Engineering Climate Adaptation: A Cross-Sector Approach to Scaling Up Adaptation Finance

March 2025











ABOUT ICSI

The International Coalition for Sustainable Infrastructure (ICSI) was founded in 2019 by Resilience Rising, the American Society of Civil Engineers (ASCE) and its ASCE Foundation, the Institution of Civil Engineers (ICE), the Global Covenant of Mayors for Climate & Energy (GCoM), WSP and LA Metro, among others. We bring together a global coalition of change agents from across the engineering, investment, city, and philanthropic communities committed to bold action to solve the systemic problems that exist at the intersection of climate change, ecosystem degradation, ageing infrastructure, and underinvestment. ICSI is the global movement for engineering action on infrastructure sustainability, resilience, and climate change. We place engineers at the forefront of climate action, harnessing their ability to provide solutions and matching it with urgent demand. The solutions we develop and promote will deliver impact on the ground, where it is needed most. ICSI was created to bring the practical, science-based, and solution-oriented perspective for which engineers are known to solve the systems-level problems surrounding infrastructure underinvestment, climate change, and resilience.

From its origin, ICSI has been committed to driving action towards instilling sustainability and resilience as the cornerstone of every decision in the infrastructure lifecycle. Built upon a commitment to tangible and collaborative action, ICSI continues to broaden participation across other stakeholder communities to accelerate the innovation, adoption and scaling of people-centred, sustainable, and resilient infrastructure solutions that support sustainable development for all.



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EXECUTIVE Summary

As climate change accelerates, there is an urgent need to unlock financing for sustainable, equitable, and resilient infrastructure globally. To address this challenge, the International Coalition for Sustainable Infrastructure (ICSI), Global Covenant of Mayors for Climate and Energy (GCoM), and the Institution of Civil Engineers (ICE) convened a series of multi-stakeholder roundtables in 2024, bringing together over 100 stakeholders from more than 60 organisations across five continents. These dialogues focused on scaling up adaptation finance for infrastructure, with an emphasis on bridging gaps between engineers, policymakers, insurers, investors, and multilateral development banks (MDBs).

The roundtables highlighted critical barriers hindering adaptation finance, including misaligned priorities, communication breakdowns, and siloed working practices across sectors. Engineers often focus on technical precision, while policymakers prioritise societal outcomes and investors seek clear financial returns. These differing approaches frequently result in missed opportunities for collaboration, particularly in integrating climate risk into investment decisions and policy frameworks.

This report synthesises and analyses key themes emerging from the discussions including the need to break down professional silos, align risk assessment methodologies, and foster greater collaboration between technical, financial, and policy communities. Standardised approaches to climate risk data collection, analysis, and communication are essential to creating a common language across sectors, enabling better project development and de-risking investments to attract capital at scale.

Engineers and other built environment professionals have a vital role to play in advancing adaptation finance, not only by delivering technical solutions but also by translating complex risk assessments into actionable insights for policymakers and investors. To do so, they must embrace new collaborative approaches, advocate for consistent technical standards, and develop cross-sectoral skills that enhance their ability to work effectively with financial and policy partners.

Support the development and validation of Standardised Risk Assessment Frameworks integrating engineering, insurance, and investment criteria

Engineers can take a leading role in aligning risk assessment approaches across sectors, ensuring engineering methodologies incorporate insurance risk pricing and investor evaluation criteria. This creates a common foundation for assessing climate risks and adaptation measures. Engineers should also actively contribute to developing robust systems for climate risk data collection and sharing, including participating in pilot programmes for standardised data-sharing platforms.

Improve Technical-to-Policy Communication by translating engineering insights into policy-friendly formats

Engineers should develop clear documentation templates and guidelines that translate technical specifications into policy-relevant recommendations. This includes framing engineering insights in terms of societal benefits, financial returns, and clear policy outcomes, supported by practical examples and case studies from successful adaptation projects. A 'Technicalto-Policy Playbook' can help provide structured approaches for communicating complex technical concepts to non-technical decision-makers.

Foster Cross-Sector Knowledge Exchange through mentorship, working groups, and formal collaboration platforms

Engineers should participate in regular cross-sector forums that bring together engineers, policymakers, investors, and insurers to jointly address adaptation challenges and solutions. Establishing formal mentorship programmes between senior engineers and policy or investment professionals can also foster ongoing knowledge exchange and mutual understanding.

Support Interdisciplinary Training to equip engineers with financial and policy skills needed for climate adaptation projects

Engineers should have access to professional development programmes that provide training in financial modelling, investment evaluation, and policy development. Building these skills will enhance engineers' ability to work effectively across sectors and contribute to integrated climate adaptation strategies.

Advocate strongly for the development and uptake of technical standards for climate resilience and adaptation across the lifecycle and accelerate workforce upskilling

Engineers should work with insurers, investors, and policymakers to promote the adoption of standardised technical standards for climate resilience and adaptation, ensuring these standards are embedded in project planning, procurement, and investment decisions. At the same time, they should support training and upskilling initiatives to ensure the engineering workforce is equipped to meet the technical challenges of climate resilience and adaptation.

By adopting these strategies, engineers can become essential catalysts for driving climate adaptation finance, ensuring infrastructure investments are both resilient and equitable in the face of accelerating climate risks.

A WORD FROM THE CO-SPONSORS:

We know that the infrastructure and critical systems integral to people's daily lives around the world will be challenged by adverse weather events, and the long-term impacts of changing climatic conditions, like rising temperatures or the loss of biodiversity.

Mott MacDonald's success in shaping outstanding outcomes for our clients and the communities they're part of is increasingly interwoven with the delivery of well-adapted sustainable infrastructure.

The scale of the climate challenge means that our entire industry must be able to find and implement those solutions, too. To solve those challenges, we need to work collaboratively, in partnership with our clients and their stakeholders.

Our work with ICSI and the findings of this report are an important step forward, providing a multi-sectoral view on how we ensure that our entire professional ecosystem plays its part. This important new report will help in both scaling up adaptation finance to meet our climate challenge and delivering well-adapted projects that ensure we can continue to realise the best outcomes. We look forward to seeing the positive impact that can be achieved throughout our sector.

MARK CROUCH

Technical Director – Decarbonisation, Mott MacDonald

Co-chair of the ICSI Funding and Financing Action Track

A WORD FROM THE CO-SPONSORS:

Infrastructure is at the heart of society. It enables economies to thrive and provides the foundation for daily life—powering cities, facilitating trade, and ensuring access to essential services. When infrastructure fails, the impacts ripple far beyond physical damage - economic productivity stalls, supply chains break down, and communities face greater risks to their safety and well-being.

Yet, climate change is putting unprecedented pressure on these critical systems. Extreme weather events, rising temperatures, and shifting climate patterns are exposing weaknesses in infrastructure worldwide. The economic cost of inaction is severe - up to 34% of global cumulative GDP is at risk until 2100, if we allow the global average temperature to rise to 3°C.

Adaptation action is lagging significantly behind despite the growing risks posed by climate change. Current adaptation finance flows account for less than 8% of the estimated annual needs. To accelerate financing and implement solutions at scale locally, we need to work in collaboration. Engineers, policymakers, investors, and insurers must work together to integrate adaptation along the full infrastructure lifecycle - planning, financing, and regulation. Without collaboration, efforts remain fragmented, and investment falls short. By aligning priorities and breaking down silos, we can accelerate funding and ensure infrastructure is built to withstand future challenges.

In a time of economic uncertainty, investing in resilience is not just about protecting infrastructure - it's a strategic necessity to shield economies and communities from escalating climate risks, enabling societies to reach their broader objectives from health to security. This report highlights key steps needed to scale adaptation finance and integrate resilience into infrastructure development. We hope the recommendations outlined in this document will provide a foundation for long lasting change across sectors.

ANNIKA ZAWADZKI

Managing Director & Partner,

BCG

INTRODUCTION

As climate change accelerates at an unprecedented pace, there is an urgent need to unlock funding for equitable, sustainable and resilient infrastructure across the globe. Projects that deliver positive outcomes for people and the planet must be prioritised to address our most pressing climate challenges.

In 2024, The International Coalition for Sustainable Infrastructure (ICSI), the Global Covenant of Mayors for Climate and Energy (GCoM), and the Institution of Civil Engineers (ICE) convened a series of multistakeholder roundtables focused on scaling up adaptation finance in infrastructure. These dialogues aimed to bridge the critical gap between the engineering community and key decision-makers in adaptation financing.

Climate leaders from diverse sectors and geographies came together to share best practices, challenges, and opportunities, fostering a cross-sectoral and cross-disciplinary dialogue that facilitates knowledge-sharing and capacity-building toward effective adaptation finance.

This report provides a synthesis and analysis of the key themes that have emerged from the roundtable discussions. These themes are crucial to scaling up adaptation financing for infrastructure and illustrate the challenges and opportunities for key stakeholder groups engaged in this process. While each group plays a vital role in the adaptation project cycle, misaligned priorities, communication barriers, and sectoral silos often hinder effective collaboration.

Understanding these key themes provides a foundation for more effective, scalable, and impactful action. The report also delivers a set of recommendations to mobilise key stakeholders to accelerate adaptation financing.

SCALE OF ENGAGEMENT

multi-stakeholder dialogues

100+ stakeholders representing over

60 organisations involved in infrastructure development across five continents

Key stakeholder groups:



KEY THEMES AND FINDINGS

Breaking Silos: Finding Common Ground

Engineers, insurers, investors, policymakers, and MDBs share a common interest in climate risk management, yet operate with different priorities and approaches that can hinder effective collaboration on climate adaptation:

- Engineers focus on technical precision and detailed risk assessments.
- Policymakers seek practical solutions that deliver clear societal benefits in a manner visible within a tangible timeframe.
- Both engineers and insurers possess deep understanding of risk and work from the ground up, but their insights often struggle to influence high-level decision-making.

These disconnects create several challenges:

LANGUAGE BARRIERS

Engineers and policymakers often speak different languages - one technical, the other focused on social and economic outcomes. This communication gap prevents valuable technical expertise from being effectively translated into policy action.

MISSED PARTNERSHIPS

While engineers and investors could form natural alliances in developing resilient infrastructure, they frequently work in isolation. Engineers may not fully grasp investors' need for clear financial returns, while investors might undervalue the technical rigour that engineers bring to risk assessment.

UNDERUTILISED EXPERTISE

Despite their sophisticated understanding of risk management, both engineers and insurers frequently find themselves on the periphery of major policy and investment decisions about climate adaptation. Their expertise in quantifying and managing climate risks is not consistently leveraged in policy development.

STRUCTURAL DISCONNECTS

Although both fundamental to infrastructure development, engineers and MDBs rarely work together directly to catalyse change at scale. While engineers emphasise detailed technical solutions, MDBs require scalable, policy-aligned outcomes to secure financing and stakeholder support.

Breaking down these professional silos requires creating structured opportunities for collaboration and knowledge exchange. When engineers, insurers, policymakers, MDBs, and investors work together effectively, they can develop integrated solutions that are technically sound, financially viable, and deliver meaningful societal benefits. Success depends on each group understanding and respecting the others' expertise while working toward shared goals in climate resilience.

De-risking Investments: Unlocking Capital at Scale

Scaling up investment in climate adaptation requires innovative approaches to managing and sharing risks across the global financial system. While the challenges are significant, combining insurance expertise with new financial instruments and technology creates opportunities to overcome traditional barriers to investment, and provide the policy certainty and incentives needed to bring together public and private stakeholders.

The foundation lies in better risk assessment and sharing of:

INSURANCE MECHANISMS

distributing them across the global financial system. When insurers price these risks effectively, they create incentives for resilient infrastructure while protecting against catastrophic losses. This risksharing function is especially crucial for developing countries, where single events can otherwise overwhelm local financial capacity.

TECHNOLOGICAL TRANSFORMATION

Technology is revolutionising how we understand and manage risks. Advanced scenario planning tools allow stakeholders to anticipate and address vulnerabilities before they materialise. This proactive approach not only improves infrastructure resilience but also makes investments more attractive by reducing uncertainties that typically deter private capital.

FINANCIAL INNOVATION

New pathways for investment are emerging and the financial sector is increasingly incorporating climate risk into investment strategies due to regulations like the Task Force on Climate-related Financial Disclosures¹. Resilience bonds, catastrophe-based community insurance, and similar instruments help bridge the gap between adaptation needs and available capital by providing clear returns tied to risk reduction. When combined with robust data integration and standardised risk assessment, these tools make adaptation projects more bankable and easier to scale.

Success requires close collaboration between insurers, investors, and project developers to create financing structures that effectively distribute risks and rewards. By embedding climate risk considerations early in project development and procurement processes, stakeholders can create more attractive investment opportunities while ensuring long-term resilience.

Standards and Data: Creating a Common Language

Creating a common language for climate adaptation requires aligning frameworks, standards, and data across engineering, finance, and policy sectors. Currently, different sectors use varying approaches to assess and communicate climate risks, creating barriers to effective collaboration and decisionmaking.

In the infrastructure space, efforts are underway to develop a global standard for evaluating sustainability and resilience. As momentum builds toward standardised approaches, emphasis is being placed on adaptation and resilience (A&R) alongside ESG factors. For example, FAST-Infra¹ and Blue Dot Network² are systems designed to evaluate the sustainability and resilience performances of infrastructure projects globally. Additionally, strong interest in resilience-related certifications, such as the Climate-Resilient Infrastructure Officer (CRIO) Certification³, also exists. Yet, the roundtable discussions highlighted that there is still a long way to go in aligning standards and data in a crosssector development space.

Standardisation needs to happen at three key levels:

FRAMEWORKS AND TAXONOMIES

These must be harmonised across sectors. While certifications like Envision⁴ and the IS Rating Scheme⁵ provide valuable standards for designing and delivering sustainable infrastructure, their effectiveness increases when embedded within funding and procurement processes. This integration creates practical incentives for adoption while ensuring consistent evaluation of adaptation measures.

DATA COLLECTION AND SHARING

This must become more systematic. Standardised climate risk assessments can create a shared foundation for decision-making. When engineers, investors, and policymakers work from the same data baseline, they can more effectively evaluate options and track progress. This alignment accelerates project development and improves outcomes by ensuring all stakeholders have a shared understanding of risks and opportunities.

INFORMATION FLOW

Data must flow smoothly between technical and non-technical stakeholders. Technical data needs to be translated into clear insights that policymakers and other decision-makers can readily use. This means moving beyond raw data to provide context and implications that inform practical choices about adaptation investments and policies.

Success requires a sustained commitment to developing and adopting shared standards. While initial coordination takes time and resources, the resulting clarity and efficiency in decision-making create lasting benefits for climate adaptation efforts.

(1) FAST-Infra (2) Blue Dot Network (3) Climate-Resilient Infrastructure Officer (CRIO) Certification (4) Envision (5) IS Rating Scheme

Knowledge Exchange: Sharing Cross-sector Expertise

Building stronger bridges between engineering, insurance, policy, and finance sectors is essential for advancing climate adaptation. While each field brings unique strengths to addressing climate risks, their full potential can only be realised through intentional collaboration and knowledge exchange.

This integration needs to happen at multiple levels:

TECHNICAL INTEGRATION

Collaboration between engineers and insurers can create more robust approaches to risk assessment and management. Engineers bring detailed understanding of infrastructure vulnerabilities and technical solutions, while insurers contribute expertise in risk pricing and transfer mechanisms. When these perspectives are combined, they produce more comprehensive and actionable risk assessments.

POLICY ENGAGEMENT

Translating technical and financial expertise into clear recommendations that resonate with policymakers' needs is critical. This means moving beyond purely technical arguments to demonstrate how engineering and insurance solutions deliver tangible societal benefits and value for money. Regular dialogue between technical experts and policymakers helps ensure that policies are both technically sound and practically implementable.

FINANCIAL INNOVATION

When investors and insurers work together to develop new mechanisms for funding adaptation, breakthrough solutions emerge. Their combined expertise in risk assessment and financial structuring can create investment vehicles that both protect against climate risks and generate acceptable returns.

PRIVATE SECTOR MOBILISATION

Collaboration with the private sector is essential for mobilising the scale of funding required. However, adaptation efforts often require significant upfront investment, which can deter private sector involvement. The financial benefits of resilient measures can also be difficult to quantify, increasing uncertainty.

The goal is not just better coordination, but true integration of expertise that leads to more effective climate adaptation solutions.

Translating Expertise: Finding Common Language for Action

Effective communication across sectors is critical for advancing climate adaptation, yet technical experts often struggle to convey their insights in ways that resonate with policymakers and investors. Currently, there is insufficient demand for government adaptation projects due to awareness gaps, and engineers have a crucial role in educating and advocating for more sustainable infrastructure policy. Success requires moving beyond technical precision to create compelling narratives about risk and resilience.

The key is connecting technical expertise to realworld priorities:

ACTIONABLE TRANSLATION

Technical insights must be translated into clear, actionable recommendations. While engineers and insurers excel at detailed risk analysis, they need to present their findings in terms of concrete benefits and outcomes that matter to decision-makers. This means focusing less on technical specifications and more on how solutions address pressing social and economic challenges

SHARED UNDERSTANDING

Building shared understanding requires sustained dialogue between sectors. When technical experts invest time in understanding policymakers' constraints and priorities, they can better align their recommendations with practical realities. Similarly, when policymakers grasp the core technical principles behind proposed solutions, they become more effective champions for evidence-based approaches.

COMPELLING STORYTELLING

Mathematical models alone rarely drive major funding decisions. Technical experts need to combine rigorous analysis with clear illustrations of how proactive investments reduce risks and deliver benefits. Real-world examples and case studies often prove more persuasive than abstract projections.

Success depends on building lasting partnerships that bridge the technicalpolicy divide. Regular interaction helps technical experts understand the political and practical constraints that shape policy decisions, while giving policymakers deeper appreciation for the technical foundations of effective solutions. This mutual understanding leads to better decisions and more successful implementation of adaptation measures.

HOW CAN ENGINEERS MAKE A DIFFERENCE? RECOMMENDATIONS AND NEXT STEPS

The enthusiastic engagement in our roundtables demonstrated a powerful commitment to collaboration, with participants acknowledging that surmounting barriers to adaptation finance necessitates the integration of cross-sectoral expertise. Addressing these disconnects requires a cohesive approach - one that promotes cross-sector partnerships, enhances risk communication, and aligns financial incentives with technical and policy objectives.

Our findings indicate that advancing adaptation finance depends on integrated strategies that transcend traditional sectoral boundaries and combine technical solutions with financial innovation. Progress hinges on sustained dedication to collaboration, clear communication, and consistent standardisation throughout the adaptation finance ecosystem.

For engineers to become change agents for climate adaptation alongside insurers, investors, and policymakers, we propose the following actions that address five key areas of focus emerging from our analysis.

Develop Standardised Risk Assessment Frameworks

Support the development and validation of Standardised Risk Assessment Frameworks integrating engineering, insurance, and investment criteria.

Engineers can take a leading role in aligning risk assessment approaches across sectors. While engineers excel at detailed technical analysis, their methodologies would benefit from alignment with insurers' risk pricing mechanisms and investors' evaluation criteria. This integration creates a common foundation for assessing climate risks and adaptation measures. Progress involves moving beyond purely engineering-focused assessments to incorporate financial and policy considerations systematically.

Additionally, engineers play a vital role in developing robust systems for climate risk data collection and sharing. Their participation in pilot programmes for standardised data sharing creates the foundation for better decision-making across sectors. Tools like PCRAM¹ demonstrate how engineers can contribute to creating shared data standards that serve multiple stakeholders. This systematic approach to data management accelerates project development while improving outcomes.

KEY ACTIONS:

- Support development and validation of integrated risk assessment methodologies that combine engineering analysis with insurance risk pricing
- Create standardised templates for infrastructure vulnerability assessments that satisfy both technical requirements and investor evaluation criteria
- Develop common data standards and protocols for adaptation project assessment, with input from engineering, insurance, and investment stakeholders

WHO:





INSURERS

(1) Physical Climate Risk Assessment Methodology (PCRAM)

Improve Technical-to-Policy Communication

Improve Technical-to-Policy Communication by translating engineering insights into policy-friendly formats.

Effective communication of engineering expertise benefits from structured approaches to knowledge translation. Engineers can present their technical insights in terms of concrete benefits and outcomes that resonate with decision-makers. This involves developing clear documentation templates and guidelines that bridge the gap between technical specifications and policy requirements. When engineers frame their recommendations in terms of societal benefits and financial returns, they become more effective partners in adaptation planning.

KEY ACTIONS:

- Establish documentation guidelines that translate technical specifications into clear policy recommendations and societal benefits, with practical examples from successful adaptation projects
- Develop a 'Technical-to-Policy Playbook' in partnership with leading policy institutions, providing engineers with structured approaches for communicating complex technical concepts to decision-makers

WHO:

Foster Cross-Sector Knowledge Exchange

Foster Cross-Sector Knowledge Exchange through mentorship, working groups and formal collaboration platforms.

Regular dialogue between engineers and other sectors benefits from formal structures for collaboration. Engineers can participate in established forums while helping create new platforms for knowledge sharing. This includes structured mentorship or training programmes pairing technical experts with policy professionals and regular cross-sector working groups, such as the Science for Policy Training Programme developed by the European Commission. These exchanges help engineers understand the constraints and priorities of other stakeholders while ensuring their technical expertise informs key decisions.

KEY ACTIONS:

- Convene cross-sector forums bringing together engineers, insurers, and policymakers to discuss specific adaptation challenges and solutions
- Create a formal mentorship programme pairing senior engineers with policy professionals and investors for periodic knowledge exchange cycles.



(1) Science for Policy Training Programme

Support Interdisciplinary Training

Support Interdisciplinary Training to equip engineers with financial and policy skills needed for climate adaptation projects.

Systematic changes in how professionals are trained and how organisations collaborate are needed. Building stronger cross-sector collaboration involves developing new capabilities within the engineering profession. Engineers benefit from training programmes that combine technical expertise with financial and policy perspectives. This includes both formal education programmes and practical experience working across traditional boundaries. When engineers develop these broader capabilities early in their careers, they become more effective partners in advancing climate adaptation.

KEY ACTIONS:

- Design and launch a professional development programme that trains engineers in financial modelling and policy development
- Develop case studies and evidence base demonstrating the value of cross-sectoral approaches
- Align on clear definitions of success and metrics for adaptation to streamline efforts and ensure greater collaboration across institutions.

WHO:



POLICYMAKERS



INVESTORS



Advocate for Technical Standards for Climate Resilience and Adaptation

Advocate strongly for the development and uptake of technical standards for climate resilience and adaptation across the lifecycle and accelerate workforce upskilling.

Engineering faces a critical bottleneck in climate adaptation: outdated technical standards and insufficient workforce capacity. Current building codes fail to address complex climate threats, requiring a comprehensive overhaul embedding resilience throughout project lifecycles. Urgent workforce upskilling is essential to implement technical standards effectively. A diverse engineering workforce ensures solutions address all communities' needs, particularly those most vulnerable to climate impacts.

KEY ACTIONS:

- Establish a cross-sectoral platform connecting engineers, policymakers, and MDBs to collaboratively develop and implement harmonised climate-resilient standards across countries and regions.
- Curate and promote workforce development initiatives that equip a diverse engineering talent pool.

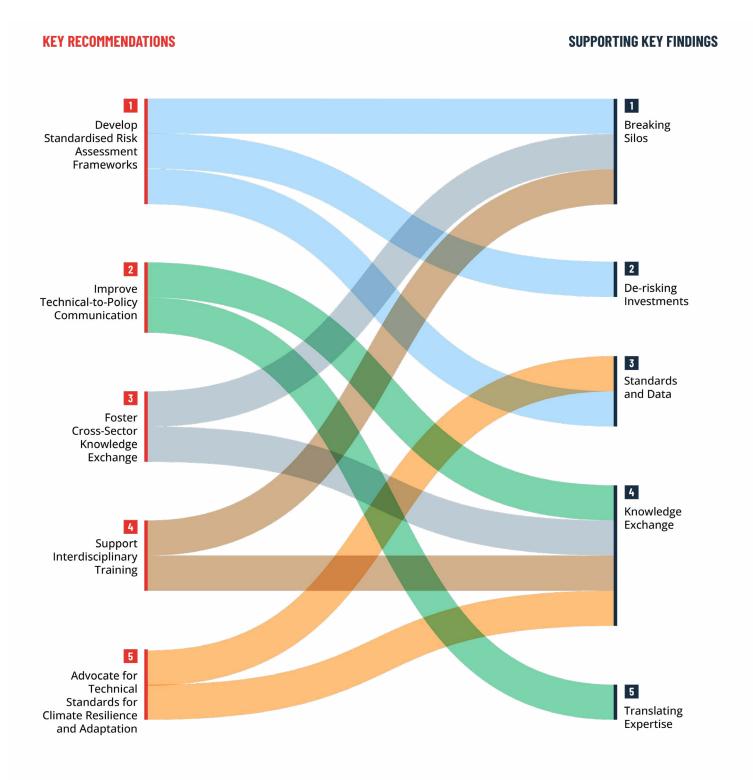
WHO:



POLICYMAKERS



Relationships Between Key Recommendations and Key Findings



CONCLUSION

The successful implementation of these recommendations depends on several critical factors: dedicated funding for cross-sectoral collaborative initiatives, executive-level commitment from key organisations, regular monitoring and evaluation frameworks, flexibility to adapt approaches based on real-world experiences, and active participation from all stakeholder groups.

The urgency of the climate crisis requires immediate action - but adaptation need not be costly, complex, or daunting.¹ Instead of waiting for the perfect solution, key stakeholders must act now to implement practical and effective measures with the knowledge, resources and tools available to them.

By embracing these recommendations, engineers can position themselves as essential catalysts in advancing climate adaptation finance. Their technical expertise, when deployed across sectoral boundaries, enables the integrated solutions our changing climate requires - elevating the engineering profession's contribution while ensuring technical considerations remain central to adaptation finance decisions.

(1) Adaptation Finance: A Primer for Practitioners February 2025 Essential components of climate adaptation finance



www.sustainability-coalition.org