed climate resilience in strategy, capital expenditure, and operations. This paper (i) reviews the risk landscape, (ii) examines resilience as an investment frontier, (iii) makes the case for governance and board engagement by investors, and (iv) proposes recommendations for implementation.

2. Climate Risk Landscape for Infrastructure

2.1 Physical Risks

- Flooding & coastal risk: The UK's Committee on Climate Change (CCC) finds that flooding remains the most significant hazard for infrastructure, with major interdependencies across sectors.
  Core transport, utilities, and social infrastructure are at rising flood risk. Up to 50% of UK rail and road networks may be exposed by 2050. For investors, this means higher O&M costs, service interruption penalties, and insurance restrictions.
- Heat stress & over-temperature: Warming summer extremes pose threats to rail buckling, transformer performance, and overheating in buildings. The UK Green Building Council notes that ~55% of homes in England already overheat in moderate summers.
- Drought & water scarcity: Drier summers create stress on water supply networks and subsurface infrastructure; soil shrinkage can undermine foundations and embankments.
- Storms & extreme events: Intense rainfall, and windstorms, that cause flooding, landslips and other surge events, which accelerate wear, result in damage, and require major adaptation or frequent repair.
- Cascading interdependencies: Failures in one infrastructure network (e.g. power) can propagate through transport, communications, health, impeding resilience.

The UK's adaptation reporting framework (ARP) provides a lens into how critical infrastructure providers assess exposure, adaptation plans, and progress.

2.2 Transition & Policy Risks

- Carbon regulation & stranded assets: Infrastructure with high emissions intensity or heavy energy demand may face obsolescence or mandated retrofits.
- Disclosure & reporting requirements: Climate disclosure frameworks (TCFD, ISSB) are increasingly expected in regulated sectors, raising demands on infrastructure operators.
- Market sentiment & capital flows: Investors and capital providers are tilting toward climate-resilient, low-carbon assets; "brown" infrastructure may face capital constraints.

3. Investment Implications & Resilience as Strategy

3.1 Impacts across the Investment Lifecycle

Stage	Climate Impacts / Challenges
Due diligence / underwriting	Necessity of scenario testing, physical risk modelling, inclusion of adaptation costs in valuations. Climate-adjusted asset valuations and scenario analysis becoming essential. Traditional models often underestimate long-term tail risk
Capital expenditure decisions	Need to embed adaptive design, modularity, redundancy, and nature-based solutions
Asset management	Higher OPEX due to adaptation, insurance costs, regulatory compliance. Need for active engagement with operators and local authorities.
Exit & valuation	Risk of repricing or discount for assets lacking resilience credentials or governance backing. Illiquid assets face repricing due to physical vulnerability or poor ESG credentials. Risk of stranded value for legacy infrastructure.

3.2 Resilience to create Increased Value

Rather than viewing climate risk solely as downside, leading investors are beginning to integrate resilience as a source of long-term value creation:

- Proactive asset strengthening: Investing in physical resilience (e.g. flood defences, reflective materials, passive cooling) can enhance operational stability and reduce insurance risk.
- Green premiums: Assets aligned with resilience standards (e.g. BREEAM, CEEQUAL, GRESB) increasingly command pricing advantages and wider buyer pools.
- Nature-based solutions: Urban developments incorporating biodiversity and water-sensitive design are seeing increased institutional interest and policy support.
- Net-zero alignment: Integration of adaptation + decarbonisation strategies supports both risk mitigation and access to green capital (e.g. sustainability-linked loans).

4. Governance & Stewardship: The Case for Board Engagement

4.1 Why Governance Matters for Climate Risk

Governance is the mechanism by which strategic decisions—investment, maintenance, adaptation priorities—are shaped. The board plays a pivotal role in risk oversight, capital allocation, management accountability, and long-term strategy.

Recent empirical work shows that board attributes (independence, diversity, size) correlate with stronger climate strategy adoption, indicating that internal governance traits shape outcomes.

Investor-driven climate governance (ICG) is an emerging approach where institutional investors actively steer corporate climate strategies via stewardship, board engagement, and coalition actions.

4.2 Mechanisms for Investor Influence

Large investors in infrastructure can seek influence through:

- Board seats / observer roles / board committee membership (especially on risk, sustainability or audit committees).
- Nomination of directors with climate expertise, ensuring the board has capacity to oversee climate strategy.
- Linking executive compensation to the mitigation of climate outcomes (resilience metrics, carbon reduction, adaptation delivery).
- Engagement protocols and escalation strategies, guided by frameworks like the 2024 Ceres Guidance on investor–board climate engagement.

Such governance engagement is especially salient in infrastructure, given the longevity, limited exit options, and systemic exposure of assets.

5. Policy & Regulatory Landscape: Evolving but Incomplete

- The UK's Third National Adaptation Programme (NAP3) has been criticised for insufficient investment and lack of enforceable adaptation targets.
- Regulators are tightening expectations: FCA, TPR, and PRA are aligning with global frameworks (TCFD, ISSB, NGFS) to enforce forward-looking climate risk governance.
- Data Gaps Persist: Investors still struggle with high-quality, asset-level climate risk data—especially for private infrastructure deals and older assets.

6. Recommendations & Pathways Forward

- Embed climate scenario analysis into all infrastructure due diligence
    - Use 2 °C, 3 °C, and 4 °C pathways; stress-test cash flows under varying adaptation cost regimes.
    - Discount cash flows under each scenario, taking account of the costs of climate-change impacts and making allowance for the costs of remedial and risk-mitigation actions.
- Prioritise climate-resilient assets
    - Allocate capital to assets with built-in adaptation, modularity, redundancy, or nature-based features.
    - Use due diligence to reward assets with futureproofed design and resilience strategies.
    - Target regions with proactive local adaptation policies (e.g. London, Rotterdam, Copenhagen).
- Negotiate governance rights in deal structuring
    - In equity, co-investment, or public-private partnership (PPP) contracts, include terms granting board access or climate oversight roles.
- Advocate transparency and standardisation
    - Push for adoption of common frameworks (e.g. CRREM, ISO 14091, GRESB resilience modules) for comparability.
    - Engage managers and developers to report on physical risk exposure,adaptation actions, and alignment with climate pathways.
- Engage collaboratively and escalate
    - Where direct influence is limited, participate via investor coalitions; escalate via voting, public engagement, or investment reallocation.
- Monitor and adapt governance strategies over time
    - Recognise that as climate science evolves, governance and adaptation strategies must also evolve — maintain flexibility in mandates.

7. Conclusion

Climate change is no longer an external risk — it is a pervasive structural force. Infrastructure investors must navigate a transformed landscape of physical losses, regulatory shifts, and market demand for resilience. Yet these challenges present a unique role and opportunity for long-horizon investors: to shape not only which assets are funded, but how those assets are governed. Board-level influence and stewardship offer a mechanism to align infrastructure firms with climate-resilient strategies, preserve value, and fulfill fiduciary responsibility.

By combining risk-aware investment practices with active governance, institutional investors can lead the transition toward a more resilient infrastructure future.

8. Suggested further reading

- Committee on Climate Change, Understanding climate risks to UK infrastructure: Evaluation of the third round of the Adaptation Reporting Power (PDF).
- Paine & Srinivasan, “Boards Can Continue to Lead the Way on Climate Governance,” Harvard Business Review, 2025
- Progress in adapting to climate change: 2025 report to Parliament (UK)
- Decarbonisation strategies and climate governance: Are institutional investors effective? (ScienceDirect)
- Infrastructure and climate change, UK Parliament POST briefing

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