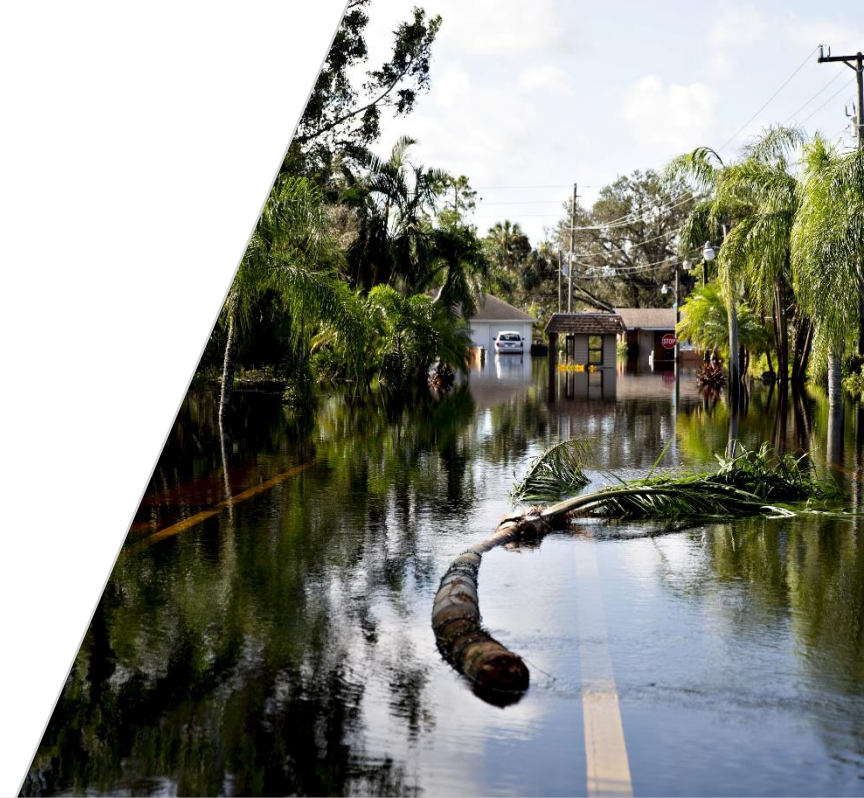


Ranking Resilience: Assessing Country Climate Adaptation

Adaptation framework and country preparedness
scorecard

October 13, 2025



BloombergNEF

Executive Summary

The physical impacts of climate change are already a significant financial risk that costs the global economy at least \$1.4 trillion per year. A country's preparedness for these impacts can materially influence the probability of loss for the assets, companies and societies located in it. To assess this, BloombergNEF has developed a framework and country scorecard that examines the climate adaptation preparedness of major economies.

- Canada and Singapore are the leaders in BNEF's adaptation preparedness analysis of the G20 and select Southeast Asian countries. They are therefore likely to have greater economic resilience to the impacts of climate change, for instance through attenuated climate losses or increased resilience of climate-sensitive industries like agriculture and resource extraction.
- A positive relationship exists between countries' risk exposure and progress on adaptation. Countries like Saudi Arabia and Russia, which are less exposed to physical climate impacts than others, rank among the least prepared to adapt.
- The US suffers the greatest cost from climate damages globally today. Yet the country is middling at the federal level in its preparedness for the impacts of climate change, ranking 12th out of 25 countries analyzed.
- The most effective way countries can accelerate adaptation is by dedicating budgets to it. Most countries are not doing so and instead pull from generic and insufficient climate or disaster recovery funds.
- Governments are starting to view climate resilience as a strategic investment, not merely a cost center. This aligns with how private investors view adaptation and could usher in much-needed capital.

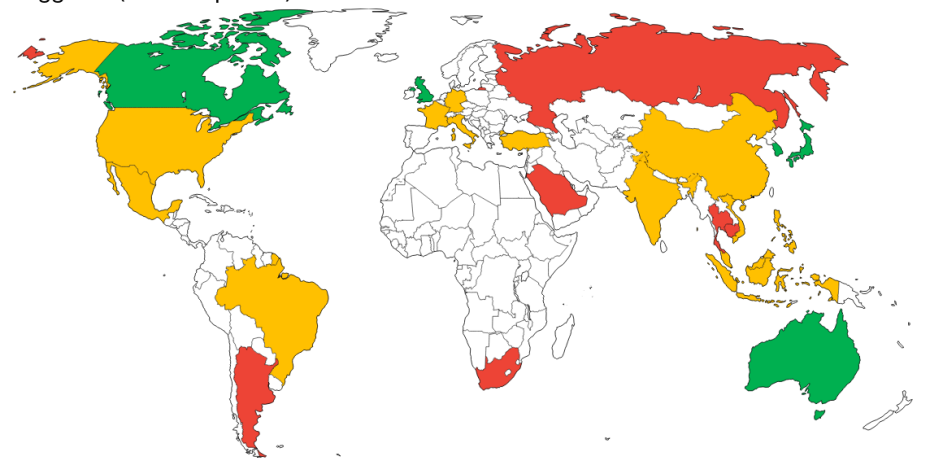
\$1.4 trillion Global loss from climate damages in 2024

\$2.5 billion Size of Canada's Disaster Mitigation and Adaptation Fund, one of the largest found

25 Number of countries in the BNEF Country Scorecard

Adaptation Preparedness Score

■ Leaders (top quartile) ■ Middle of the pack
■ Laggards (bottom quartile)



Bloomberg

Source: BloombergNEF. Note: markets in white are not covered in this report.

Contents

Financial Materiality	3
BNEF framework and country scorecard	7
Scorecard results and analysis	11
Appendix 1: Framework in depth	21

Financial Materiality

Uncovering the link between climate impacts and investment risk

Climate events wrought \$1.4 trillion damage last year, and growing

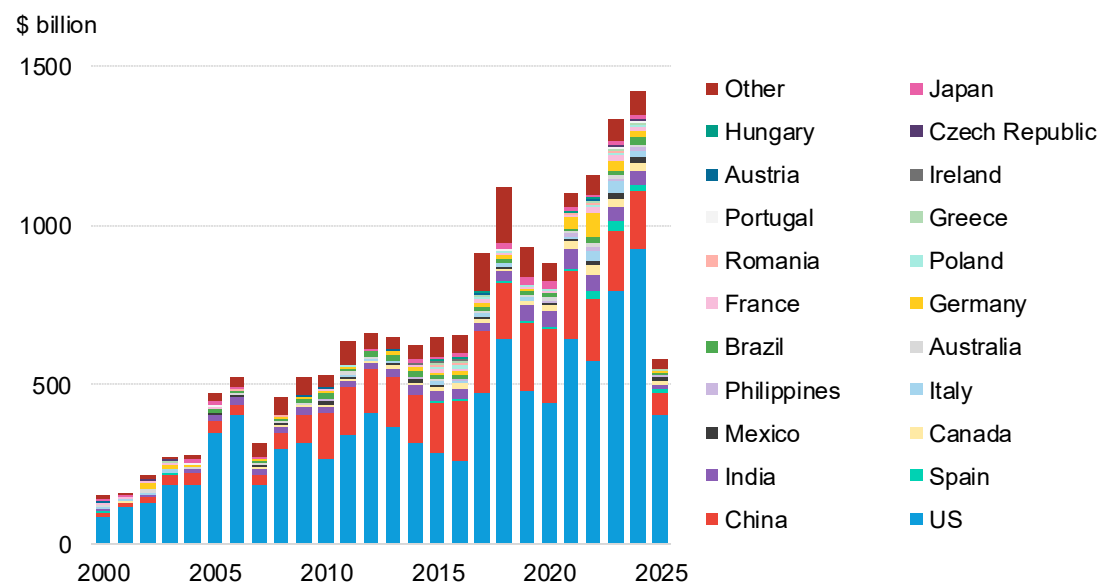
Adaptation is a solution

Resilience is the ability to withstand abnormal conditions without disrupting function and output. Adaptation is the process of increasing societal and economic resilience to climate change. Solutions can be engineered (e.g. constructing sea walls), ecosystem-based (e.g. protecting wetlands) or planning-based (e.g. diversifying sourcing for supply chain resiliency). Adaptation is already a global policy priority but must also become an investor priority given the scale of climate-related losses and the potential investment opportunities it brings.

..to mounting climate-driven losses

Climate-driven damages are increasing worldwide and harming human health, economic development, regional security and corporate profitability. Global losses topped \$1.4 trillion last year, almost 10x the total in 2000. With the world off track to meet the UN's 1.5 degree warming goal, future damages will almost certainly worsen unless economies and societies adapt.

Global climate damages per year and market



Source: BloombergNEF, Bloomberg Intelligence. Note: 2025 value through May. Total climate damages includes all categories tracked by BI, including government recovery spend, private property losses, crop damages, etc. For full dashboard see BI BESGG CLIMATEDAM <GO> and methodology MMDL 403209647 <GO>.

Resilience largely missing in current analysis

Physical risk analysis is becoming more mainstream among investors. However, most efforts center on studying event and asset **exposure**, leaving out a critical piece of the equation. Understanding and quantifying **resilience** is necessary if the desire is to manage overall vulnerability to physical risks.

VULNERABILITY =

EXPOSURE

Degree of hazards
faced

-

RESILIENCE

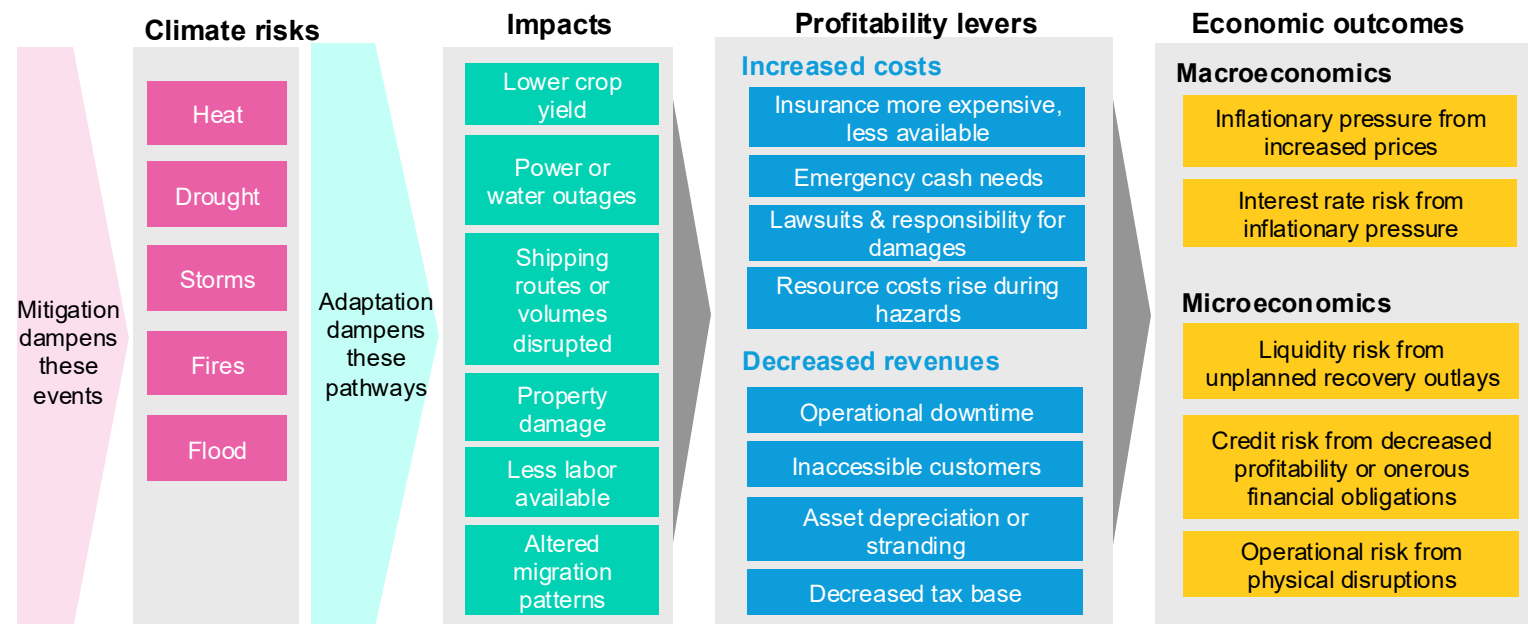
Ability to
withstand impacts
or adapt

Investment analysis must account for climate adaptation

There are **transmission channels** between climate events and financial risks, both at the micro- and macro-level. For more, see *Beyond Flood and Fires* ([web](#) | [Terminal](#)).

Adaptation can dampen the risk channels. Assets that are well-adapted should have a lower probability of loss from physical risks. Incorporating adaptation into investment analyses therefore gives insight into how climate losses may evolve.

Physical climate risk propagation pathways



Source: BloombergNEF. Note: Illustrative examples only, not exhaustive.

Why are national adaptation strategies an important investment lens?

The systemic risks of climate change are best addressed by coordinating bodies like national governments. Many financially material physical risks are outside of an asset owner's direct control, such as disruptions to common-use infrastructure like roads or ports. The work of adapting public infrastructure falls primarily to governments but benefits communities, companies and investors.

BNEF hypothesis: The resilience of a host country is a key determinant of systemic climate risk for any asset. Countries that effectively adapt can lower the probability of climate-related losses for all investments in that market.



Implication: Investors should consider national adaptation efforts as part of risk analysis for all exposed markets. This is an important way to manage the risk of climate losses. To do so, investors need a data-driven resource to compare progress across regions.

BNEF presents two new adaptation resources

1) Adaptation Preparedness Framework

Organizes key strategy components needed to effectively build economy-wide climate resilience



2) Adaptation Preparedness Country Scorecard

Scores countries on adaptation steps undertaken, standardized against the framework

These resources can support several practical use cases by user type:



Investors

- Screen for climate risk and adaptation progress within exposed markets or when initiating expansion in new regions
- Identify portfolio risk hotspots and engagement opportunities
- Participate in financing of adaptation projects by better understanding government plans and timelines



Policymakers

- Assess completeness of own strategy and identify any gaps
- Compare efforts to other nations of interest including key trading partners
- Identify adaptation and resilience strategy best practice



Corporates

- Guide efforts to establish adaptation strategy
- Assess adaptation efforts of home market, key partners and along the supply chain
- Analyze risks when initiating investment or expansion into new markets

Longer term research vision:

- BNEF's framework can be a standard assessment tool for future analysis of regional adaptation efforts or company initiatives
- With this scorecard as a baseline, future research can highlight specific pockets of progress and provide a historical view of change

BNEF framework and country scorecard

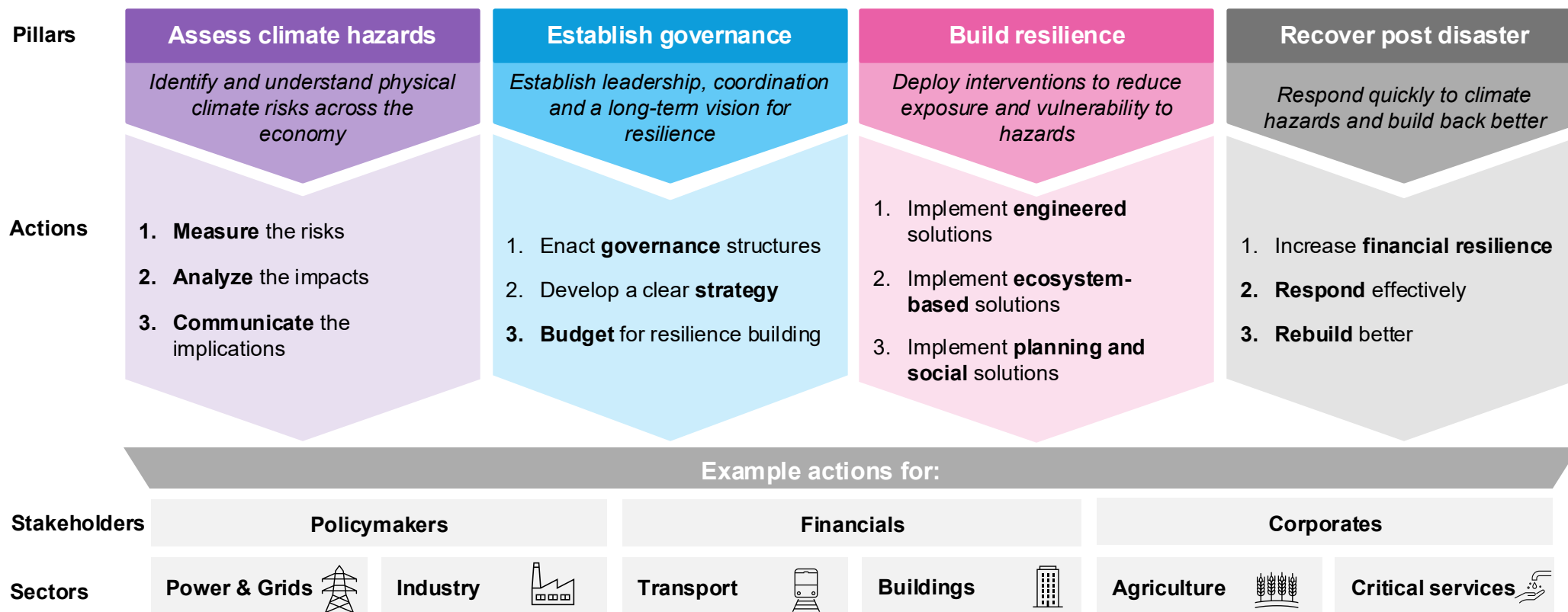
Evaluating adaptation strategy and national preparedness

BNEF Adaptation Preparedness Framework

The below framework provides a clear list of actions for building economy-wide resilience. It is a roadmap for initiating, improving or evaluating adaptation strategies. As a practical guide, the framework is:

- **Universal:** can be applied to almost any entity type, with adaptation examples for each stakeholder and sector below.
- **Informed:** draws upon critical elements observed in existing strategies and in guiding resources such as the Sendai Framework for Disaster Risk Reduction and the Intergovernmental Panel on Climate Change Working Group II.

Summary: BNEF Adaptation Strategy Framework



Source: BloombergNEF. Illustrative only. Full framework in Appendix.

BNEF Adaptation Preparedness Country Scorecard

Building upon the framework, the Adaptation Preparedness scorecard quantifies the critical adaptation elements each country has undertaken. High-scoring countries have a comprehensive approach and are therefore more likely to experience resilience improvements in the future.

Scorecard metrics and scoring summary

Step 1

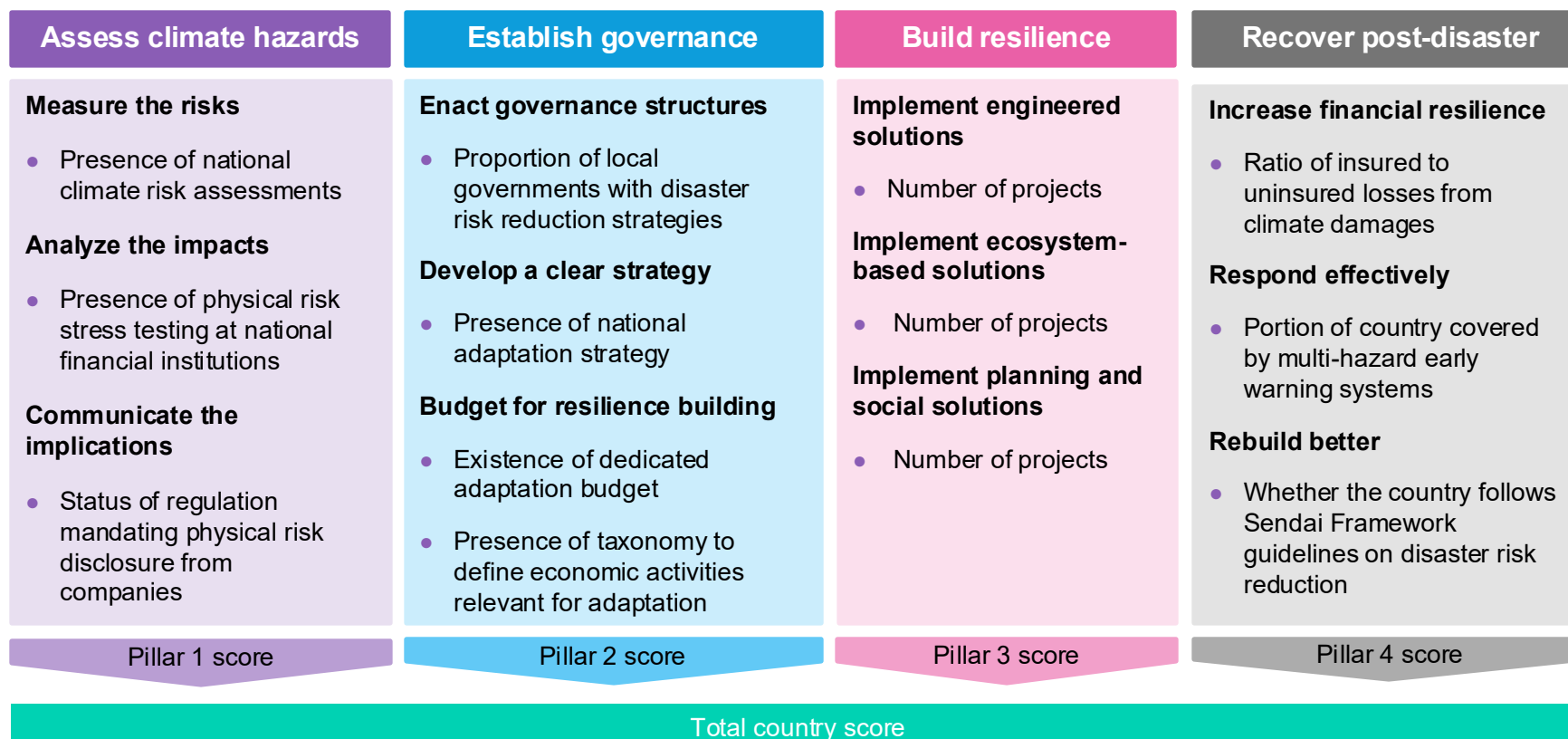
Countries are scored on each bulleted metric

Step 2

Pillar score is simple average of all available metric scores

Step 3

Total score is average of all pillar scores



Scorecard coverage is 25 markets, including all G20 and select Southeast Asian countries. This captures nations already facing high economic losses from climate change and where adaptation is known to be a policy priority. The methodology can be applied to other countries as well.

Further detail on metrics and scoring is available in the Appendix.

Source: BloombergNEF. Full definitions and scoring criteria in Appendix.

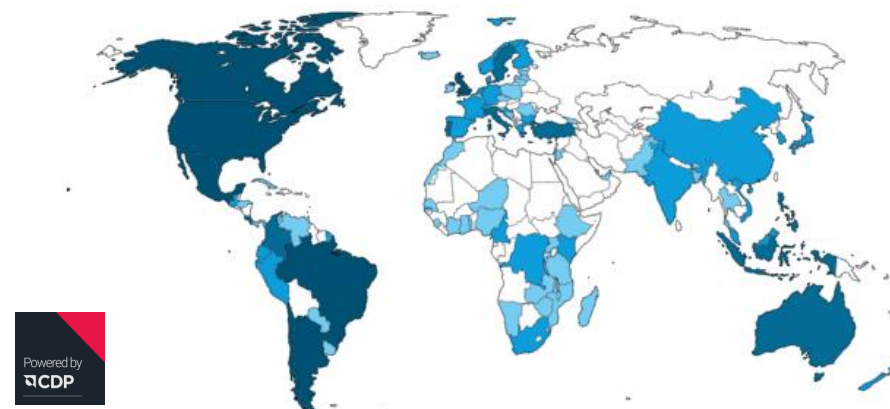
BNEF scorecard fills market gap

Scorecard uniquely evaluates adaptation

- **Adaptation-specific, with context:** BNEF's scorecard uses indicators that represent progress on *climate adaptation* specifically. The scorecard aligns with our strategy framework, so each dataset tells part of a bigger story across policy, finance and implementation.
- **On-the ground progress:** Our scorecard incorporates evidence of real-world progress, not just targets, thanks to a collaboration with CDP-ICLEI. Our analysis includes their 2023 Cities Adaptation Actions survey of over 1,200 adaptation projects implemented globally.
- **Data transparency:** BNEF's datasets and calculation methodology are fully transparent. We publish all underlying data and scoring calculations.

Number of adaptation actions reported to CDP

■ <10 ■ 10-99 ■ 100-199 ■ 200+



Source: CDP, BloombergNEF. This data was collected in partnership by CDP and ICLEI - Local Governments for Sustainability.

Indicators used in ND-GAIN Readiness Index

Component	Indicators			
Economic Readiness	<u>Doing Business</u> (one indicator considering the following 10 sub-indicators)			
	Starting a Business	Dealing With Construction Permits	Getting Electricity	Registering Prosperity
	Getting Credit	Protecting Investors	Paying Taxes	Trading Across Borders
	Enforcing Contracts		Resolving Insolvency	
Governance Readiness	<u>Political Stability and Non-Violence</u>	<u>Control of Corruption</u>	<u>Rule of Law</u>	<u>Regulatory Quality</u>
Social Readiness	<u>Social Inequality</u>	ICT Infrastructure (1, 2, 3, 4)	<u>Education</u>	Innovation (1, 2)

Source: Notre Dame Global Adaptation Initiative, University of Notre Dame.

Market comparison

- The Notre Dame Global Adaptation Initiative (ND-GAIN) index is a leading resource ranking countries on both climate vulnerability and readiness to adapt.
- However, its “Readiness to Adapt” measurement uses generic indicators that reflect broad economic efficiency without a clear focus on climate (left).
- BNEF improves upon the ND-GAIN index by introducing datasets which are specific to climate adaptation.
- ND-GAIN's methodology is strong for measuring exposure to physical risks. We include an analysis of this data in the following section to visualize country gaps between exposure and preparedness.

Scorecard results and analysis

Mapping national resilience

Adaptation Preparedness Scorecard – Country Results

1	Completed or in force
0.5	Limited or in progress
0	No evidence
-	Data gap

The scorecard shows progress on building resilience against climate hazards. Scores measure achievement against key actions in the framework. A full score of 1 means the country is addressing all the right strategic steps to adapt its economy to climate hazards.

	Assess climate hazards			Establish governance				Build resilience			Recover stronger post-disaster			Total score
	National risk assessment	Physical risk stress testing	Physical risk disclosures	Local government strategy	National adaptation strategy	Dedicated adaptation budget	Adaptation taxonomy	Engineered projects	Ecosystem-based projects	Planning and social solutions	Climate insurance coverage	Early warning systems	Disaster risk management	
1. Canada	1	1	1	1	1	1	0.5	1	1	1	1	1	1	0.97
2. Singapore	1	1	1	N/A	1	1	1	1	0.5	1	-	0.5	-	0.83
3. South Korea	1	1	0.5	1	1	0.5	1	1	1	1	0	0.5	1	0.80
4. Australia	1	1	1	0.5	1	1	0.5	1	1	1	1	0	0	0.77
4. UK	1	1	1	1	1	1	0	1	1	1	0	0	1	0.77
4. Japan	1	1	0.5	1	1	1	0	0.5	0.5	0.5	1	1	1	0.77
7. France	1	1	1	1	1	1	1	1	0.5	0.5	0	0.5	0.5	0.75
7. Germany	1	1	1	-	1	1	1	0.5	0.5	0.5	0	0.5	1	0.75
9. Italy	1	1	1	0.5	1	0.5	1	1	1	1	0	0	0.5	0.73
9. Indonesia	1	0	1	0.5	1	0.5	1	1	1	1	0	0.5	1	0.73
11. Mexico	0.5	1	1	1	0.5	0.5	1	1	1	1	0	0.5	0	0.69
12. US	1	1	0	1	0	0.5	0	1	1	1	1	0.5	0.5	0.68
12. Malaysia	1	0	1	1	0.5	1	1	1	0.5	0.5	-	0.5	0.5	0.68
14. Philippines	0.5	0	0.5	0.5	0.5	1	1	1	1	1	0	0.5	1	0.65
15. Brazil	0.5	1	1	-	0.5	1	0.5	1	1	1	0	0	-	0.63
16. India	1	1	0.5	0.5	0.5	1	0.5	1	0.5	0.5	0	0	1	0.61
17. Turkey	1	0	1	0.5	1	0.5	0	1	1	1	0	0.5	-	0.60
18. China	1	0	0.5	-	1	0.5	0	1	1	0.5	0	0.5	1	0.58
19. Vietnam	0.5	0	0	-	1	1	1	0.5	0.5	0.5	-	0.5	-	0.54
20. South Africa	0.5	0	0.5	0.5	1	0.5	1	0.5	1	1	0	0	0	0.48
21. Argentina	0.5	0	0	-	1	0.5	0	1	1	1	0	0	0.5	0.46
22. Cambodia	0.5	0	0	0.5	0.5	0.5	1	0.5	0.5	0	-	0.5	0.5	0.41
23. Thailand	0.5	0	0.5	0.5	0.5	0.5	1	0.5	0.5	0	0	0	0.5	0.36
24. Russia	0.5	0	0	1	0.5	0	1	-	-	-	-	0.5	0.5	0.32
25. Saudi Arabia	0	0	0	1	0	0.5	0	0	0.5	0	-	0	1	0.26

Leaders
Middle of the pack
Laggards

Source: BloombergNEF. Note: Datasets and score compilation available in accompanying excel download. Pillar score = average of all available metric scores. Total score = simple average of all pillar scores.

How to interpret the results

High scores indicate stronger adaptation approach

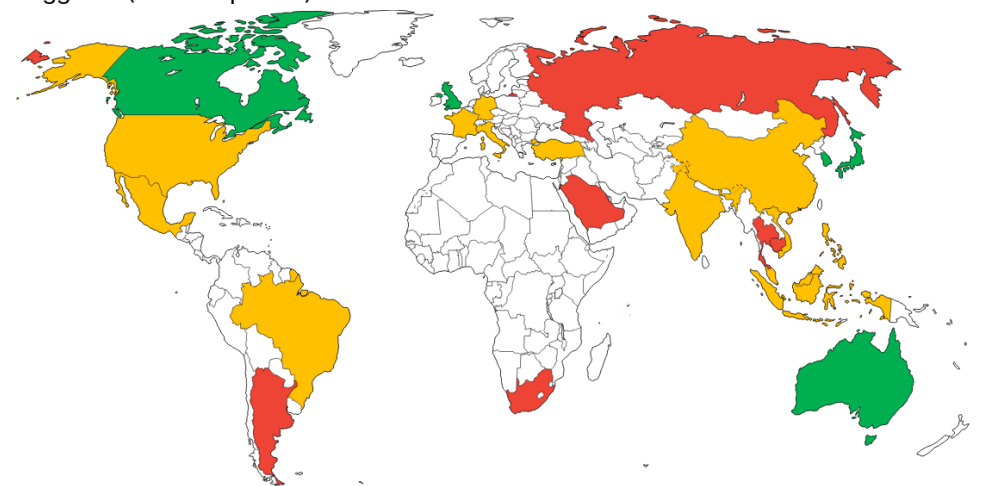
- **BNEF hypothesis:** Investors can expect lower climate-driven losses in markets that adapt effectively, all else being equal.
- **Implication:** High-scoring markets are in the process of adapting effectively because they have undertaken more critical steps to building resilience. These markets are in theory best-equipped to manage the economic impacts posed by physical climate change.

Understanding the implications

- **Leaders** have a comprehensive approach and follow best practice. They are likely to see a reduction in risk and experience economic **benefits of resilience** earlier, like:
 - Attenuation of climate losses
 - Increased global competitiveness of climate-sensitive industries (e.g. agriculture, extractive, shipping)
 - Lower risk perception among foreign investors
 - Growth of new markets for adaptation solutions
- **Middling** scores indicate countries have neglected certain facets or have not followed best practices. An **improved approach** could reduce risk and maximize future benefits.
- **Laggards** have not addressed adaptation well at the national level or have not publicized their efforts. Climate-induced **economic losses are more likely to go unchecked** in these countries, particularly in the near term.

Adaptation Preparedness Score

- Leaders (top quartile)
- Middle of the pack
- Laggards (bottom quartile)



Bloomberg

Source: BloombergNEF. Note: markets in white are not covered in this report.

Limitations

- BNEF's scorecard is not a projection. It does not predict adaptation success but rather assesses whether each country's adaptation approach is comprehensive. In theory, a robust approach is more likely to reduce risk and produce resilience benefits.
- BNEF's index measures activity at the national level and sets an important foundation for assessment. This can and should be enhanced by regional and city-level efforts which are often more attuned to the local circumstances that decide appropriate adaptation actions.

Preparedness correlates with exposure

Putting adaptation into context

Countries **do not face equal imperative** to adapt because climate change and its impacts are not uniform. It is valuable to assess adaptation jointly with exposure:

$$\text{VULNERABILITY} = \boxed{\text{EXPOSURE}} - \boxed{\text{RESILIENCE}}$$

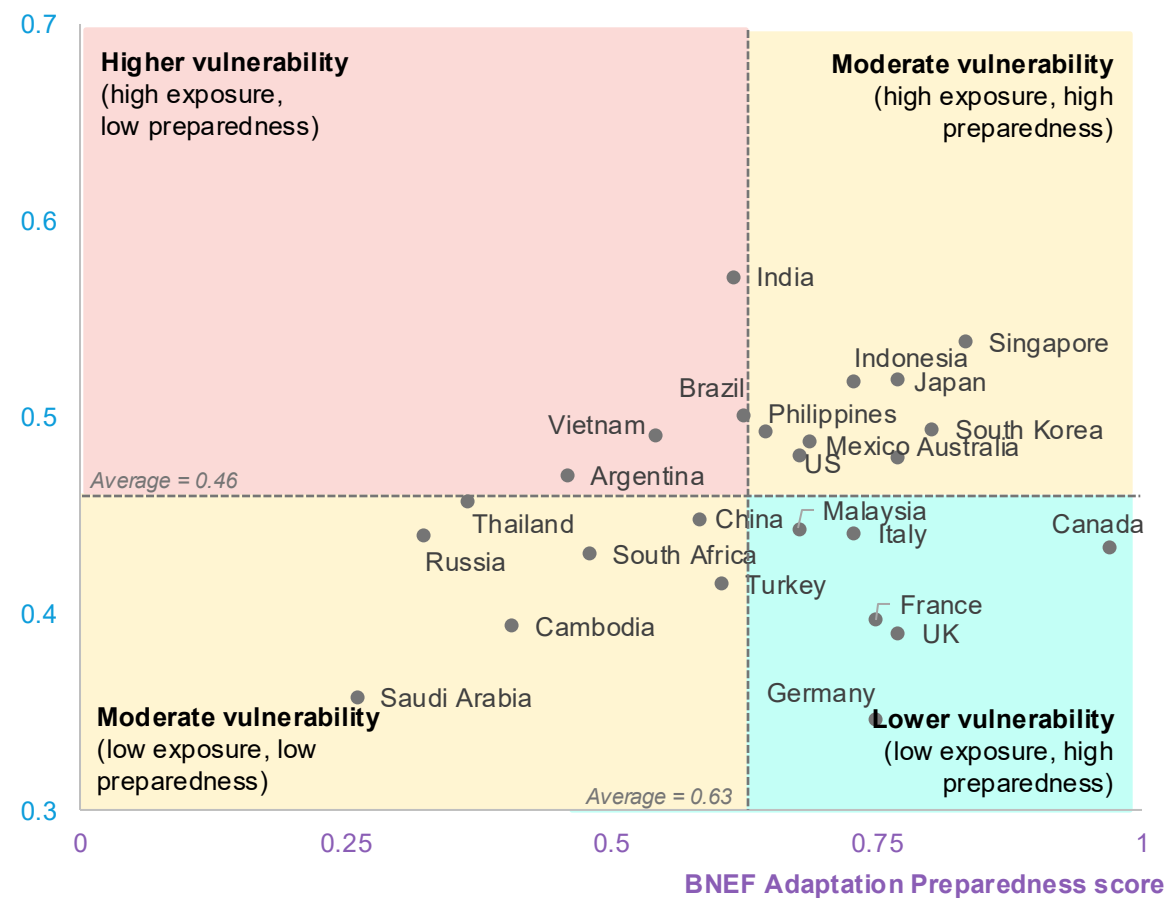
Degree of hazards faced Ability to withstand impacts or adapt

To do so, we overlay the **ND-GAIN exposure score** on **BNEF's adaptation preparedness score**.

- The overall positive trend indicates that countries experiencing more extreme climate events are also moving most effectively to address adaptation.
- Highly exposed countries such as Singapore, Indonesia and Japan demonstrate that they are building resilience and reducing vulnerability.
- India, Brazil, Argentina and Vietnam are a bit behind the curve, facing high exposure with low adaptation preparedness. This raises their relative vulnerability.
- Canada, France, the UK and Germany all face low exposure but are well-prepared, implying they may be better equipped to manage physical climate risks.
- Although the least prepared, Saudi Arabia and Russia also have lower exposure scores and therefore may have fewer incentives to act.

Comparing adaptation preparedness to physical risk exposure

ND-Gain Exposure score



Source: BloombergNEF, Notre Dame Global Adaptation Index.

Country implications

Leader trends



Strong governance unifies leaders

No country was able to achieve a high score without performing well in the policy-oriented criteria represented by pillars 1 and 2. This shows that government has responsibility to set effective foundations for adaptation.



Resource economies move early

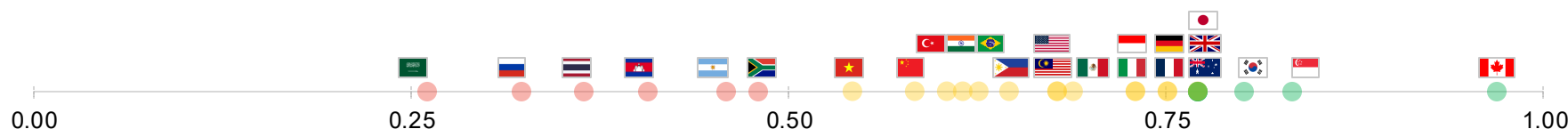
Many countries that derive a large portion of GDP from natural resources or infrastructure industries have already implemented adaptation policy. Dependency on these climate-sensitive industries makes the economic need for adaptation more obvious.



Bloc strategies propagate success

The EU bloc has pushed forward initiatives elevating baseline preparedness and so its members achieve similar scores. ASEAN members diverge but the grouping is actively disseminating adaptation priorities. This seems to be taking effect as the region is home to many countries with expected improvements to adaptation policy (below).

BNEF Adaptation Preparedness Score



Pathways to improve



Build the fundamentals

The most decisive metrics for preparedness are presence of an adaptation strategy and dedicated funding. Countries where these fundamentals are weak or missing will have a hard time adapting efficiently, effectively and economically.



Disclose more

Transparency is crucial for other stakeholders, especially potential financiers, to understand government objectives and plan their own involvement. Improvements can come from publishing progress reports against targets, or submitting data to international frameworks (e.g., Sendai, CDP).



Use recovery as springboard

These countries struggle with post-disaster recovery. As they move to improve that reactive response, it can be enormously beneficial to consider proactive and preventative adaptation measures as well. Done well, they both serve a common risk reduction goal.

Upcoming changes

Adaptation plan announced



Taxonomy announced



Disclosures announced



Source: BloombergNEF. Note: Shows example countries, not exhaustive. EU refers to European Union. ASEAN refers to Association of Southeast Asian Nations.

Unpacking Pillar 1: Assess Climate Hazards

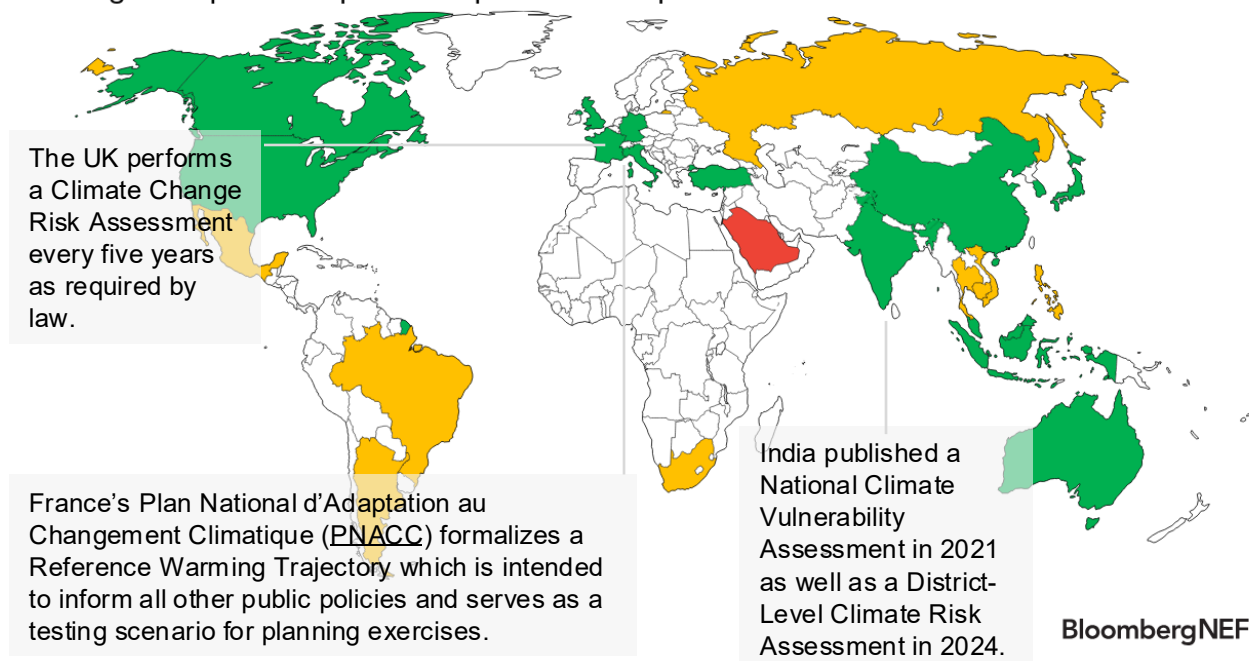
Metric	Importance	Full score	Half score	Source
Presence of national climate risk assessment	Builds a shared understanding of expected risks among all stakeholders. This helps ensure that adaptation plans and solutions are decided based on a science-backed analysis of the problems.	Conducted and published regularly	Sporadic report or brief inclusion in adaptation plan	BNEF research
Physical risk stress testing at key financial institutions	Measures financial stability against climate damages by revealing critical dependencies and tipping points. This enables better planning and prioritization of adaptation interventions.	Past stress tests with physical risk	No half score	BNEF Policy Navigator
Physical risk disclosure policy	Requiring companies to report on physical risks increases transparency of climate vulnerabilities across supply chains and portfolios. This also leads to better awareness of the problems which should motivate better management of the risk.	Mandatory disclosures	Voluntary or announced disclosures	BNEF Policy Navigator

Spotlight on climate risk assessments

- The first step to building resilience is to figure out what requires adapting. Risk assessments reveal those needs by mapping out material climate exposures across sectors and regions.
- Good climate risk assessments should:
 - Establish the range of possible future climate conditions to inform policy and strategy development
 - Marry top-down and bottom-up data evaluation
 - Consider all sectors, regions, communities and risk types
 - Models direct and second-order impacts
 - Are forward-looking and repeated as needed, e.g. as guidance and data availability evolves

Presence of a national climate risk assessment

■ Regular report ■ Sporadic report ■ No report



Source: BloombergNEF. Note: markets in white are not covered in this report.

Unpacking Pillar 2: Plan for Resilience

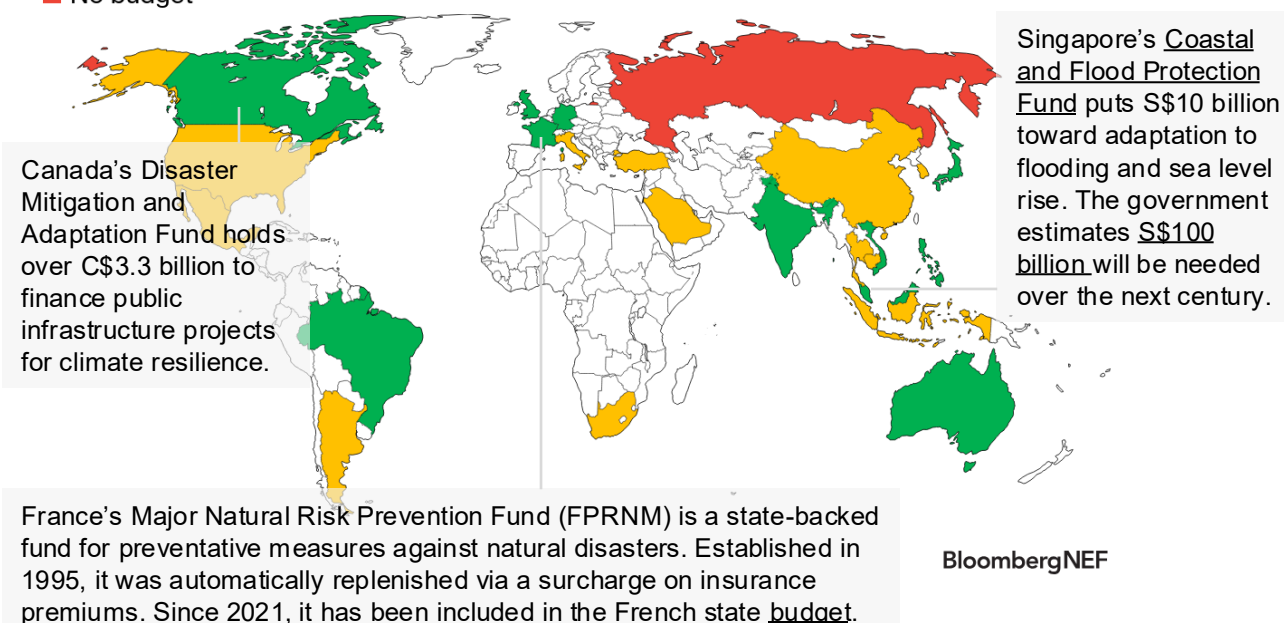
Metric	Importance	Full score	Half score	Source
Local government strategy alignment	National strategies alone cannot build economy-wide resilience. Lower levels of government must also form plans that connect national goals with local context.	100% of local governments adopt nationally-aligned plans	50-99% of local governments	Sendai Framework
National adaptation strategy	Central strategies catalyze action by setting a vision, deputizing stakeholders, and initializing action. Legislated national policies tend to carry more weight than National Adaptation Plans (NAPs) submitted to the UN.	Active central strategy	General climate plan or NAP only	BNEF research
Adaptation budget	Earmarking adaptation funds makes resources available so that goals can progress. It's also a positive signal for the earnestness and durability of adaptation agendas.	Dedicated adaptation fund or recurring budget allocation	Generic climate funds or temporary subsidies	BNEF research
Adaptation taxonomy	By defining how economic activities contribute to climate adaptation, taxonomies help investors identify and finance qualifying activities, therefore scaling up action.	Taxonomy in force defines adaptation	Adaptation definition in development	BNEF Policy Navigator

Spotlight on adaptation budget

- An allocation of funds specifically for adaptation and resilience is a clear way to ensure progress on deliverables. Most countries do not earmark for adaptation specifically but such carveouts accelerate efforts as general climate funds tend to overwhelmingly finance mitigation activities.
- Ideal funding mechanisms will:
 - Help attract new sources of capital or reduce barriers for private investment
 - Have a replenishing method so funds can be consistently available long-term
 - Clearly define eligibility for qualifying disbursements
 - Align financing with national adaptation priorities

Existence of allocated adaptation budget

■ Allocated budget
 ■ General climate budget or temporary subsidy
 ■ No budget



Source: BloombergNEF. Note: markets in white are not covered in this report.

Unpacking Pillar 3: Reduce Climate Risks

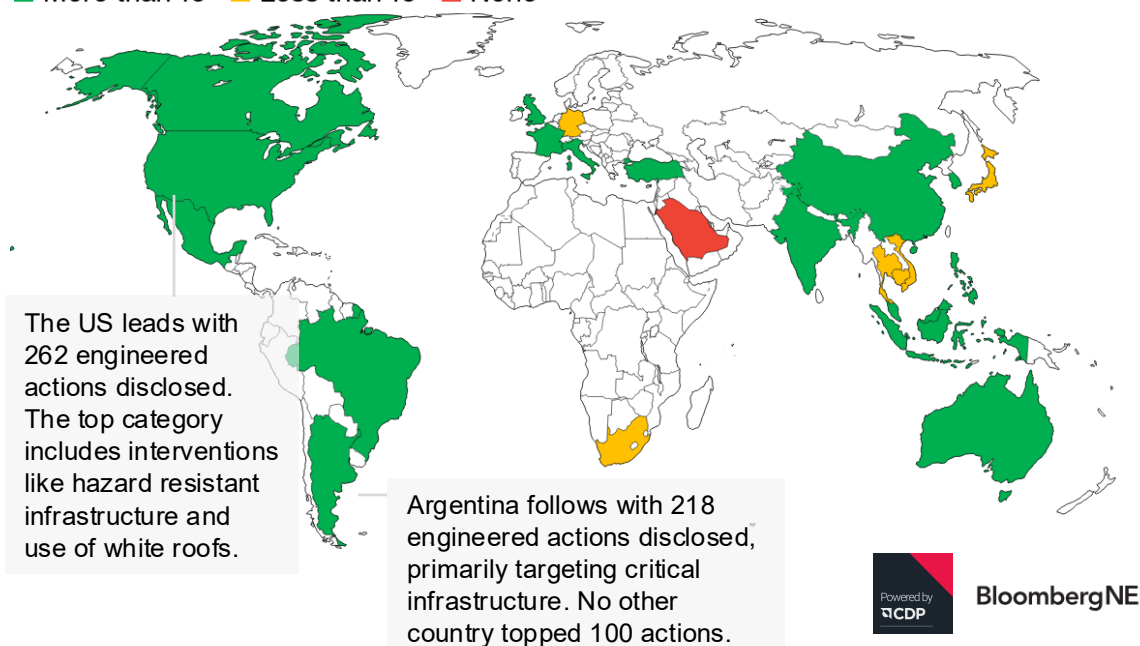
Metric	Importance	Full score	Half score	Source
Engineered solutions implemented	Funded and established adaptation activities are the strongest evidence of progress on the ground. They prove that a country is committed to building resilience and is effectively turning government goals into reality.	More than 10 actions reported	Between 1-9 projects reported	CDP Cities Adaptation Actions, 2023
Ecosystem-based solutions implemented				
Planning & social solutions implemented				

Spotlight on engineered solutions

- Engineered adaptation solutions are often large-scale public infrastructure projects which require a lot of time and money. The scale of project rollout is a good indicator of a government's commitment to and effectiveness in building resilience.
- In CDP's database, engineered actions are the most common with 75% of countries reporting at least one.
 - The majority of engineered projects (roughly 54%) address water-related risks through interventions like flood defenses, drainage systems and sea walls.
 - Heat is the only other risk (5% of projects) being specifically addressed through interventions like cooling centers and public shading.
 - All other interventions target general or multiple climate risks. Examples include hazard-resistant construction and updated building codes.
- We encourage readers to explore the [CDP data](#) directly.

Implementation of engineered adaptation actions

■ More than 10 ■ Less than 10 ■ None



Source: CDP, BloombergNEF. This data was collected in partnership by CDP and ICLEI - Local Governments for Sustainability. Note: Map shows only markets within BNEF scorecard. Full CDP dataset includes many more markets out of scope for this exercise.

Unpacking Pillar 4: Recover Stronger

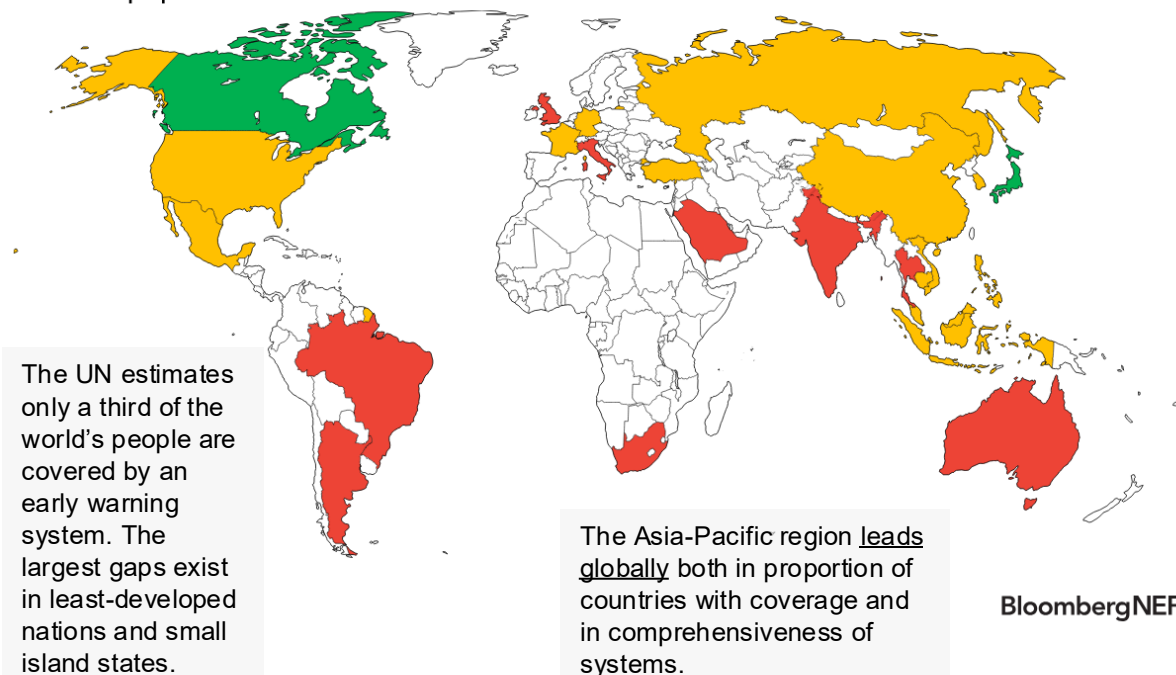
Metric	Importance	Full score	Half score	Source
Climate damages insurance gap	Insurance provides some financial resilience to climate shocks and should be available and affordable to all who want it. The insurance gap varies by market, but industry experts agree that increased coverage benefits economic resilience and reduces public burden. ^{1,2,3}	Ratio of insured: uninsured losses greater than 1	Ratio greater than 0.5	Bloomberg Climate Damages Tracker
Early warning system coverage	Multi-hazard early warning systems give notice prior to hazards so that people and businesses can enact protective measures or even evacuate in order to minimize realized impacts.	100% national coverage	50-99% coverage	Sendai Framework
Build back better	Plans and policies that prioritize resilience in disaster response help make the most out of recovery efforts since the rebuild period presents highly economical opportunities to embed resilience.	100% alignment with Sendai Disaster Risk Reduction Framework	50-99% aligned	Sendai Framework

Spotlight on early warning systems

- Multi-hazard early warning systems are the closest thing to a universally appropriate adaptation solution. So much so that the UN set a goal for all people to be protected by early warning systems by 2027.
- Early warning systems have proven to be highly cost-effective, not only for economic stability against extreme climate conditions but importantly for reducing the loss of human lives.
- According to the UN, ideal systems will be:
 - Multi-hazard, capable of detecting a variety of risks whether they occur alone, simultaneously or in a cascade
 - End-to-end with alerts that span from hazard detection to understandable warning messages and action communications
 - Designed to empower people to act on time and in the appropriate manner to reduce harm

Proportion of population covered by early warning systems

■ 100% population covered ■ 50-99% ■ Less than 50%



Source: BloombergNEF, Sendai Framework Monitor. Note: markets in white are not covered in this report.

The heat is on: Trends to watch

Adaptation policy is evolving quickly, boosted by collaborative international efforts. Here are some development areas we can foresee.

Financing and investment

- **Cost center to revenue driver:** most discussion of adaptation in the public sphere centers on financing costs. But some countries are starting to see the investment opportunity as well.
 - **Singapore's** sovereign wealth fund released a whitepaper in 2025 exploring investment opportunities in the adaptation economy and how to best position the fund.
 - **Japan's** Adaptation Plan identifies that the country's adaptation-related companies should seize on opportunities to expand their businesses domestically and abroad.
- **Budget tagging** to reveal true allocation to mitigation or adaptation. This can help governments align future spending with climate priorities.
 - **Indonesia** performs climate tagging on its national budget to ensure priority areas receive requisite spending. The **Philippines** conducts a similar exercise.

Priority hazards

- **Focus on heat:** heat waves are a risk to population health especially in areas with low penetration of air conditioning. Economically, they also take a toll on sectors reliant upon outdoor labor such as natural resources, agriculture and construction.
 - **Japan** requires employers from 2025 to protect workers from heatstroke or pay penalties. Employers must monitor heat conditions and provide additional cooling and medical support once temperatures exceed a threshold.

Policy direction

- **Regional cooperation:** sharing information to harness synergies and maximize regional resilience. Efforts are most evident in Asia currently.
 - **Singapore's** climate risk assessment includes wider **Southeast Asia**, stemming from an understanding that resilience of the country and region is tied. **Japan's** Asia-Pacific Adaptation Information Platform offers data and expertise to other Asian countries as well.
- **Progress rollback:** national governments could deprioritize adaptation due to politicization or a desire to defer responsibility to local entities. Removing resources without replacements can increase disaster risk.
 - **Mexico's** FOPREDEN was a fund for climate resilience and disaster prevention but was dissolved in 2020. In the **US**, the Trump administration has rolled back many climate efforts and has proposed the dismantling of disaster response agency FEMA.

Process and implementation

- **Formalized auction process:** governments could run auctions for resilience outcomes. This way, they can focus on the desired result while giving bidders the innovative space to design adaptation measures that can achieve said outcomes most effectively and economically.
 - **Malaysia's** government ran an auction in 2022 for flood mitigation. Eight companies reportedly submitted proposals to construct flood defenses including tunnels and drainage systems in the Klang Valley.
- **Emergence of central resilience officer:** one person or office to coordinate all adaptation efforts. Several states and cities have created such roles which could spread to national level positions soon.

Appendix 1:

Framework in depth

Full framework

Pillar	Description	Action	Sub-action
Assess climate hazards	<i>Identify and understand climate risks across the economy</i>	Measure the risks	Collect best available climate data (historical, projections, scenarios). Identify locations of critical assets, people and services. Support data sharing exercises and frameworks
		Analyze the impacts	Perform physical climate risk assessment and scenario analysis across all major exposures to understand key vulnerabilities. Consider all sectors/supply chain/portfolio. Consider knock-on impacts across the economy. Understand the interplay between climate and nature risks
		Communicate the implications	Mandate physical climate risk analysis and reporting for companies, financial institutions, counterparties and suppliers Educate key stakeholders on the physical impacts posed by climate change
Establish adaptation governance	<i>Establish leadership, coordination and a long-term vision for resilience</i>	Enact governance structures	Assign clear responsibility for adaptation and resilience, including disaster management and establish communication channels between relevant departments.
			Align on responsibilities, goals, strategy with local actors and regional departments to ensure effective nationwide resilience. Engage with relevant stakeholders Work with global actors to share knowledge and amplify collective action
		Develop a clear strategy	Set adaptation goals underpinned by an action-oriented strategy Learn and improve by monitoring strategy progress and effectiveness. Update strategy to reflect changing conditions
			Align A&R strategy with other strategic priorities to avoid interference, maladaptation Allocate budget to adaptation and resilience solutions, projects, R&D and disaster recovery
Build resilience	<i>Implement practices to increase resilience of assets and people</i>	Budget for resilience building	Develop mechanisms to ease public and private investment into A&R e.g., taxonomies, carbon market, innovative financing structures
		Implement engineered solutions	Reduce exposure of infrastructure, nature and people through physically preventing or reducing contact with high-risk climate hazards Reduce vulnerability of assets, ecosystems and communities by increasing durability of the built environment and access to critical infrastructure and resources
		Implement ecosystem-based solutions	Reduce exposure of assets and communities to climate hazards by restoring vital ecosystems and implementing urban nature-based solutions Reduce vulnerability of ecosystems and communities by promoting land stewardship, agricultural practice change and diversification
		Implement planning and social solutions	Reduce exposure of communities and assets to climate hazards through management of human settlements and infrastructure development Strengthen community and system capacity to cope with climate hazards through education, social safety nets and community-based adaptation planning
Recover stronger post-disaster	<i>Respond quickly to climate hazards and build back better</i>	Increase financial resiliency	Increase insurance penetration, coverage and options for risk transfer Set a clear disaster response strategy with associated budget. Engage with relevant agencies and departments to build emergency management strategies
		Respond effectively	Align with early warning systems to ensure timely response. Maintain critical infrastructure and provision of goods and services during climate hazards. Mobilize emergency services, search and rescue and aid providers
		Rebuild better	Ensure effective and equitable disaster recovery Build back better i.e., faster, more resilient, more inclusive

Pillar 1 Explained: Assess Climate Hazards

Identifying and understanding physical climate risks are the foundational steps to building resilience. By **measuring risks**, governments, investors and companies can identify material hazards and assess vulnerability of populations, assets, and infrastructure. **Analyzing impacts** translates climate science into real world financial effects on the economy. Finally, **communicating implications** builds awareness and provides businesses, communities, and investors with the necessary data to take informed action.

Scorecard metrics explained

Action	Measure the risks	Analyze the impacts	Communicate the implications
Metric	Presence of a national climate risk assessment	Physical risk stress tests at key financial institutions	Physical risk disclosure policy in force
What this measures	Whether the country performs risk assessments which make use of all available data to analyze how climate change will impact its people, assets and industries.	Whether the country has initiated climate stress testing at its financial institutions. Stress tests must include physical risk shocks. Key financial institutions refers to central banks as well as large, systemically-important commercial banks.	Whether the country mandates companies and other asset owners to measure, analyze and disclose the physical risks and opportunities they face along with their strategies for risk management.
Rationale for choice of metric	Builds a shared understanding of expected risks among all stakeholders. This helps ensure that adaptation plans and solutions are decided based on a science-backed analysis of the problems.	Important for measuring financial stability against climate damages and revealing critical tipping points. This enables better planning and prioritizing of adaptation interventions.	Disclosure policies help surface the data necessary to better understand climate vulnerability among supply chains and portfolios. This leads to better understanding of physical risk vulnerabilities, which then leads to better adaptation planning.
Emerging best practice	- Establish the range of possible future climate conditions to inform policy and strategy development - Marry top-down and bottom-up data evaluation - Consider all sectors, regions, communities and risk types. Models direct and second-order impacts - Are forward-looking and repeat at least every decade	- Incorporate scenarios with both transition and physical risk parameters - Consider all financial players, e.g., banks, investors, insurers - Consider all material physical risks (tendency to concentrate on floods only) - Perform at central banks and systemically important financial institutions	- Require standard units, formats and disclosure timeframes to maintain comparability - Align with global frameworks e.g., ISSB - Provide resources to support data collection and analysis - Require disclosures of risk management plans
Scoring (0 if no evidence)	1 – conducted and published regularly 0.5 – sporadic report only or brief inclusion within adaptation plan or strategy	1 – stress tests at national financial institutions includes physical risk	1 – mandatory disclosures 0.5 – voluntary or announced disclosures
Data source	BNEF research	BNEF Policy Navigator	BNEF Policy Navigator

Source: BloombergNEF

Pillar 2 Explained: Establish Governance

Good governance gives structure and resources to every step of resilience, so that goals can progress smoothly toward results. **Enacting governance structures** clarifies responsibilities across national, subnational, public and private players. **Developing a clear strategy** gives countries a roadmap for long-term resilience. **Budgeting for resilience** secures the financial resources to translate plans into tangible action.

Scorecard metrics explained

Action	Develop a clear strategy	Enact governance structures	Budget for resilience	
Metric	Presence of national adaptation strategy	Local government strategy score	Dedicated budget for adaptation	Presence of adaptation taxonomy
What this measures	Whether a central strategy exists nationally which sets goals, deputizes relevant stakeholders and formalizes a process for carrying out the work of adaptation.	Whether subordinate levels of government (state, city) set their own disaster risk strategies which align with national vision. Serves as a proxy for whether subordinate governments have considered adaptation.	Whether the country identifies and sets aside recurring funds for resilience, adaptation and preventing natural disasters.	Whether a taxonomy exists that defines how individual economic activities contribute to climate adaptation and how to determine if activities are maladaptive.
Rationale for choice of metric	Strategy is critical for catalyzing effective action. Specifically, for setting common vision, mandating any critical changes and cementing reference points for other policy initiatives. Government plans also provide a signal for when and how private capital can become involved.	National strategies alone cannot build nation- and economy-wide resilience. Local entities should study their own needs and plan for how they'll contribute to national goals. Their plans should be more detailed than national ones and more attuned to local circumstances.	A pot of money specifically for adaptation and resilience is the best way to ensure progress on deliverables. It helps concentrate efforts since general climate funds tend to <u>finance more mitigation</u> activities.	The existence of these taxonomies helps companies market their qualifying activities and makes it easier for investors to identify areas for financing.
Emerging best practice	- Is informed by climate science - Sets strategic vision including goals and timelines - Coalesces relevant actors and delegates responsibility - Maintains transparency through progress reports - Iterates with periodic plan updates - Is encoded in legislation	- Alignment of plans between national and local governments - Development of sectoral strategies - Collaboration between local actors to share best practices	- Automatically refresh with recurring funds - Clearly define eligibility for qualified disbursements - Help attract new sources of capital or reduce barriers for private investment - Align financing with national adaptation priorities	- Define qualifying and disqualifying activities, for instance through clauses on maladaptation or “do no significant harm” - Inclusion of activities across the economy, including ecosystem-based solutions
Scoring (0 if no evidence)	1 - Active central strategy 0.5 - NAP or general climate action plan only	1 – 100% of local government 0.5 – 50-99% 0 – 0-50%	1 – standalone fund or recurring allocation in national budget 0.5 - general climate funds or temporary subsidies only	1 - taxonomy defines adaptation 0.5 – adaptation definition in development
Data source	BNEF research	Sendai Framework Monitor (E2 indicator)	BNEF research	BNEF Policy Navigator

Source: BloombergNEF

Pillar 3 Explained: Build Resilience

Adaptation action occurs in this pillar. Actions broadly fall into reducing exposure (e.g., by avoiding the risk) or reducing vulnerability (e.g., by improving the ability to withstand risk). We have categorized these activities into three buckets: **engineered solutions** using hard infrastructure to protect from extreme events; **ecosystem-based solutions** which leverage natural systems to buffer from hazards while supporting biodiversity, and **planning and social solutions** which use education and logistical planning to make processes and communities more resilient.

Scorecard metrics explained

Action	Implement solutions to increase resilience of assets and people		
Metric	Number of engineered actions	Number of ecosystem-based solutions	Number of planning and social solutions
What this measures	Presence of engineered projects to enhance resilience. Examples include sea walls, flood drainage systems, reinforced structures, elevated roads.	Presence of ecosystem-based projects to enhance resilience. Examples include wetland or mangrove protection to enhance flood resilience, planting trees to combat desertification, improved irrigation practices.	Presence of planning or social projects to enhance resilience. Examples include updated building codes for extreme weather, diversifying supply chains, limiting development in high-risk areas.
Rationale for choice of metric	Funded and established adaptation activities prove that a country is committed to building resilience and is turning strategy into reality. As with any policy area, there is a risk that goals remain goals without turning into change on the ground. Measuring the rollout of adaptation projects provides a crucial piece of evidence for assessing how well countries are translating talk into action.		
Emerging best practice	• Risk informed and designed for tail risks and compound events, rather than based on historical events • Based upon best practice with any potential for maladaptation assessed and mitigated • Implemented alongside other public development, hitting multiple co-benefits • Custom to each local use case and environment with community engagement throughout process • Accompanied by a robust monitoring and evaluation process to ensure efficacy and ability to roll up into national metrics • Use of blended finance to reduce burden on public funds, reduce risk and crowd in private capital		
Scoring (0 if no evidence)	1 – project count of 10 or more 0.5 – project count between 1-9	1 – project count of 10 or more 0.5 – project count between 1-9	1 – project count of 10 or more 0.5 – project count between 1-9
Data source	CDP Cities Adaptation Actions 2023; This data was collected in partnership by CDP and ICLEI - Local Governments for Sustainability. Where there were data gaps for Singapore, Saudi Arabia and Cambodia, manual research was undertaken to identify project examples.		

Source: BloombergNEF, CDP-ICLEI.

Pillar 4 Explained: Recover Post Disaster

The final pillar encompasses disaster response and recovery to manage the residual risks which cannot be removed through adaptation. **Increasing financial resiliency** ensures governments, businesses, and households can withstand shocks without collapsing economically. **Responding effectively** reduces impacts and restores services quickly, minimizing disruption. **Rebuilding better** ensures that post-disaster reconstruction strengthens infrastructure and systems, reducing exposure to the next event rather than replicating past vulnerabilities.

Scorecard metrics explained

Action	Increase financial resilience	Respond effectively	Rebuild better
Metric	Climate damages insurance gap	Early warning system coverage	Disaster risk response
What this measures	The ratio between climate losses that are insured vs uninsured. This measures the extent to which insurance industry absorbs financial damages caused by climate events. A higher ratio means insurance is more widespread, which indicates that the economy has more financial resiliency towards physical risks.	Portion of the country covered by multi-hazard early warning systems which can alert the population prior to expected extreme or dangerous conditions.	Whether the country has adopted national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction
Rationale for choice of metric	Insurance has been a major source of financial resiliency in many markets facing climate risks. Insurance can also be a lever for encouraging and financing adaptation investments. Without a healthy insurance market, the economic repercussions of climate damages will be amplified.	Early warning systems are one of the few adaptation solutions that makes sense just about anywhere. By providing alerts prior to forecasted extremes, they give people and businesses time to prepare for and potentially avoid the impact.	A great time to build resilience is in the recovery period post-disaster. Plans and policies that prioritize resilience in disaster response help make the most out of recovery efforts.
Emerging best practice	Use of innovative products and technology to increase access, affordability and ensure payouts are timely e.g. parametric insurance, catastrophe bonds, microinsurance, regional risk pooling	- Use of real-time data and AI analysis such as satellite imagery, flood and fire sensors - Multi channel communication - Coordination with response strategy	- Combine adaptation with reconstruction - Integrating disaster risk reduction into development measures e.g. inclusion, gender - Incorporation of ecosystem-based approaches
Scoring (0 if no evidence)	1 – ratio greater than 1 0.5 – ratio between 0.5 and 0.99	1 – 100% early warning coverage 0.5 – 50-99% coverage	1 – 100% score 0.5 – 50-99% score
Data source	Bloomberg Intelligence Climate Damages Tracker	Sendai Framework (Target G: Early Warning Systems); where there were data gaps, we used evidence of early warning system projects from the CDP Cities Adaptation Actions, 2023, ASEAN report Appendix C B.1 and China Meteorological Administration	Sendai Framework (Target E1, component “Address the recommendations of Priority 4, Enhancing disaster preparedness for effective response and to Build Back Better”)

Source: BloombergNEF

Examples actions for policymakers

Measure the risks	Analyze the impacts	Communicate the implications	Enact governance	Develop a clear strategy	Budget for resilience
- Invest in the collection and production of best practice climate data and models. - Deploy technologies to enhance coverage and quality. - Make climate data and risk tools publicly available. - Report into global data-gathering frameworks.	- Perform climate risk assessments across the economy - Identify vulnerabilities, particularly within financial systems and key sectors - Follow best practice on scenario modeling - Identify the level of acceptable risk (by sector, region, hazard) thereby defining the scope of work for adaptation.	- Mandate companies and financial institutions to annually disclose their physical climate risks, management strategy - Implement climate literacy programs across communities and within the education system. - Foster human resource capacity through funding training on key skills required to support the transition.	- Establish clear ownership of the climate adaptation and disaster management agenda within government and communication channels between departments. - Clarify adaptation responsibilities of sub-national actors (agencies, local governments, private sector) and work with them to develop corresponding strategies. - Engage in cooperative international governance which supports resilience building e.g., transboundary fishing agreements, international compact on migration, ocean governance. - Support the Global Goal on Adaptation and development assistance to fund loss and damage in low-income countries.	- Set clear adaptation goals and develop action-oriented strategy. - Integrate A&R into sectoral strategies e.g., transport, buildings, cities - Set metrics for measuring implementation success. - Carry out regular progress reviews. - Use results to inform future plans and iterations. - Screen existing public policies and expenditures for climate vulnerabilities and maladaptation. - Harmonize adaptation goals with other national priorities (e.g. security) - Embed just and equitable considerations into policymaking	- Allocate budget for A&R efforts across the economy - Develop an A&R taxonomy, and/or embed climate adaptation within existing green taxonomies. - Participate in or pilot new financing mechanisms for adaptation measures e.g., public-private partnerships, debt for adaptation swaps, carbon and biodiversity markets. - Develop competitive process for achieving public adaptation & resilience goals, e.g., through project tenders or auctions.
Implement engineered solutions	Implement ecosystem-based solutions	Implement planning and social solutions	Rebuild better	Respond effectively	Increase financial resilience
- Invest in protective adaptation solutions, e.g., flood defenses starting with highest risk communities. - Research technologies, e.g., continuous monitoring, early detection, AI and alarm systems. - Invest in retrofitting and efficiency improvements. - Maintain reliable provision of public services e.g. building strategic reserves, investing in storage, diversifying supply and identifying alternative sourcing locations. - Expand air conditioning penetration or access to cooling stations. - Develop resilience ratings and minimum thresholds for new and existing assets.	- Enact policy and funding to support large scale ecosystem restoration in high-risk areas. - End harmful production subsidies and price supports leading to ecosystem degradation. - Invest in greening urban areas and surrounding public services. - Mandate the inclusion of ecosystem-based solutions in planning. - Enact policy and create incentives to support land stewardship practices, e.g., sustainable fishery management and regenerative agriculture.	- Deploy early warning systems. - In high-risk areas, limit development or initiate managed migration and exit of people and businesses. - Develop a strategy on climate-related immigration. - Reference projected future climate impacts when forming design standards and building codes. - Enforce building codes. - Provide upskilling, transition programs and income support to workers in sectors impacted by climate change or impacted by the transition to a resilient economy. - Support education programs and adapt guidelines to reduce vulnerability of communities.	- Bolster the insurance market. - Expand coverage, leverage public-private partnerships, introduce new products (parametric insurance, microinsurance). - Scale regional insurance programs for developing countries.	- Develop disaster response strategy and governance. - Engage closely with A&R agencies and sectors. - Allocate budget for disaster response which refreshes - Align with early warning systems to ensure timely response. - Maintain critical infrastructure and provision of goods and services during climate hazards. - Mobilize emergency services, search and rescue and aid providers.	- Enable access to emergency funds and social safety nets following climate events. - Enact strategy to manage post disaster displacement. - Provide support to affected communities, including on mental health. - Bolster industries vital to post disaster rebuild and repair e.g. construction. - Form strategy to build back better.

Source: BloombergNEF

Examples actions for financials

Measure the risks	Analyze the impacts	Communicate the implications	Enact governance	Develop a clear strategy	Budget for resilience
- Acquire and collect high-quality climate and asset location data. - Integrate forward-looking climate data into catastrophe models. - Track climate events and damages. - Adapt pricing models accordingly.	- Perform regular scenario modeling to understand impact on portfolio and to surface emerging risks. - Integrate into risk management processes. - Participate in central bank stress testing exercises. - Rethink existing models and frameworks given climate uncertainty.	- Set minimum requirements for reporting on climate vulnerabilities and adaptation plans by counterparties. - Encourage thorough and frequent reporting. - Engage with counterparties regularly and share learnings on vulnerabilities and best practices.	- Establish clear ownership of climate adaptation and resilience within the company and establish reporting lines between relevant departments. - Ensure board and management oversight. - Work with regional offices and counterparties to clarify responsibilities and to adapt overarching adaptation strategy to their circumstances. - Engage and network across the sector to identify and scale financing of adaptation and resilience solutions.	- Set clear adaptation goals and develop action-oriented strategy. - Integrate A&R into strategies for different asset classes. - Set metrics for measuring implementation success. - Carry out regular progress reviews. - Use results to inform future plans and iterations. - Assess company and investment policies and strategic priorities for climate vulnerabilities and potential for maladaptation.	- Engage in blended finance to fund adaptation agenda. - Develop an A&R taxonomy, and/or embed climate adaptation within existing green taxonomies. - Scale carbon and nature offset mechanisms to finance adaptation and resilience projects. - Identify innovative financing mechanisms to derisk emerging A&R solutions.
Implement engineered solutions	Implement ecosystem-based solutions	Implement planning and social solutions	Rebuild better	Respond effectively	Increase financial resilience
- Identify and fund hard adaptation solution providers and projects. Invest in monitoring and detection technologies and services. - Identify and fund adaptation solution providers and projects which support retrofits and efficiency gains.	- Identify and fund ecosystem-based solutions and consider blended finance vehicles. Extend green bond taxonomies to include nature-based activities. - Identify and fund soft adaptation solution providers such as efficiency improvements and practice change.	- Identify stranded assets (i.e., assets which may be too expensive to adapt or rebuild post disaster damage), report on physical and financial implications, plan for effective exit. - Support customers to save for and acquire loans for required retrofits or building works.	Increase insurance penetration, coverage and options for risk transfer.	Participate in or pilot new financing mechanisms for disaster relief e.g., catastrophe bonds.	Identify and invest in opportunities that will experience financial uplift from adaptation, e.g., solution providers, construction-related sectors.

Source: BloombergNEF

Examples actions for corporates

Measure the risks	Analyze the impacts	Communicate the implications	Enact governance	Develop a clear strategy	Budget for resilience
- Acquire and collect high-quality climate data. - Use technologies to enhance coverage and quality. - Identify locations of critical assets and suppliers. - Collaborate across the sector and with working groups.	- Assess and monitor physical climate risks across the supply chain on a regular basis using scenario analysis. - Integrate climate into existing risk management processes.	- Set minimum requirements for reporting on climate vulnerabilities and adaptation plans by key suppliers and customers. - Encourage thorough and frequent reporting. - Engage with suppliers regularly and share learnings on vulnerabilities and best practices.	- Establish clear ownership of climate adaptation and resilience within the company and establish reporting lines between relevant departments. - Ensure board and management oversight. - Work with regional offices, sites and suppliers to clarify responsibilities and to adapt overarching adaptation strategy to their circumstances. - Engage and network across the sector and through value chains to identify and scale adaptation and resilience solutions and lower systemic risk.	- Set clear adaptation goals and develop action-oriented strategy. Integrate A&R into departmental strategies e.g., procurement, sales. - Set metrics for measuring implementation success. - Carry out regular progress reviews. - Use results to inform future plans and iterations. - Assess corporate policies and strategic priorities for climate vulnerabilities and potential for maladaptation.	- Estimate needs for and allocate budget to adaptation and resilience across operations and the supply chain. - Develop an A&R taxonomy, and/or embed climate adaptation within existing green taxonomies. - Scale carbon and nature offset mechanisms to finance adaptation and resilience projects. - Identify innovative financing mechanisms to derisk emerging A&R solutions.
Implement engineered solutions	Implement ecosystem-based solutions	Implement planning and social solutions	Rebuild better	Respond effectively	Increase financial resilience
- Invest in continuous monitoring and early detection of climate hazards and vulnerabilities. - Invest in hard protections and adaptations at high-risk sites to protect critical assets - Retrofit infrastructure to become stronger and more resistant to climate hazards. - Address weaknesses in supply chains, identify alternative sources and consider diversification to ensure reliable supply of products from suppliers and/or to customers during climate hazard events. - Invest in infrastructure to ease pressures on employees and customers e.g., air conditioning.	- Adopt ecosystem-based solutions to protect supply chains and consider them within site planning. - Partner across the value chain to finance and implement high impact projects. - Work with, educate and provide financing solutions to producers to scale regenerative agriculture and resilient farming practices.	- Integrate physical climate risk assessment into spatial planning. - Develop design standards with resilience in mind. - Adhere to building codes. - Provide upskilling and transition programs to employees and critical communities where adaptation strategy may cause disruption to livelihoods e.g., loss of jobs, displacement.	- Procure insurance for critical assets. - Support suppliers to do the same.	- Educate stakeholders, customers on emergency protocol and availability of critical services. - Develop emergency access and evacuation strategies. - Implement emergency protocol effectively. - Maintain operations, services and supply chains where possible.	Scale industries vital to post disaster rebuild and repair e.g., construction, maintenance, essential goods.

Source: BloombergNEF

Example actions by sector

Action	Power	Industry	Transport	Buildings	Agriculture	Critical infrastructure
Reduce exposure of infrastructure, nature and people through physically preventing or reducing contact with highest risk climate hazards.	Invest in structural protection for critical energy assets in high-risk zones. This could include flood barriers or elevating sub stations. Invest in technologies which monitor, predict and alert to climate hazards.	Invest in structural protection of critical assets in high-risk zones, including measures such as flood barriers or elevation of assets. Invest in technologies which monitor, predict and alert to climate hazards.	Invest in structural protection of critical transport assets in high-risk areas. This could include elevation of roads, railways and ports, wind breaks or flood barriers. Invest in technologies which monitor, predict and alert to climate hazards.	Invest in structural protection of buildings, including raising foundations and constructing drainage channels. Invest in technologies which monitor, predict and alert to climate hazards.	Invest in structural protection of agricultural assets including irrigation canals or wind breaks. Invest in technologies which monitor, predict and alert to climate hazards e.g., vegetation coverage monitoring.	Invest in structural protection of hospitals, utilities and telecom stations, including flood barriers, drainage channels and wind breaks. Invest in technologies which monitor, predict and alert to climate hazards.
Reduce vulnerability of assets, ecosystems and communities by increasing durability of the built environment and access to critical infrastructure and resources.	Proactively retrofit energy assets and update the power grid for greater resilience e.g., undergrounding of power lines and use of heat-resistant materials. Support distributed renewable energy systems through investment in battery storage and smart grids.	Reinforce structures and retrofit existing industrial zones against relevant climate hazards e.g. air conditioning and use of heat-resistant materials. Research and scale the production of resilient materials, adaptation technologies and industries which will be required for new building standards, retrofits and rebuilds.	Retrofit transport to reinforce structures and provide ventilation and cooling. Improve permeability of roads, railway and other transport infrastructure. Establish back up systems to maintain functioning public transport and supply chains and deploy technologies which manage traffic and routing.	Retrofit or reinforce existing buildings using resilient building materials e.g. stronger, insulated, flood resistant. Invest in cooling techniques and technologies e.g., cool roofs, air conditioning.	Reinforce and retrofit agricultural structures such as barns to withstand higher temperatures and extreme weather events. Scale cold chain and food storage systems to build food security. Scale precision agriculture, efficient irrigation and water management technologies e.g., drip irrigation, use of drones.	Reinforce and retrofit hospitals and clinics against extreme heat and climate hazards. Increase access to services through telemedicine and mobile health services, resilient rural internet extension and satellite networks. Implement water reuse and recycling. expand water storage and management infrastructure e.g., reservoirs, tanks, rain capture, smart water meters

Source: BloombergNEF

Example actions by sector

Action	Power	Industry	Transport	Buildings	Agriculture	Critical infrastructure
Reduce exposure of assets and communities to climate hazards by restoring vital ecosystems and implementing urban nature-based solutions.	Use nature buffers and protections for critical energy assets in high-risk zones e.g., planting trees or hedgerows around power plants	Use nature buffers and protections for critical industrial assets in high-risk zones e.g., planting trees around industrial sites	Use natural buffers and protections for critical transport assets in high-risk zones e.g., green corridors and vegetated slopes alongside roads and railways or mangrove restoration near to ports.	Use natural buffers and protections for buildings in high-risk zones. Scale urban nature-based solutions e.g., green roofs, urban green space, tree cover in streets.	Invest in ecosystem restoration and protection in high-risk agricultural locations. Use nature buffers and protections such as riparian buffer zones and hedgerows. Protect and restore watersheds and wetlands in agricultural areas.	Invest in ecosystem restoration or natural buffers surrounding critical infrastructure in high-risk zones.
Reduce vulnerability of ecosystems and communities by promoting land stewardship, agricultural practice change and diversification.	N/A	N/A	N/A	N/A	Promote soil and nutrient management practices to improve overall soil health and agricultural resilience. Consider practices such as integrated crop and livestock systems, controlled release fertilizers, reduced tillage, crop rotations including legumes and agroforestry. Invest in more resilient seed and livestock varieties. Increase food security by supporting projects and technologies to reduce food loss and waste and shift diets towards more plant-based and locally grown foods. Invest in seed banks for long term resilience.	N/A

Source: BloombergNEF

Example actions by sector

Action	Power	Industry	Transport	Buildings	Agriculture	Critical infrastructure
Reduce exposure of communities and assets to climate hazards through management of human settlements and infrastructure development.	Embed climate resilience into the design of new power and grid infrastructure and site selection. Review regularly. If necessary, develop relocation plans for critical energy assets in high-risk zones.	Update building codes to require all new industrial facilities to be built with climate resiliency in mind. Embed climate projections into site selection and supply chain planning and review regularly.	Embed climate projections into the design of new transport assets and infrastructure. Consider climate risks when planning routes for public transport, freight, shipping, and aviation.	Embed climate projections and resilience considerations into building codes and explore innovative building design options. Embed both climate impacts (e.g., migration) and resilience building (e.g., site selection) considerations into spatial and urban planning. If necessary, develop planned retreat or migration strategies for highly exposed communities.	Embed climate resilience into agricultural planning e.g. changing timing or locations of planting, harvests, fishing and livestock grazing in line with shifting climatic conditions. Expand more resilient, non-agricultural production methods in high-risk locations e.g., precision fermentation.	Embed climate resilience into the design of new critical infrastructure. If necessary, develop relocation or expansion plans for critical services in highest-risk locations.
Strengthen community and system capacity to cope with climate hazards through education, social safety nets and community-based adaptation planning.	Update employee health and safety plans to encompass climatic changes. Support employees and local communities in high-risk locations.	Update employee health and safety plans to encompass climatic changes. Support employees and local communities in high-risk locations.	Update employee health and safety plans to encompass climatic changes. Invest in technological solutions to track and build efficiency across supply chains. Support employees and local communities in high-risk locations.	Update employee health and safety plans to encompass climatic changes. Support residents to build resilience in their homes and communities.	Invest in farmer training on how to implement and finance climate resilient agricultural practices. Update farmer health and safety plans to encompass climatic changes. Provide community support to farmers and local residents in high-risk locations.	Update employee health and safety plans to encompass climatic changes. Ensure communities are aware of public services available. Expand vaccination programs and drug treatments for climate related diseases. Deploy air quality monitoring and purification.

Source: BloombergNEF

Copyright and disclaimer

Copyright

© Bloomberg Finance L.P. 2025. This publication is the copyright of Bloomberg Finance L.P. in connection with BloombergNEF. No portion of this document may be photocopied, reproduced, scanned into an electronic system or transmitted, forwarded or distributed in any way without prior consent of BloombergNEF.

Disclaimer

The BloombergNEF ("BNEF"), service/information is derived from selected public sources. Bloomberg Finance L.P. and its affiliates, in providing the service/information, believe that the information it uses comes from reliable sources, but do not guarantee the accuracy or completeness of this information, which is subject to change without notice, and nothing in this document shall be construed as such a guarantee. The statements in this service/document reflect the current judgement of the authors of the relevant articles or features, and do not necessarily reflect the opinion of Bloomberg Finance L.P., Bloomberg L.P. or any of their affiliates ("Bloomberg"). Bloomberg disclaims any liability arising from use of this document, its contents and/or this service. Nothing herein shall constitute or be construed as an offering of financial instruments or as investment advice or recommendations by Bloomberg of an investment or other strategy (e.g., whether or not to "buy", "sell", or "hold" an investment). The information available through this service is not based on consideration of a subscriber's individual circumstances and should not be considered as information sufficient upon which to base an investment decision. You should determine on your own whether you agree with the content. This service should not be construed as tax or accounting advice or as a service designed to facilitate any subscriber's compliance with its tax, accounting or other legal obligations. Employees involved in this service may hold positions in the companies mentioned in the services/information.

The data included in these materials are for illustrative purposes only. The BLOOMBERG TERMINAL service and Bloomberg data products (the "Services") are owned and distributed by Bloomberg Finance L.P. ("BFLP") except (i) in Argentina, Australia and certain jurisdictions in the Pacific islands, Bermuda, China, India, Japan, Korea and New Zealand, where Bloomberg L.P. and its subsidiaries ("BLP") distribute these products, and (ii) in Singapore and the jurisdictions serviced by Bloomberg's Singapore office, where a subsidiary of BFLP distributes these products. BLP provides BFLP and its subsidiaries with global marketing and operational support and service. Certain features, functions, products and services are available only to sophisticated investors and only where permitted. BFLP, BLP and their affiliates do not guarantee the accuracy of prices or other information in the Services. Nothing in the Services shall constitute or be construed as an offering of financial instruments by BFLP, BLP or their affiliates, or as investment advice or recommendations by BFLP, BLP or their affiliates of an investment strategy or whether or not to "buy", "sell" or "hold" an investment. Information available via the Services should not be considered as information sufficient upon which to base an investment decision. Bloomberg makes no claims or representations, or provides any assurances, about the sustainability characteristics, profile or data points of any underlying issuers, products or services, and users should make their own determination on such issues. The following are trademarks and service marks of BFLP, a Delaware limited partnership, or its subsidiaries: BLOOMBERG, BLOOMBERG ANYWHERE, BLOOMBERG MARKETS, BLOOMBERG NEWS, BLOOMBERG PROFESSIONAL, BLOOMBERG TERMINAL and BLOOMBERG.COM. Absence of any trademark or service mark from this list does not waive Bloomberg's intellectual property rights in that name, mark or logo. All rights reserved. © 2025 Bloomberg.

BloombergNEF (BNEF) is a strategic research provider covering global commodity markets and the disruptive technologies driving the transition to a low-carbon economy.

Our expert coverage assesses pathways for the power, transport, industry, buildings and agriculture sectors to adapt to the energy transition.

We help commodity trading, corporate strategy, finance and policy professionals navigate change and generate opportunities.

BloombergNEF

Danya Liu dliu294@bloomberg.net

Natasha Mawdsley nmawdsley1@bloomberg.net

Client enquiries:

Bloomberg Terminal: press <Help> key twice

Email: support.bnef@bloomberg.net

Learn more:

about.bnef.com | [@BloombergNEF](https://twitter.com/BloombergNEF)