MSCI Institute

Transition Finance Tracker

SPECIAL EDITION

Spotlight on adaptation and resilience

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Foreword

The cost of physical risk is rising. So is the investment case for adaptation and resilience.

Extreme weather events and other hazards could cost listed companies an estimated USD 1.3 trillion this year, with chronic risks, led by extreme heat, eroding revenues. Insured losses from physical risk topped USD 100 billion last year for the sixth consecutive year.[1]

This edition of our Transition Finance Tracker highlights two manifestations of that risk unfolding in real time: the physical climate exposure of AI data centers — increasingly a linchpin of the modern economy — and a growing gap in homeowners' insurance in U.S. states that are most exposed to extreme weather.

As London Climate Action Week opens, the latest report from the U.K. Climate Change Committee puts hard numbers on the stakes.[2] In a world that warms 2°C (3.6°F) above preindustrial times by 2050, for example, 92% of British homes are at risk of overheating — think nighttime temperatures of 26°C (79°F) in bedrooms — highlighting the need for adequate cooling. The benefits of investing in cooling, including reductions in heat-related deaths and emergency hospital admissions, would exceed the costs by roughly 1.3 to one, according to one Committee estimate.

With that as background, we highlight exposure to physical risk in the U.K., which is a microcosm of exposure unfolding globally. We explore the investment performance of companies selling adaptation and resilience solutions, and how that picture varies by industry and geography. We also examine demand for air conditioning — a solution that helps people adapt to a warming world but also contributes to the emissions warming it.

The Committee observed that the U.K. was built for a climate that no longer exists. The same is true of most economies and societies. As the data suggests, adaptation and resilience may prove to be a defining source of financial risk and opportunity over the decade ahead.

Linda-Eling Lee
Founding Director,
MSCI Institute

Highlights

1. **Rain-induced flooding presents the top physical hazard to AI data centers in the U.K.** Three — to be built at Hillingdon, Newham and Long Drax, respectively — could face significant disruption in a once-in-a-hundred-year weather event. The risk of flooding in its various forms presents the hazard most likely to disrupt AI data centers globally.

2. **Storms present the greatest physical climate risk to facilities of U.K.-based listed companies**, with 88% exposed, based on MSCI's adaptation and resilience data. Roughly half (47%) indicate some action to reinforce their resilience.

3. **Property insurers are pulling back in the U.S. counties most exposed to physical hazards.** Nonrenewal rates in those counties rose to 1.4% in 2023, compared with 0.87% in less-exposed counties.

4. **For now, adaptation and resilience providers barely edge ahead.** Among listed large- and mid-cap companies, companies with revenue from adaptation and resilience solutions performed only slightly better (+65%), on average, compared with non-providers (+59%), over the 29 months ended May 31, 2026.

5. **A hotter world will drive exponential demand for cooling as households and business adapt.** That could double emissions by 2050 from a 2016 base of 1.1 gigatons ($GtCO_2e$), according to the International Energy Agency.

6. **Adaptation may be at least as important as AI in shaping the electricity grid.** Global electricity demand is projected to grow by roughly 6,750 terawatt-hours (TWh) between now and 2030, with cooling of spaces — at 651 TWh — driving more electricity demand than the boom in data centers (530 TWh).

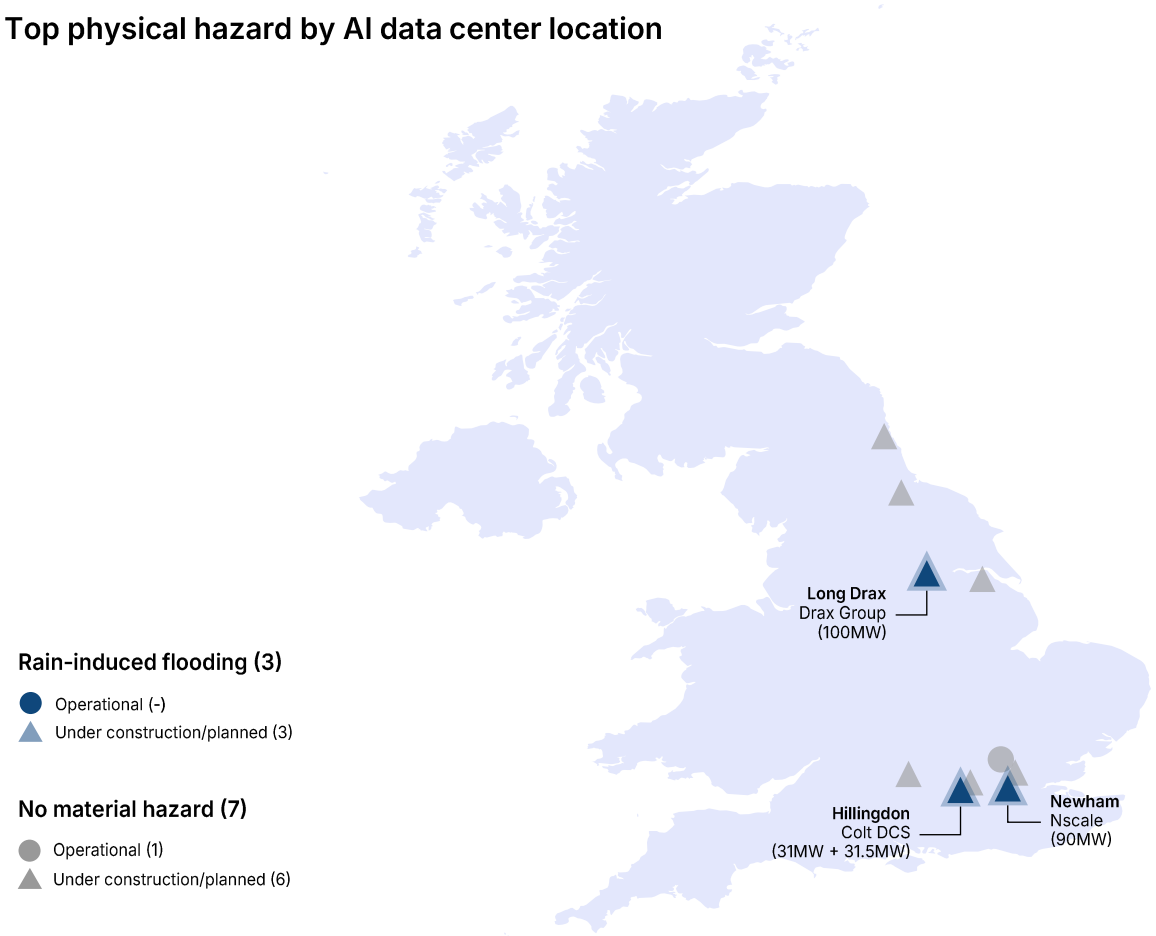
7. **The Asia-Pacific region has emerged as the epicenter of demand for cooling as an adaptation to rising heat.** Companies there account for roughly 48% of those that sell air conditioning globally (roughly in line with their representation in the universe of listed companies) but make up more than two-thirds (68%) of those building air-conditioning capacity specifically to address the risks of extreme heat.

8. **Providers of adaptation and resilience solutions span industries.** Among listed large - and mid - cap companies, the insurance (77%), capital goods (69%) and telecommunication services (68%) industries have the highest share providing at least one adaptation and resilience solution.

Are U.K. data centers vulnerable to physical hazards?

- **Flooding from heavy rainfall represents the chief physical hazard to data centers in the U.K. designed to train large AI models.** Among those in our dataset, one — Waltham Cross — is currently operational; the other nine are under construction or planned.
- **Three locations — Hillingdon, Newham and Long Drax — could face significant disruption** in a once-in-a-hundred-year weather event.
- **The largest U.K. AI campus by capacity is Cambois in Northumberland at 720 MW.** Its modeled flood and cyclone exposure is low, but its coastal location near the North Sea may present site-specific risks not fully captured by current modeling.
- **For investors, the picture is consistent:** sites under construction or planned are concentrated inland and in Greater London, locations where flooding from heavy rainfall is the primary physical risk to plan for.

Top physical hazard by AI data center location

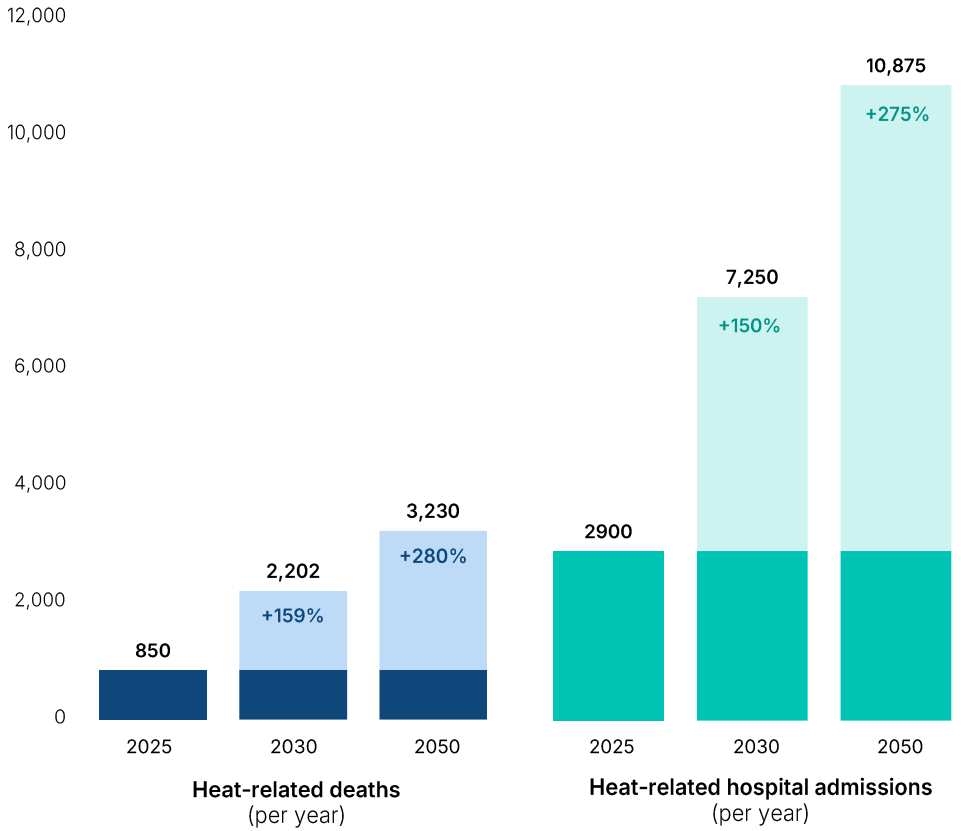


Source: Data centers and construction status from MSCI's Real Capital Analytics dataset, covering roughly 9,000 data-center assets, and additional research, as of June 12, 2026. MSCI Sustainability & Climate Research geospatial return-period (RP) physical-risk data, showing the greatest financial impact per site among tropical cyclone and coastal, fluvial and pluvial flooding hazards, which are in scope of MSCI's RP-100 business-interruption loss estimates. MSCI's RP-100 business-interruption loss estimates, based on a current-policies scenario, show how much of a site's annual revenue could be lost in a one-in-a-hundred-year event (annual probability of 1%), as of June 12, 2026.

What are the health impacts of heat waves in the U.K.?

- **As the U.K. warms, a key question for investors and policymakers** is which mix of cooling solutions — active AC, passive measures, urban greening — gets deployed at what scale, and how quickly.
- **The average annual number of heat-related deaths in the U.K. could rise from roughly 850 a year currently to 2,200 in the 2030s and 3,200 in the 2050s if global temperatures were to rise 2°C (3.6°F) above preindustrial levels,** according to the U.K. Climate Change Committee.[3] Heat-related emergency hospital admissions follow the same trajectory. The Committee values the annual health-system cost at £1.3 billion (USD 1.7 billion) in the 2030s and £1.9 billion (USD 2.6 billion) in the 2050s, based on 2025 prices.
- **Cooling — air conditioning combined with passive measures such as ventilation, blinds and insulation — features prominently in the Committee's recommendations,** which span homes, hospitals and public spaces. The Committee estimates these measures could reduce excess heat-related deaths by 31% in the 2030s and 37% by mid-century, while cutting heat-related emergency admissions by 3% and 12%, respectively.
- **The cost of inaction outweighs the cost of action.** The Committee estimates that investing £14 billion (USD 18.8 billion) a year in adaptation would avoid £17 billion (USD 22.8 billion) per year in damages at 2025 prices.

Projected rise in annual heat-related deaths and emergency hospital admissions



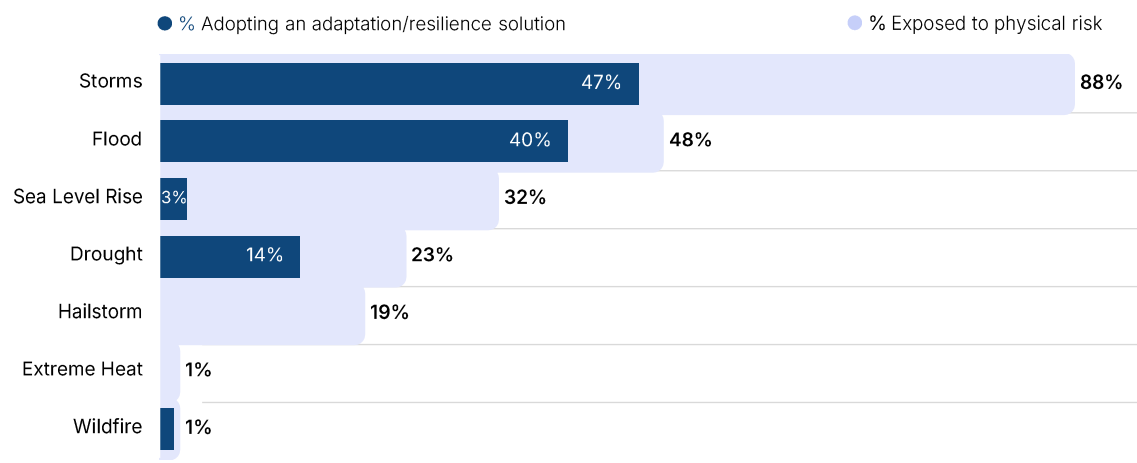
Source: MSCI Sustainability & Climate Research, based on estimated annual excess deaths/accident and emergency admissions attributable to heat at circa 2°C warming detailed in "A Well-Adapted UK: The Fourth Independent Assessment of UK Climate Risk (CCRA4-IA)," May 20, 2026. Forecasted numbers based on computation from the report's growth estimates.

How are U.K. companies adapting to rising physical risks?

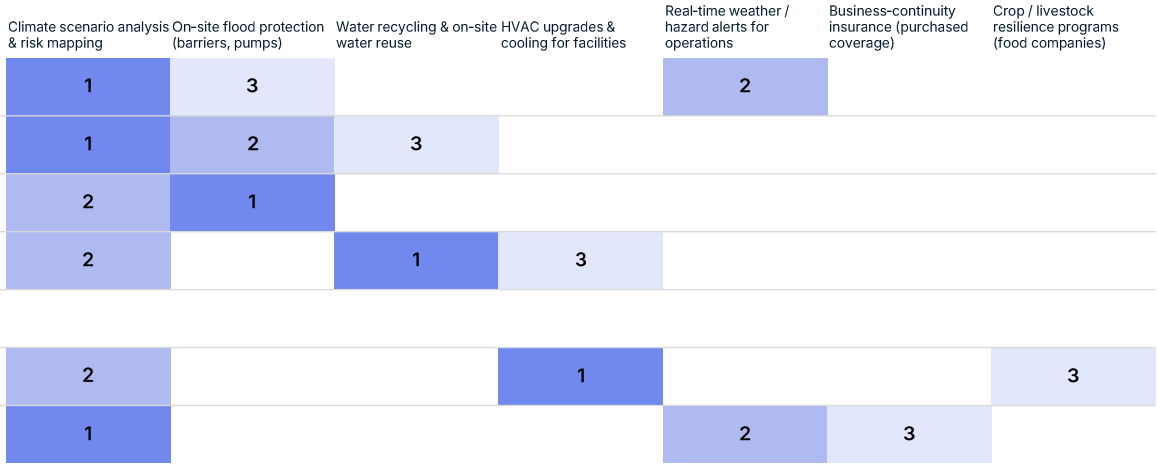
- **Among U.K.-based listed companies, storms are the most pervasive significant exposure, affecting 88% of companies,** driven largely by extreme winds from the North Atlantic. Flooding follows at 48%. Companies primarily use scenario analysis and risk mapping to address both hazards, with on-site flood protection the second-most-cited response.
- **Extreme heat is the mirror image.** It barely registers as a significant exposure by physical-risk models, yet roughly 14% of U.K. companies are already retrofitting ventilation and air conditioning — suggesting they are getting ahead of a hazard that may be building on the horizon.

Physical risk exposure and adaptation response, U.K.-based listed companies

Percentage of companies exposed significantly to physical risk



Top-3 adaptation and resilience solutions used, by physical risk

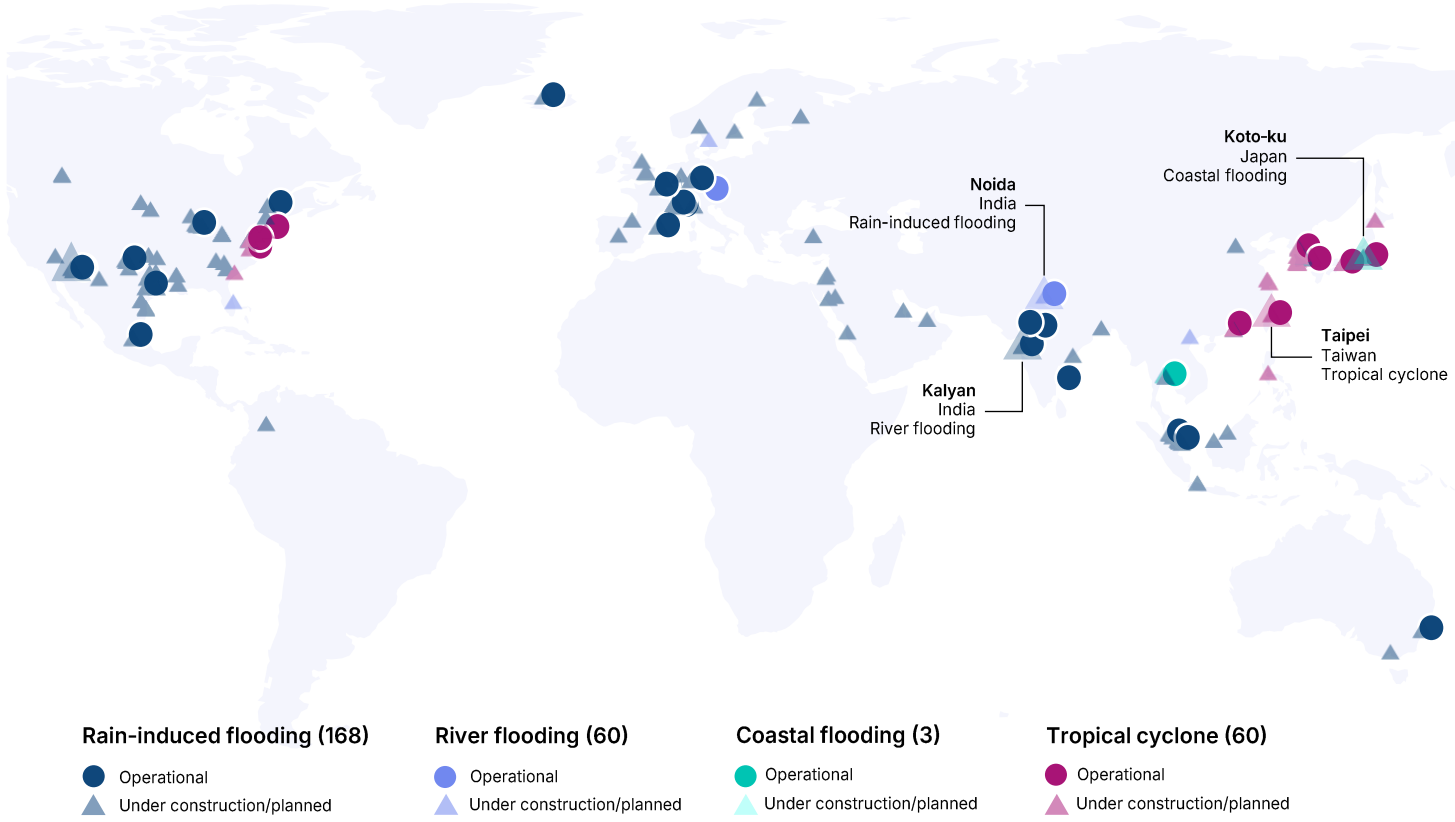


Source: MSCI Sustainability & Climate Research, based on data from MSCI Adaptation and Resilience Metrics and MSCI Physical Risk Metrics, as of June 12, 2026.

Which physical hazards pose risks to AI data centers globally?

- **For each data center in our dataset that is designed to train large AI models, the map shows the single physical hazard most likely to cause significant business disruption in a once-in-a-hundred-year event.** Those most exposed to each hazard are all planned or under construction in the Asia-Pacific region.
- **Flood risk in its various forms dominates across most sites globally.** Tropical cyclones are the leading hazard along the U.S. Gulf and East coasts, as well as in Japan.
- **The hazards are not hypothetical.** In September 2018, a severe thunderstorm near Microsoft's San Antonio data center caused spikes and drops in voltage that knocked out cooling and damaged significant hardware.[4] Full recovery of dependent cloud services took 21 hours and cascaded globally.

Top physical hazard by AI data center location

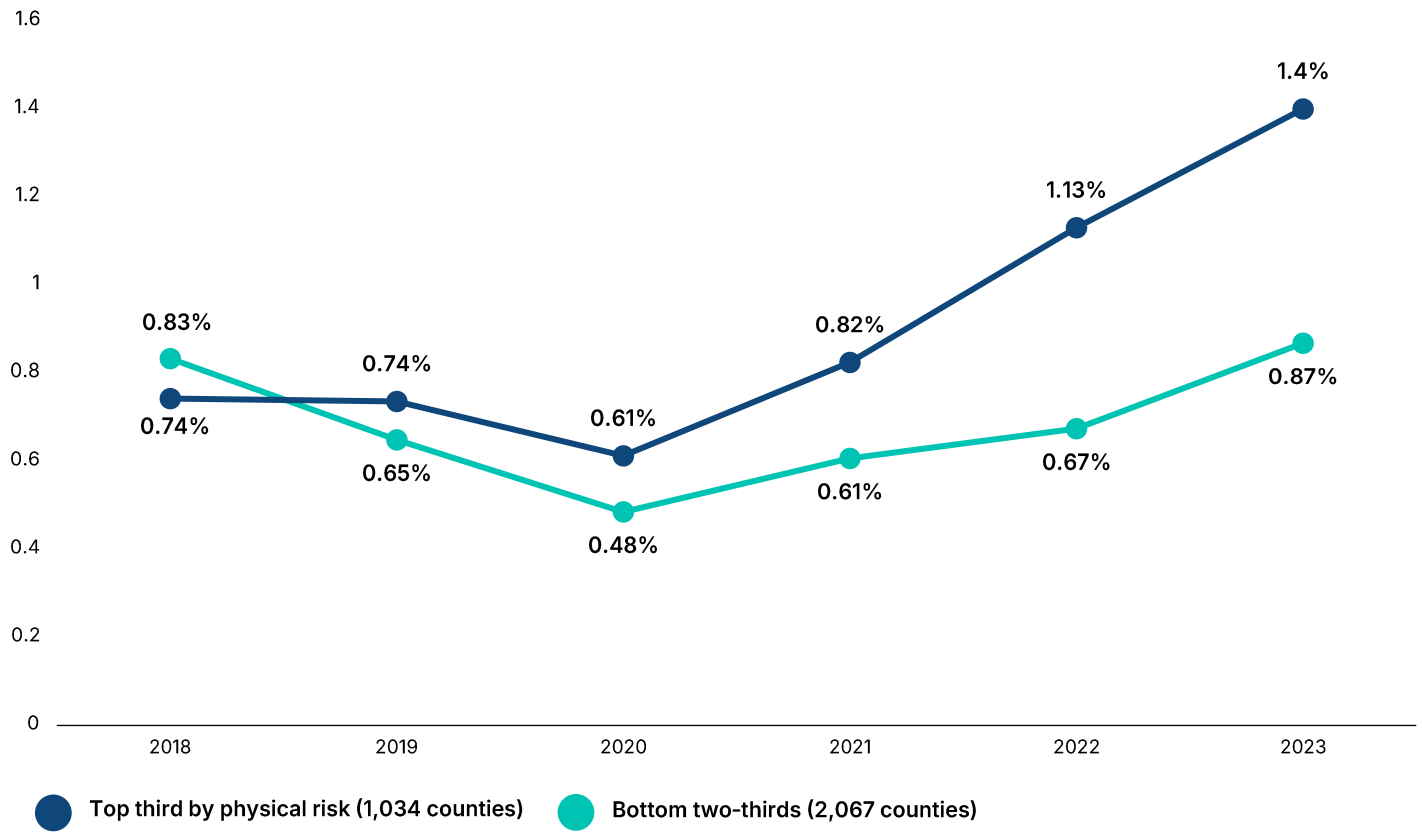


Source: Data centers and construction status from MSCI's Real Capital Analytics dataset, covering roughly 9,000 data-center assets, and additional research, as of June 12, 2026. MSCI Sustainability & Climate Research geospatial return-period (RP) physical-risk data, showing the greatest financial impact per site among tropical cyclone and coastal, fluvial and pluvial flooding hazards, which are in scope of MSCI's RP-100 business-interruption loss estimates. These estimates are based on a current-policies scenario. MSCI's RP-100 business-interruption loss estimates how much of a site's annual revenue could be lost in a one-in-a-hundred-year event (annual probability of 1%), as of June 12, 2026. Only data centers whose RP-100 business-interruption loss estimates exceed 1% on any hazard in scope are included.

Where are U.S. homeowners unable to renew insurance policies?

- **Property insurers are pulling back from U.S. counties with the highest exposure to acute hazards** such as wildfire, tropical storms, and rain-induced and coastal flooding.
- **In 2018, the highest-risk third of U.S. counties had a slightly lower rate of home-insurance nonrenewal** than the rest of the country — 0.74% versus 0.83%. By 2023, the picture had flipped: nonrenewal rates in the counties most exposed to physical hazards hit 1.4%.

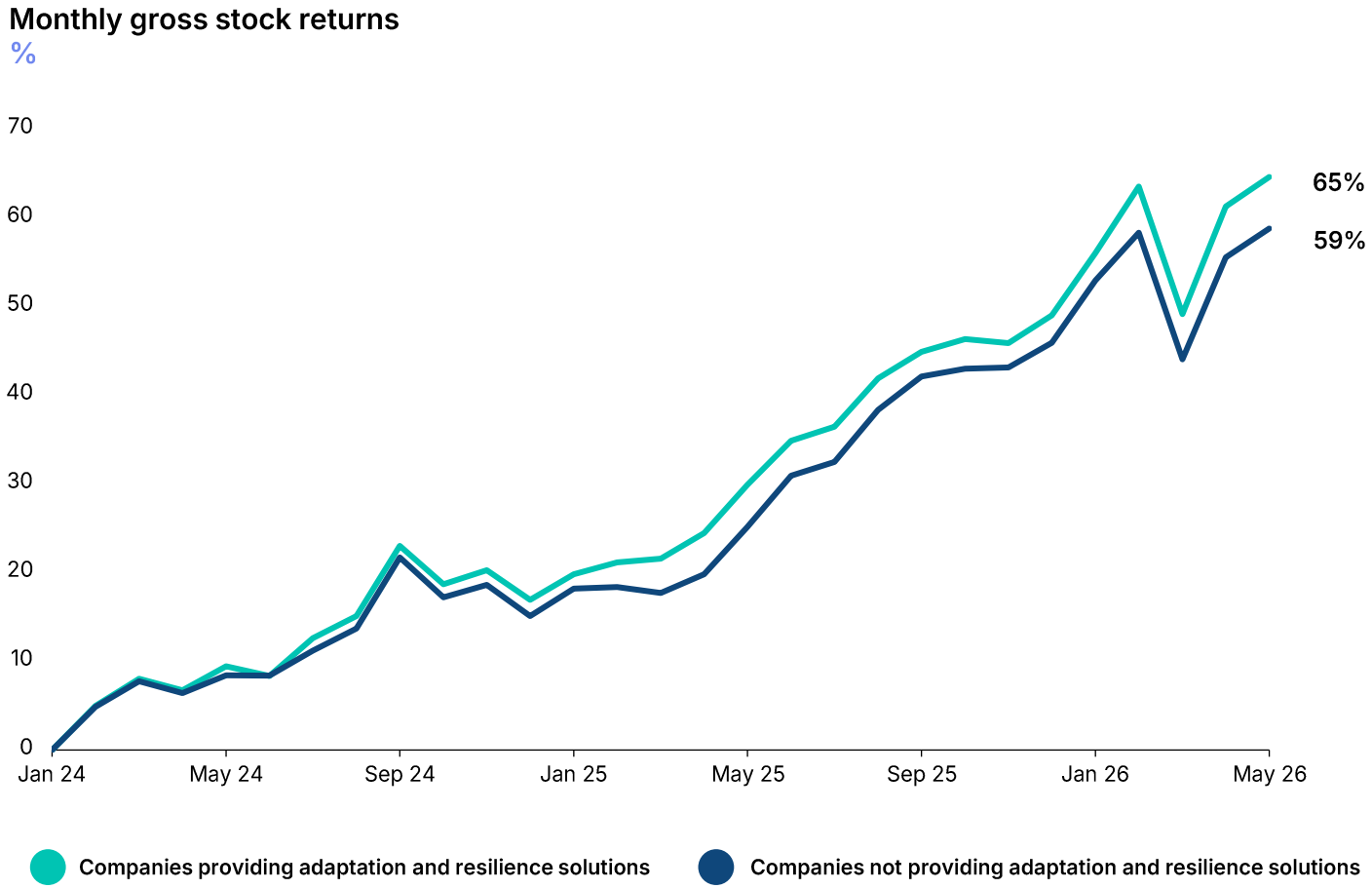
Home-insurance nonrenewal rates in U.S. counties by physical-risk tier



Source: MSCI Sustainability & Climate Research average hazard percentile data based on wildfire, fluvial, pluvial and coastal flooding, and tropical cyclones for U.S. counties, as of June 12, 2026. These estimates are based on a current-policies scenario. Non-renewal data from "'Insurance Company Climate Crisis," U.S. Senate Budget Committee, December 2024, showing per-county yearly nonrenewal counts and policies in force. Analysis covers 3,102 counties matched across the two datasets.

How have providers of adaptation and resilience solutions performed?

- **Among listed large- and mid-cap companies, companies with revenue from adaptation and resilience solutions performed only slightly better (+65%),** on average, compared with non-providers (+59%), over the 29 months ended May 31, 2026.
- **Note that revenue from adaptation and resilience solutions may constitute an insignificant share of solutions providers' overall revenue.** The chart shows who is in the market for adaptation and resilience, not who specializes in it. The cohort is overrepresented in the financials, industrials and utilities sectors, which rallied in the second half of the period, and underrepresented in consumer discretionary, consumer staples and energy sectors, which fell over the same time.



Source: MSCI Sustainability & Climate Research, based on companies in the MSCI ACWI Index as of May 31, 2026. Monthly returns are based on USD gross amounts, including dividends. Companies providing adaptation and resilience solutions are defined as companies with at least one adaptation or resilience solution among their products and services, as disclosed in their reporting across 10 adaptation themes (flood, drought, wildfire, cyclone/hurricane/storm, sea-level rise, extreme heat, hailstorm, landslide, extreme cold, and cross-sectional) in MSCI's Adaptation and Resilience Metrics dataset (simulated results) for the calendar year 2025. Cohort monthly returns are computed as the simple cross-sectional average of constituents' monthly USD total returns, then compounded and rebased to 100 as of Jan. 31, 2024.

Which industries are providing adaptation and resilience solutions?

- **Among listed large- and mid-cap companies, the insurance (77%), capital goods (69%) and telecommunication services (68%) industries have the highest share** providing at least one adaptation and resilience solution.
- **The data suggests that adaptation and resilience solutions take a variety of forms.** Insurance companies, which also rank highly, offer a mix of climate-hazard products, catastrophe bonds, and parametric and reinsurance solutions. Companies in the capital-goods industry — which includes manufacturing — provide flood-protection works, drainage, seawall and levee infrastructure, water-treatment equipment, and ventilation and cooling (HVAC) systems.
- **Though it may seem counterintuitive that companies in the telecommunications services sector are involved in adaptation and resilience solutions,** they produce precision-agriculture sensors for aquaculture, farm-management software for water optimization and bundled-satellite imagery with smart-farming software.

Top adaptation and resilience providers by industry group (%)

		HVAC & cooling systems	Early-warning sensors & monitoring	Water treatment, recycling & desalination	Green loans, mortgages & adaptation financing	Precision-agriculture IoT & sensor packages	Climate-hazard insurance products	Backup power & microgrids	Climate risk analytics & advisory	Companies analyzed
Insurance	77%		2				1		3	94
Capital Goods	69%	2		1		3				284
Telecommunication Services	68%		2	3		1				59
Banks	61%				1		2		3	210
Real Estate Management & Development	58%	1		2					3	52
Commercial & Professional Services	49%			1		2	3			39
Software & Services	45%	3		1		2				97
Consumer Durables & Apparel	44%	1	2							41
Utilities	43%	2		1				3		130
Automobiles & Components	42%	1		3				2		67

Source: MSCI Sustainability & Climate Research, based on MSCI's Adaptation and Resilience Metrics dataset (simulated results) and companies in the MSCI ACWI Index as of June 12, 2026. Industry groups reflect the Global Industry Classification Standard (GICS®) jointly developed by MSCI and S&P Dow Jones Indices.

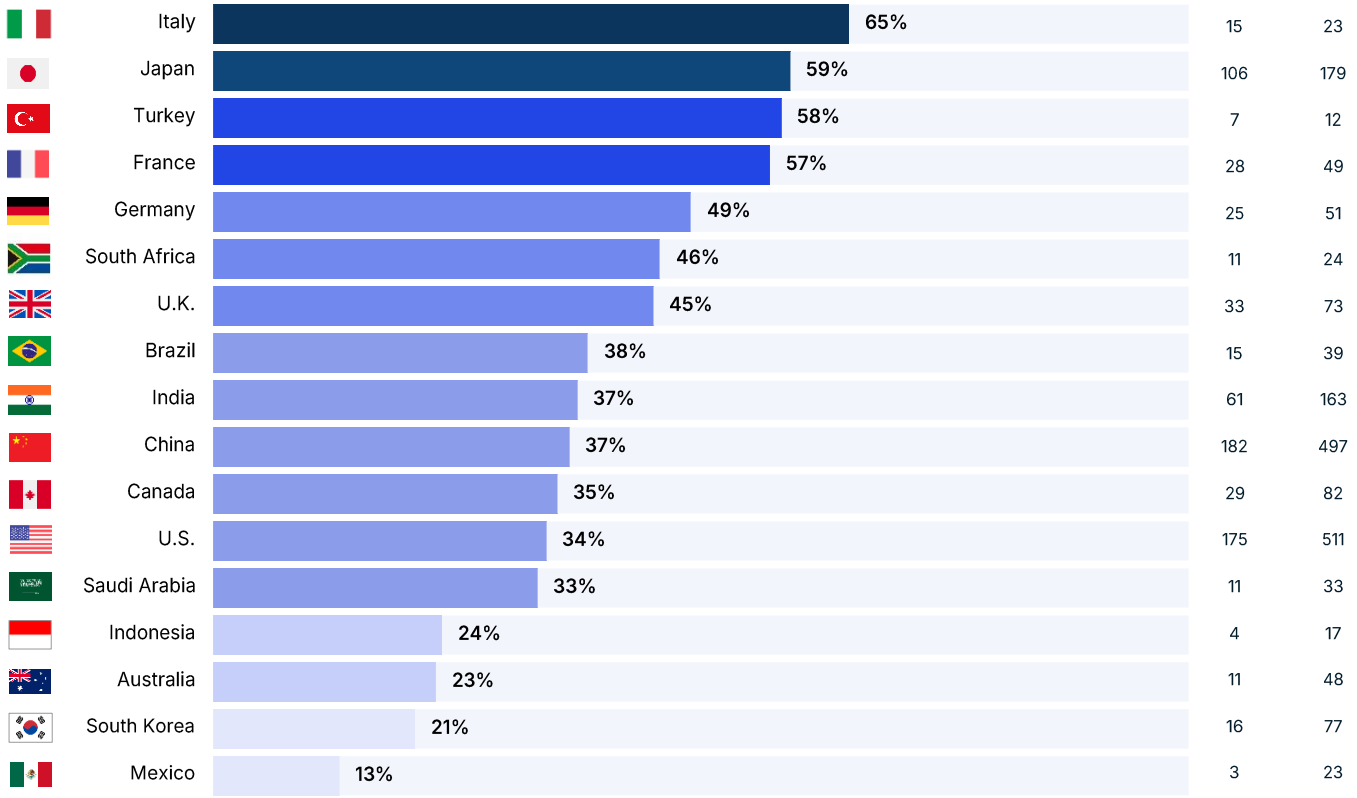
Where are providers of adaptation and resilience solutions based?

- **Nearly two-fifths (39%) of listed large- and mid-cap companies globally sell at least one product or service that helps customers adapt to climate change** — such as flood barriers, irrigation gear, weather analytics, parametric insurance, and green mortgages — based on companies' latest reporting.
- **Among companies in the largest economies, Italy leads with nearly two-thirds of those analyzed offering at least one adaptation solution, followed by their counterparts in Japan, Turkey and France.** (Italy's high share reflects a combination of regulatory requirements for catastrophe insurance, a relatively finance-heavy listed sector, and a small, analyzed universe of 23 companies.) South Korea and Mexico have the lowest share, at 21% and 13%, respectively.
- **Note that companies included here offer at least one adaptation and resilience solution;** for most, it's not their main business. The chart shows who is in the market for adaptation and resilience, not who specializes in it.

Resilience-solutions sellers by major economy

%

	Sellers	Analyzed companies
Italy	15	23
Japan	106	179
Turkey	7	12
France	28	49
Germany	25	51
South Africa	11	24
U.K.	33	73
Brazil	15	39
India	61	163
China	182	497
Canada	29	82
U.S.	175	511
Saudi Arabia	11	33
Indonesia	4	17
Australia	11	48
South Korea	16	77
Mexico	3	23

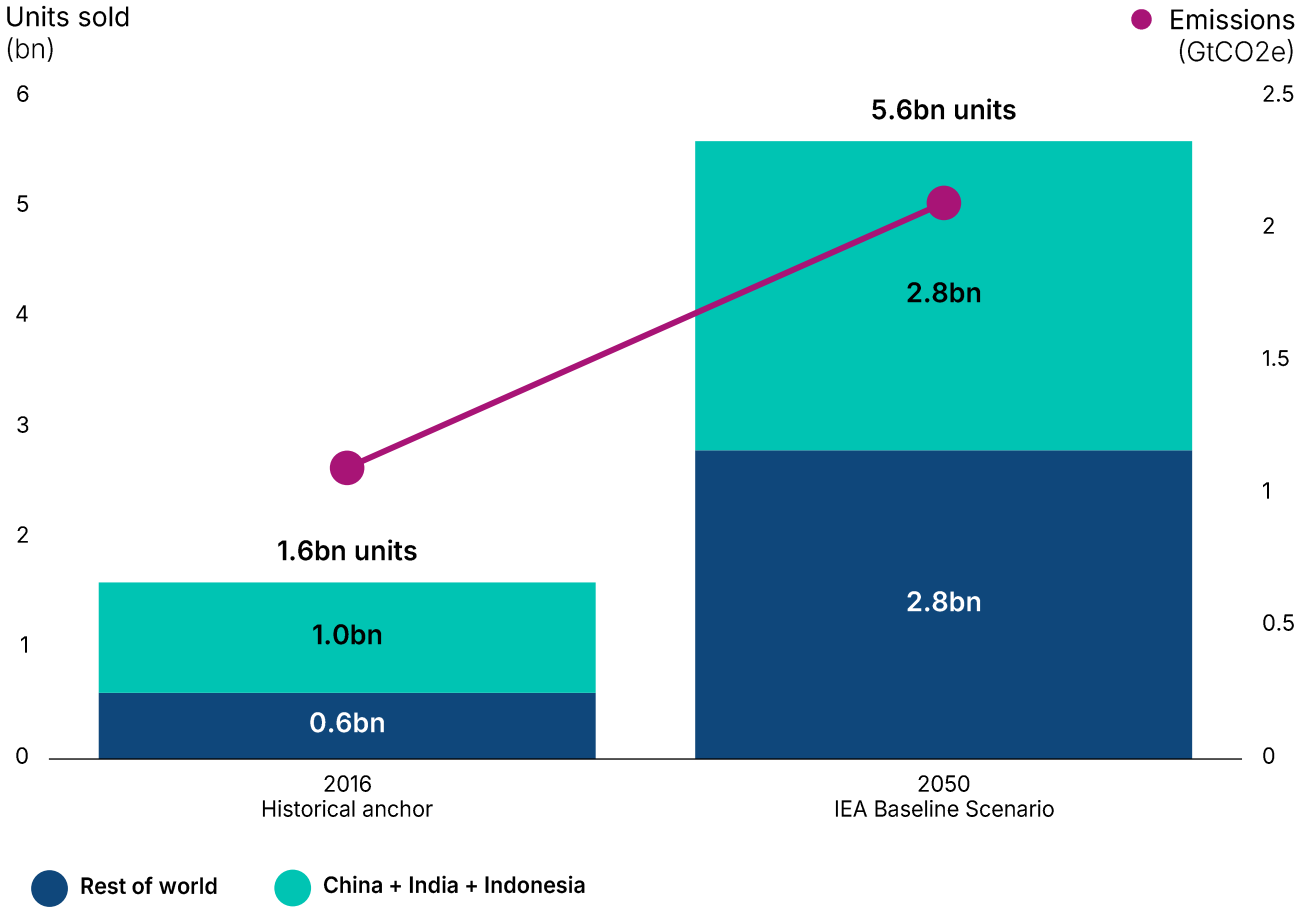


Source: MSCI Sustainability & Climate Research, based on companies in the MSCI ACWI Index as of April 30, 2026. Major economies represented here are from the G20, except Argentina and Russia which have no listed companies in the index. Providers of adaptation and resilience solutions are defined as companies with at least one adaptation and resilience solution among their products and services, as disclosed in their reporting across 10 adaptation themes (flood, drought, wildfire, cyclone/hurricane/storm, sea-level rise, extreme heat, hailstorm, landslide, extreme cold, and cross-sectional) in MSCI's Adaptation and Resilience Metrics dataset (simulated results) for the calendar year 2025.

Is air conditioning an adaptation opportunity or a climate risk?

- **Air conditioning is the quintessential climate-adaptation product** — a defense against the very heat its operation accelerates. The global stock of AC units rose from roughly 1.6 billion in 2016 and could more than triple to 5.6 billion by 2050 under the International Energy Agency's Baseline Scenario.
- **In this baseline scenario, China, India and Indonesia alone are expected to account for half of that 2050 stock.** Cooling-sector emissions reached about 1.1 GtCO2e in 2016, according to the IEA, which projects roughly double that level by 2050 without major gains in energy and carbon efficiency.
- **For investors, demand for cooling signals both the scale of adaptation need** in a hotter world and the transition risk that managing it can create.

Global AC stock and cooling-sector emissions

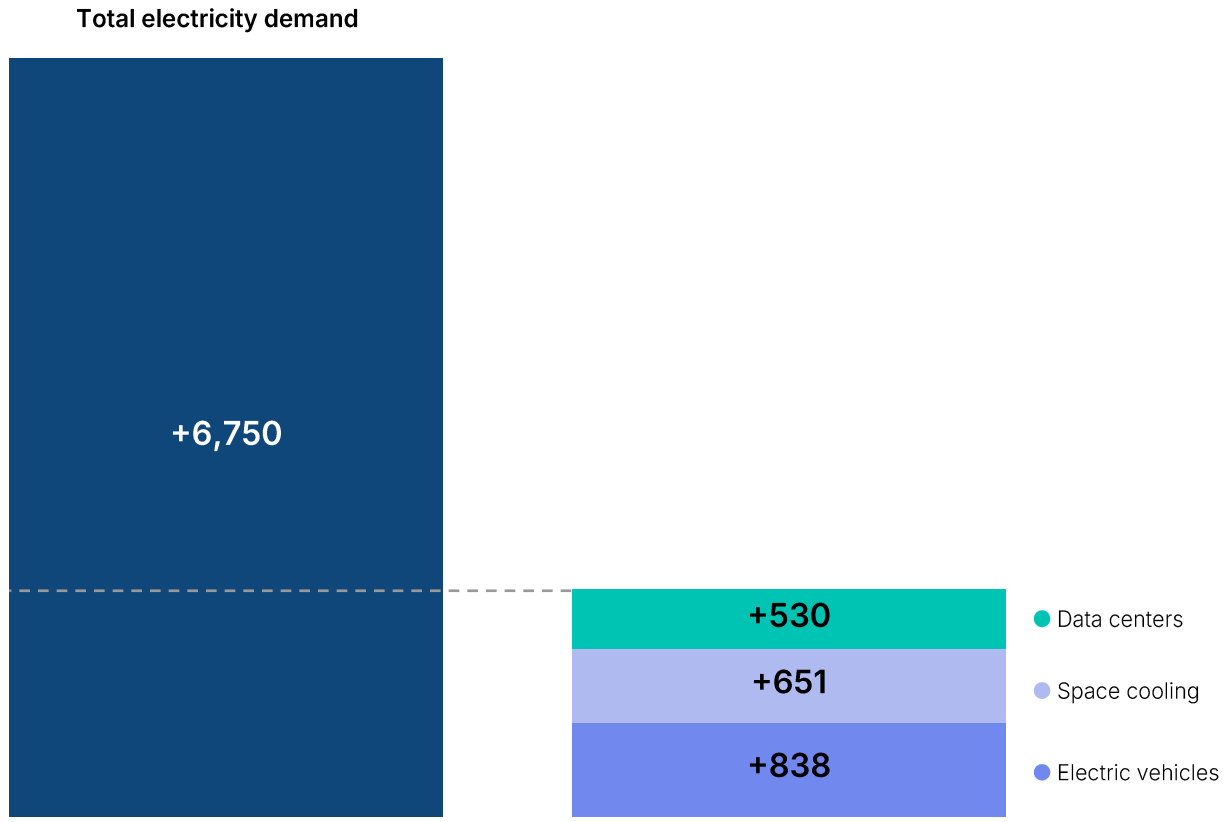


Source: "The Future of Cooling," International Energy Agency (IEA), May 2018, and "Energy Efficiency 2024," November 2024, IEA.

How could demand for cooling impact the electricity grid?

- **Adaptation could rival AI as one of the largest sources of demand for electricity globally in the remainder of this decade.** Global electricity demand is projected to grow by roughly 6,750 TWh between now and 2030, according to the IEA. Of that growth, electric vehicles account for 838 TWh, space cooling for 651 TWh, and data centers for 530 TWh — suggesting that adaptation to climate change is at least as important as the energy transition and the AI build-out in shaping the grid.
- **More cooling can mean more emissions.** When AC units run on coal- or gas-heavy grids, rising demand for cooling translates into more greenhouse-gas emissions — over 1 GtCO2e in 2022 — more demand for cooling, and a self-reinforcing loop that is the definition of maladaptation. Whether AC's role in adaptation reinforces or undercuts the transition depends almost entirely on how these risks are managed.

Projected growth in energy demand by driver 2024-2030
Terawatt-hours (TWh)



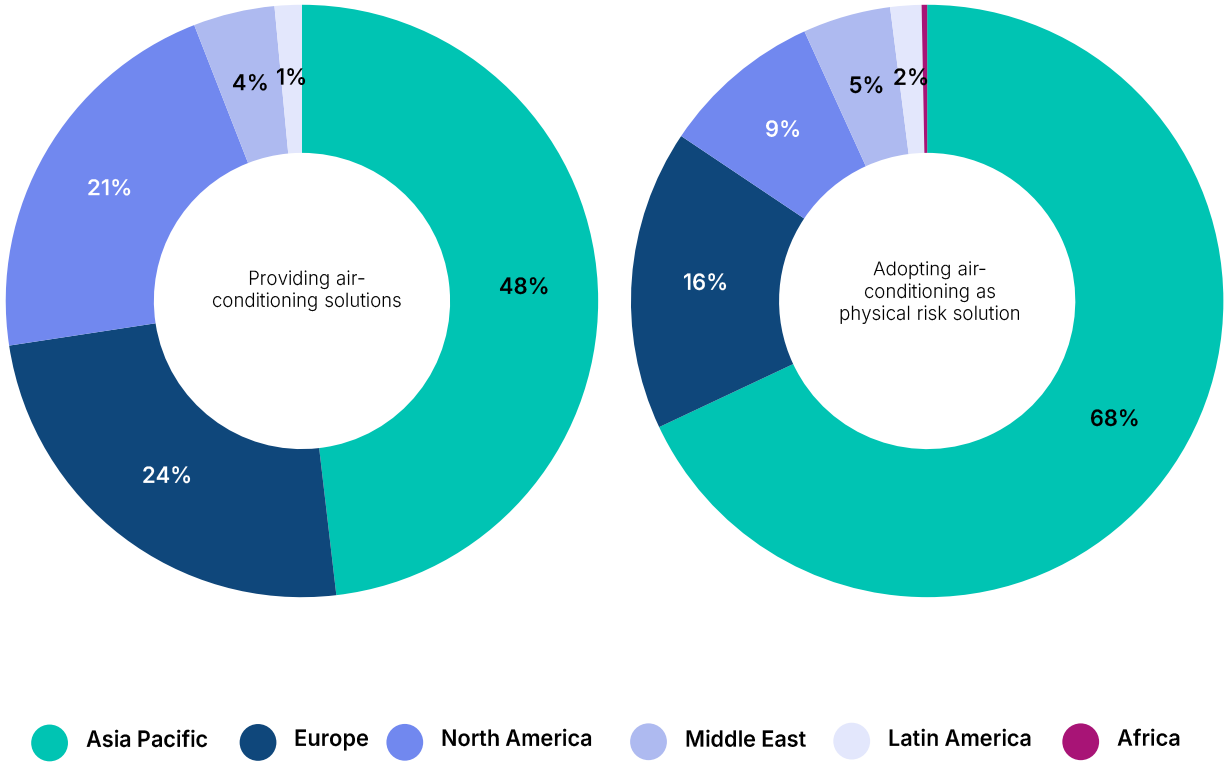
Source: "Energy and AI," International Energy Agency, April 10, 2025 (Base-Case Scenario 2024–2030).

Which regions are driving demand for air conditioning as an adaptation solution?

- **Nowhere is demand for cooling more apparent than in Asia, which is warming twice as fast as the global average.**[5] Companies in the region account for roughly 48% of those that sell air conditioning globally (roughly in line with their representation in the universe of listed companies globally) but make up more than two-thirds (68%) of those building air-conditioning capacity specifically to address growing risk from extreme heat.
- **Companies in the rest of the world show the inverse pattern.** For instance, U.S. companies comprise 22% of air-conditioning providers but nearly 9% of firms citing it as an adaptation measure, reflecting lower concern with the risk of extreme heat than in the Asia-Pacific region.

> *"[W]e recognize the potential for physical risks such as an increase in cleanroom air-conditioning costs resulting from a rise in outdoor temperatures."*
>
> **Chipmaker, Japan**

Air-conditioning solution providers and adopters
Share of companies by region (%)



Source: MSCI Sustainability & Climate Research, based on data from MSCI's Adaptation and Resilience Metrics (simulated results), as of June 12, 2026. Regional classification reflects the company's country of domicile. Among large- and mid-cap companies, 135 were identified as selling air-conditioning solutions and 353 as adopting those to mitigate physical risk.

What we mean by adaptation and resilience solutions

- **We use the term "adaptation and resilience solutions" in this report** to refer to commercial solutions that help governments, businesses or consumers prepare for or recover from climate shocks, ranging from adequate cooling in response to rising heat to insurance against extreme weather events. The terminology comprises both adaptation and resilience, which are two related parts of a continuum of strategies to manage the adverse effects of climate change.[6]
- **Our framing of adaptation and resilience solutions draws on our analysis** in "The Hidden Adaptation Economy: A New View of Corporate Resilience and Opportunity," where we classified revenue-generating adaptation activities along two dimensions: the systems needs that those solutions target, and the delivery channels through which companies offer them.
- **As shown in the table, systems needs span four macro areas** requiring resilience-building, while delivery channels describe the main paths through which companies bring adaptation and resilience solutions to market.

Adaptation and resilience product set matrix

Delivery channels → / System needs ↓	1.Capital & financing Deploying capital to enable adaptation assets and services	2. Insurance & risk transfer Pooling, transferring, or pricing physical climate risk	3. Physical solutions & enabling technologies Tangible assets, systems, and technologies that directly reduce risk	4. Advisory, planning & operational support Information, coordination, and response that support adaptation outcomes
A.Natural systems & landscape Ecosystems that reduce physical climate risk	Financing for ecosystem restoration (wetlands, mangroves, watersheds); nature-based flood and erosion control projects	Parametric and catastrophe insurance linked to natural hazards	Nature-based flood buffers; erosion control materials; landscape-scale water retention solutions	Ecosystem risk mapping; land-use and watershed planning; nature-based solution assessment
B. Food, water & agricultural systems Water availability, food production, and supply chains	Financing for irrigation, water supply, desalination, wastewater treatment, and climate-smart agriculture	Crop and weather-linked insurance products	Precision irrigation systems; industrial and agricultural cooling; water treatment and reuse technologies; climate-resilient inputs	Drought monitoring; agricultural early-warning systems; water-resource analytics; farm-level decision support
C. Built environment, infrastructure & urban Buildings, energy, transport, and cities	Financing for resilient buildings, energy systems, transport, and urban infrastructure	Property, catastrophe, and hazard insurance; reinsurance	Industrial and data-center cooling systems; HVAC and thermal management; flood protection and drainage infrastructure; monitoring hardware	Climate risk analytics for assets; infrastructure stress testing; urban planning and resilience advisory; emergency response coordination
D. Social systems & human health People, safety, access, and social capacity	Financing for social protection, emergency liquidity, and access to essential services	Micro-insurance and disaster protection for households and communities	Micro-scale adaptation solutions (e.g., personal cooling, portable protection, air filtration); health-related resilience technologies	Disaster preparedness and response planning; public health monitoring; risk communication and early-warning services

Source: "The Hidden Adaptation Economy: A New View of Corporate Resilience and Opportunity," MSCI Institute, March 18, 2026

Acknowledgements

The authors

Tanguy Séné is an executive director, MSCI Research & Development, and an Institute fellow for transition finance.

Lauren Yeung is an MSCI Institute analyst.

Linda-Eling Lee is founding director and head of the MSCI Institute.

Additional contributions

The report benefited from analysis and input from Yoon Young Chung, Matthias Kemter, Mathew Lee, Rumi Mahmood, Elchin Mammadov and Katie Towey.

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About the data in this report

Listed companies referenced in this report are constituents of the MSCI ACWI Index, which captures large- and mid-cap companies across 23 developed and 24 emerging market countries. As of May 29, 2026, the index comprises 2,513 companies and captures approximately 85% of the global equity investment opportunity set.

MSCI's Adaptation and Resilience Metrics dataset maps issuers' disclosed adaptation and resilience activities to physical risks — classifying scope, type, technology and materiality for each activity across ACWI corporate issuers — to help investors assess which companies are exposed and how prepared they are.

References

1. "2025 marks sixth year insured natural catastrophe losses exceed USD 100 billion, finds Swiss Re Institute," Swiss Re Institute, Dec. 16, 2025.
2. "A Well-Adapted UK: The Fourth Independent Assessment of UK Climate Risk (CCRA4-IA)," May 20, 2026
3. See note 2
4. "Postmortem: VSTS 4 September 2018," Microsoft Developer Blogs, Sept. 10, 2018.
5. "Asia is warming twice as fast as the rest of the world," UN News, June 23, 2025.
6. See "The Unavoidable Opportunity: Investing in the Growing Market for Climate Resilience Solutions," Global Adaptation & Resilience Investment Working Group, March 2024. ("Adaptation refers to systemic adjustments to climate change, while climate resilience refers to the ability to recover from risks and impacts of climate change.")

Transition Finance Tracker

London Climate Action Week edition

This issue of our Transition Finance Tracker spotlights the market for adaptation and resilience, from the physical climate exposure of AI data centers to how capital is flowing toward solutions.

All previous issues →

Previous issues

Q1 2026 Data Update

Energy returns amid a supply shock, climate-fund performance, climate targets, corporate and sovereign emissions trajectories, carbon-credit demand (6 charts).

Q4 2025

Physical risk at 2026 World Cup stadiums, low-carbon versus fossil-fuel financing ratios, and big tech Scope 2 emissions (12 charts).

Q3 2025

Climate capital flows, finance sources and uses, transition opportunities, cross-border carbon trading, corporate and sovereign emissions trajectories, climate disclosure (30+ charts).

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