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Climate Year in Review – *2025*

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Delaying Progress

Climate Year in Review 2025

Executive briefing on the major trends, reports, and events in climate diplomacy, decarbonization, renewable energy, climate finance, climate adaptation & biodiversity. What changed in 2025 and the implications for 2026.

Some in the media coined 2025 as the year Trump tried to kill clean energy and failed. The reality is more nuanced. Instead of solar and wind being the focus, geothermal and nuclear energy are the new national champions. Electricity demand is skyrocketing from thirsty data centers that underpin an evolving digital age, and while solar continues to get cheaper, many consumers' utility bills are going up. Robust base-load power is a worthwhile pursuit in this context, and while pursuing all options at once would still be preferable, politics ultimately sets the agenda. Still, despite increasing external pressures to both solar and wind projects and EVs in the U.S., the exponential renewables rollout has matched new demands for energy and helped to flatten global emissions growth. However, the emissions curve has not bent *downward* as needed and emissions are still rising, albeit at a decreasing rate.

Progress is being made across the climate landscape, from technology to diplomacy, but all delays now will have higher costs down the line. The shift in the United States' position is one part politics and another part a change in clean energy philosophy. The shifting of grant funds and support to new innovative nuclear plays and geothermal technological advancements shows that clean energy is not off the table and has hardly been killed, but other types of innovative projects are being fast tracked and encouraged, with national security concerns driving the rationale.

Solar drives ahead with or without an expanding U.S. market, sitting at ~200 GW including all small-scale systems. China crossed the 1,000 GW mark in solar in 2025, with 2,200 GW in total installed renewables capacity, making up ~60% of its total. In 2024 alone, 360 GW of wind and solar were added, another 210 GW in the first half of 2025, and with plans for +200-300 GW per year from 2026-2030. This growth is critical as its use of coal has also increased to meet rising overall energy demands. Globally this is reflected in US$1.1 trillion in investment going to new coal, oil and gas projects, while US$2.2 trillion went to renewables, nuclear, grids, storage and energy efficiency projects.

UNFCCC's COP system continues to be a source of disappointment in the climate diplomacy landscape, as the U.S. sent no delegation, while China starts to be viewed as the global front-runner in renewables and decarbonization. Not long ago, the lack of action by large and growing economies like China's was cited as a reason not to pursue self-imposed limits on emissions that may affect economic growth. Now the lament is the lack of energy security by not dominating these new industries or their supply chains. Collective action on a global scale with respect to emissions and economic growth is proving exceedingly difficult for the current UN-led paradigm, and calls are growing for new models and collective blocs. The Netherlands and Colombia will seek to chart a new course on establishing a fossil fuel treaty in 2026, with the need for this further emphasized after another disappointing COP.

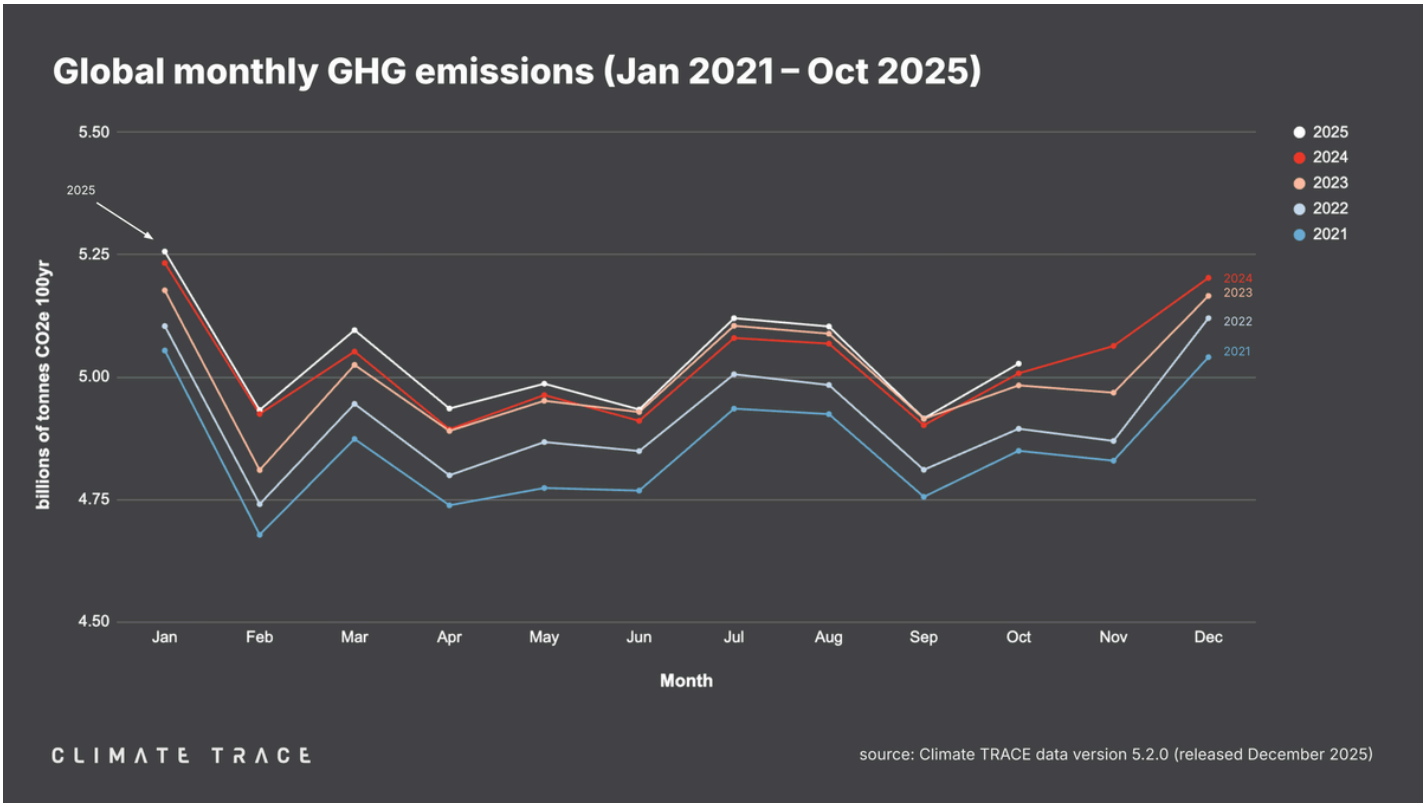
The year began with the devastating wildfires in Los Angeles, California that caused one of the most expensive disasters in U.S. history, which also embodies the climate issues of today. The fires were *fueled* and made *more likely* due to severe drought conditions caused by climate change, but the actual fires were first started by arson per federal investigators—a purely human cause. The response from authorities was incomplete and insufficient, allowing embers to re-ignite and spread, thereby setting off the true damage. Global climate diplomacy is charting the same path, delaying progress to effectively respond to anthropogenic climate change, or doing too little too late.

Climate Data & Temperature Records

Each year more emissions accumulate in the atmosphere, further tipping the imbalance in the global carbon budget from human activities that generate emissions. By March 2025, CO_2 had passed 430ppm, routine daily and monthly readings climbed from roughly 419ppm in 2022 to about 428ppm in 2025—an increase of 3ppm a year. The precise number fluctuates day to day or month to month, but the continuous upward march is undeniable. The 2024 jump of +3.75ppm is the largest annual rise on record. These atmospheric concentrations are the highest in human history, at levels last seen millions of years ago, when the planet was significantly warmer and the seas far higher. Carbon emissions have kept rising since 2021, but the pace of growth has slowed each year since the post-Covid rebound. In 2025, emissions remained slightly above 2024 levels: 50.31bn tons CO_2e were recorded by October, putting the year on track for ~62.26bn tons CO_2e—a new record and the first time above 62bn, per Climate Trace.

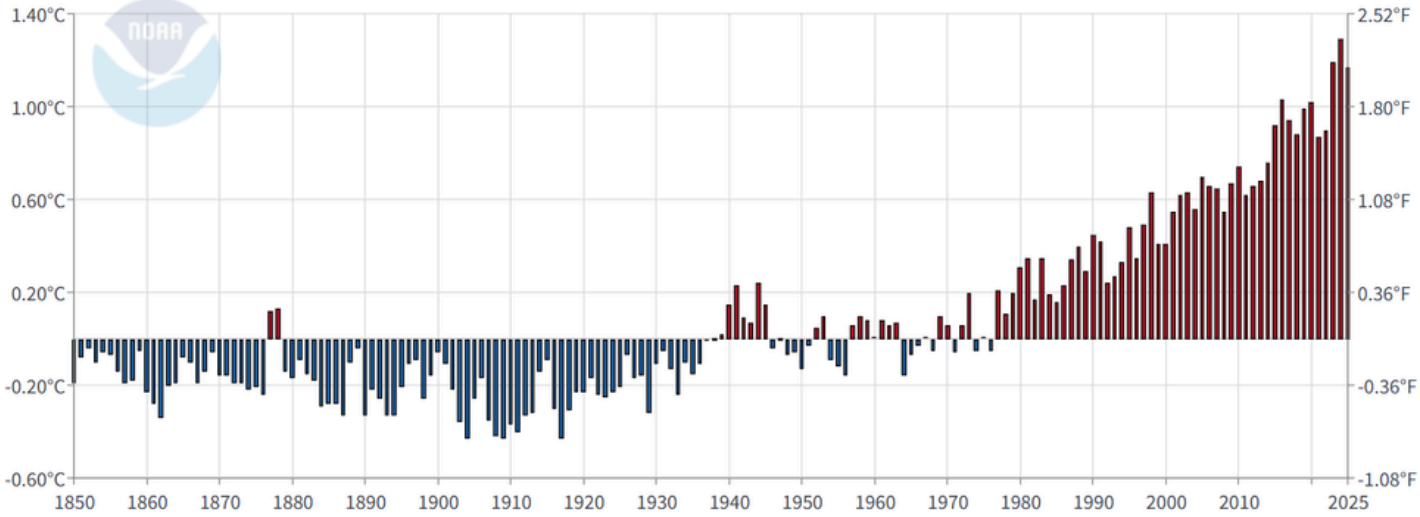
2021–60.03bn +2.79% | **2022**–60.73bn +1.17% | **2023**–61.59bn +1.42% | **2024**–61.92bn +0.54% | **2025**–62.26bn +0.55%
January–5.28bn -0.59% | ***February***–4.99bn +0.20% | ***March***–5.29bn +1.15% | ***April***–5.16bn +0.78% | ***May***–5.17bn +0.36%
June–5.11bn +0.29% | ***July***–5.21bn +0.43% | ***August***–5.16bn +0.40% | ***September***–4.94bn +0.66% | ***October***–5.03bn +0.40%

Hottest on Record	1st		2nd		3rd	
January	2025	+1.31°C	2024	+1.29°C	2020	+1.17°C
February	2024	+1.40°C	2016	+1.31°C	2025	+1.22°C
March	2025	+1.31°C	2024	+1.31°C	2016	+1.30°C
April	2024	+1.26°C	2025	+1.20°C	2020	+1.13°C
May	2024	+1.15°C	2025	+1.06°C	2020	+1.00°C
June	2024	+1.17°C	2023	+1.06°C	2025	+0.95°C
July	2024	+1.18°C	2023	+1.16°C	2025	+0.96°C
August	2024	+1.24°C	2023	+1.24°C	2025	+1.06°C
September	2023	+1.40°C	2024	+1.22°C	2025	+1.15°C
October	2023	+1.37°C	2024	+1.34°C	2025	+1.23°C
November	2023	+1.43°C	2024	+1.33°C	2025	+1.18°C
December	2023	+1.39°C	2024	+1.30°C	2019	+1.13°C



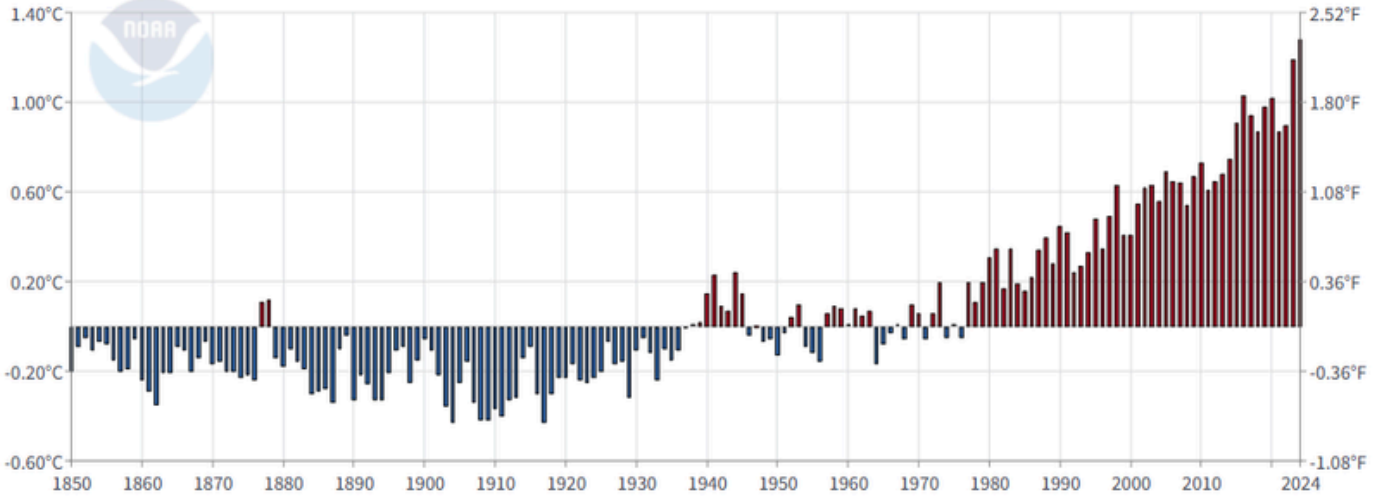
Global Land and Ocean Average Temperature Anomalies
January-December

2025



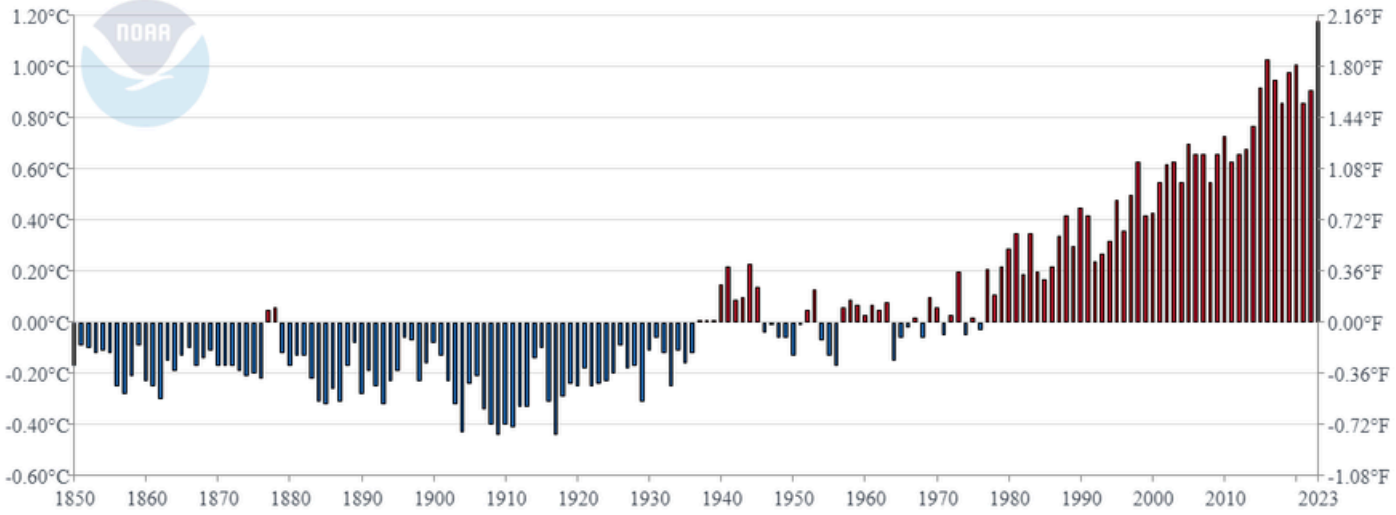
Global Land and Ocean Average Temperature Anomalies
January-December

2024



Global Land and Ocean
January-December Temperature Anomalies

2023



In 2025 the Paris Agreement's temperature goals became less a guardrail than a line already crossed. For much of the year the global average temperature anomaly ran above +1.5°C, with a 12-month average around +1.55°C even as weak La Niña conditions (a cooling influence) took hold. Heat records and costly extremes, from lethal European heatwaves to floods on multiple continents, reinforced that recent anomalies are becoming the baseline. By December, scientists determined 2025 would finish among the very hottest years on record, extending a run of 3 extraordinary years in which the climate system has stayed hot through periods when it should have eased.

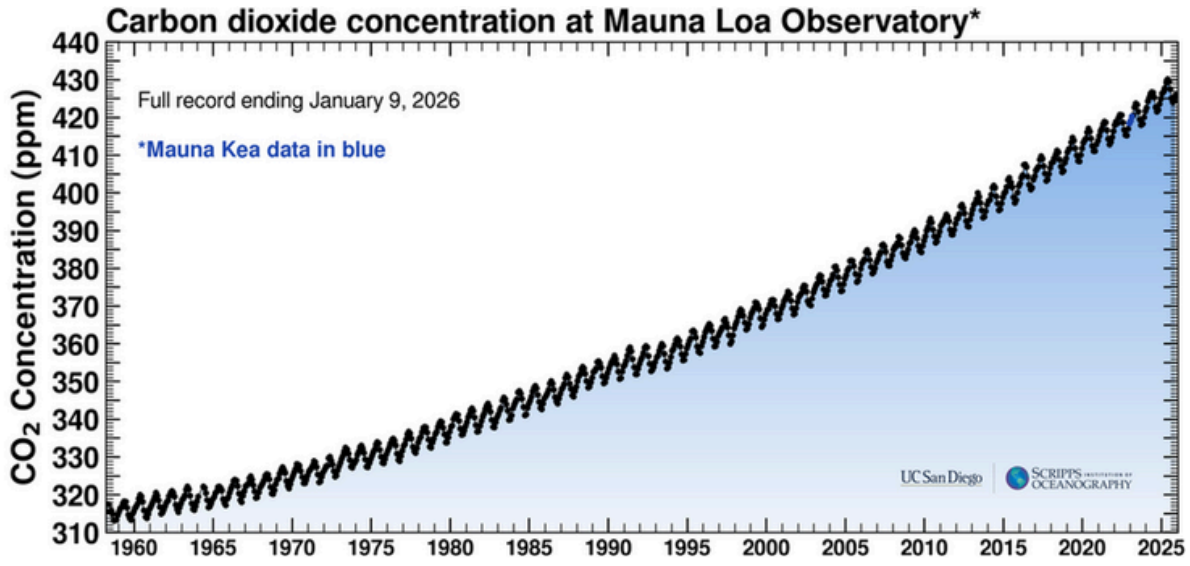
The emissions story is only marginally better. Global emissions output continues to rise, albeit more slowly, as renewables and efficiency gains restrained their growth, but without reversing it. Surging electricity demand, transport growth and sustained fossil use—especially in the power sector—kept the world on course for another record year. Governments, meanwhile, are planning fossil-fuel production through 2030 far above what any 1.5°C pathway can tolerate, widening the gap between the rhetoric of summits and the energy-system reality. A modest fall in oil prices and early signs of slowing upstream investment did little to change the broader direction. The transition is advancing, but not fast enough to bend the curve.

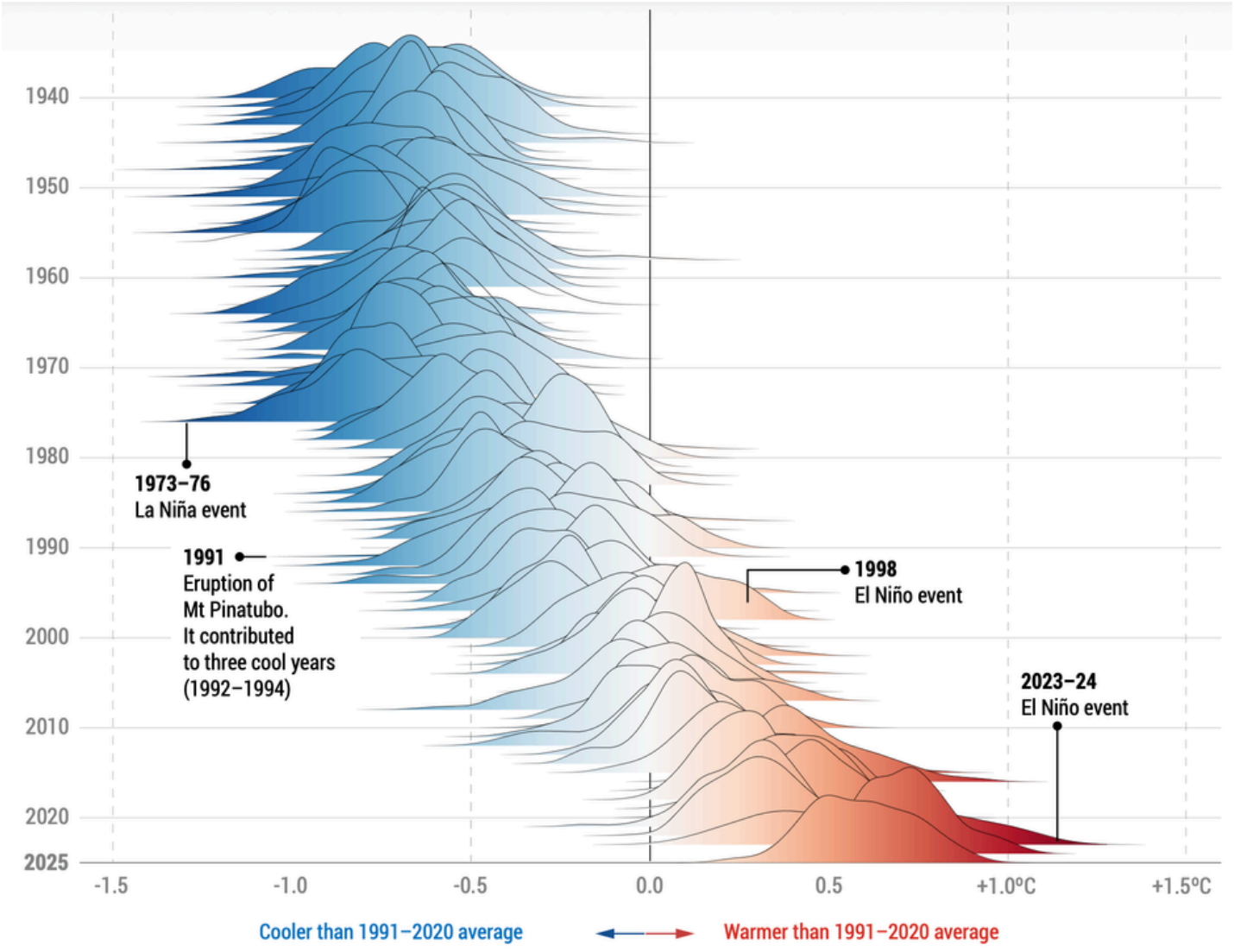
Politics continues to lag behind the physics. The year marked the 10th anniversary of the Paris Agreement, yet climate diplomacy appears more fractured than ever. The U.S. shifted its engagement with the UN climate process and trimmed support for its key scientific and monitoring institutions, weakening both climate governance and the information infrastructure that underpins it. Domestically, the revision of cornerstone clean-energy incentives—justified by supply-chain and security arguments—raised the risk premium for investors. The resulting chill was most visible in offshore wind, where cancellations and delays collided with renewed interest in oil-and-gas infrastructure. Policy volatility in the world's largest economy reverberated internationally as it slowed deployment, complicated electrification by heightening price risks, and asked new questions of global leadership.

Multilateral talks reflected the same constraints. COP30 in Belém delivered incremental progress on adaptation frameworks and process, but it was dominated by familiar disputes over finance, equity and implementation—and by the limited engagement of several major emitters, feeding arguments for parallel tracks outside the COP system. The core fault line remains money, with promises by rich countries to mobilize support for poorer, climate-vulnerable states continuing to lag behind both stated need and past pledges, sharpening demands for loss-and-damage mechanisms, fairer adaptation finance and credible delivery. The latest national pledges offered only a small fraction of the reductions required. In practice, the 1.5°C window is no longer a planning assumption but a shrinking political slogan.

There were, however, pockets of momentum that hint at what could work if scaled. New financial vehicles and regional safety-net initiatives sought to narrow protection gaps—from African and ASEAN efforts to strengthen climate-risk coverage, to new forest securitization proposals in the Americas, to renewed philanthropic and private-capital interest during Climate Week. On governance beyond the UNFCCC, the High Seas Treaty reached the ratification threshold to enter into force in early 2026, even as negotiations on a plastics treaty collapsed under producer-state resistance—an emblem of selective cooperation. Technology trends were similarly mixed: renewables retained strong cost advantages in most markets, carbon removal attracted capital alongside tougher scrutiny, nuclear re-entered many strategy debates, and green hydrogen advanced where economics and regulation allowed rather than where ambition demanded.

Altogether this year underscored a widening mismatch between climate physics and diplomacy. Climate signals are accelerating while politics remains uneven, episodic and increasingly transactional. The question for 2026 is no longer whether solutions exist, but whether institutions—both national and multilateral—can deploy them at the speed and consistency that a more volatile world requires.





*The height of each curve is proportional to the number of days experiencing a given temperature anomaly

Data: ERA5 • Reference period: 1991-2020 • Credit: C3S/ECMWF

Climate Diplomacy

Multilateral climate diplomacy was not defined by decisive breakthroughs in 2025, but a continuous search for landing space on several stalled issues. The outcomes often substituted process, mechanisms, and reaffirmations of cooperation for the sort of binding outcomes needed to match the pace of warming. In the lead-up to COP30, the latest UNEP Emissions Gap and Adaptation Gap reports captured the mood in their titles—"Off target" and "Running on Empty"—and COP30 largely reinforced those warnings. The conference's headline outcomes leaned heavily on non-binding and voluntary action, such as the "Global mutirão," a pledge to triple climate finance, voluntary initiatives and partnerships, stronger recognition of Indigenous peoples, and a continued shift toward pledges from smaller stakeholders such as cities and states. While 119 countries representing 74% of global emissions released NDCs by the end of COP30, their ambition still translates to only ~15% of the emissions reductions required, showing the widening gap between diplomatic signaling and real-world trajectories.

A few initiatives mattered less for what they delivered immediately than for what they revealed about the direction of climate diplomacy. Early in COP30, the "Declaration on Information Integrity on Climate Change" acknowledged that disinformation is no longer a side issue but a direct threat to policy durability and public consent—even if the text itself remains voluntary. More consequential was the Belém Declaration on Global Green Industrialization. Building on the July 2025 Global Green Industrialization Dialogue, it set out a work program and institutional architecture to coordinate the planning and scaling of low-carbon industrial systems across governments, international bodies, the private sector and academia. Its emphasis on decarbonizing industry and supply chains—via renewables, storage, efficiency, circular production and sustainable mining—signals a more explicitly industrial, trade-linked phase of climate diplomacy.

The same trade–climate linkage sharpened around carbon border measures. India's bid for an exemption from the EU's CBAM is likely to be refused, likely complicating EU–India trade negotiations and underscoring how carbon pricing and permitting are increasingly tied to tariffs and market access in emissions-intensive sectors. The EU also set for itself an agreed legally binding course to cut its emissions by 90% from 1990 levels by 2040—aiming to deliver roughly 85% of this through domestic reductions, and about 5% met via carbon credits from developing countries. A further optional 5% via international credits can be utilized if internal political constraints tighten and delay progress. This design will keep pressure on two questions that will not stay technical for long—the integrity of carbon credits and the politics of equity when part of the reduction effort is effectively purchased abroad.

Across the year, the broader multilateral environment continued to feel fragile. Through Q1-Q2, momentum stalled as major powers and multinational companies cut climate-linked funding or quietly exited earlier commitments, weakening confidence in long-term transition plans. The Loss & Damage Fund (FRLD) illustrates both the hard-won progress and persistent vulnerability of climate finance. First proposed in 1991, created at COP27, operationalized at COP28, and only beginning to accept contributions in 2025, it has already been strained by the U.S. resigning from its board after contributing $17.5m out of $786m in total pledges. Most pledges now come from the EU plus individual European states—led by Germany, France, and Italy at roughly $109–110m each—yet reported total paid-in contributions are far lower ($261m), with just $475m confirmed in signed agreements. Some major pledges remain unpaid and unsigned, including Italy's and the UAE's, while a handful of countries are fully paid in.

Finance tensions were a constant theme in the technical and political run-up to COP30. At SB62 in Bonn, procedural fights delayed progress on several fronts, including a long debate over adaptation metrics that narrowed an unwieldy list of 9,000 indicators down to 490, with a target of 100 by COP30. The New Collective Quantified Goal (NCQG) on climate finance—$300bn—remained a flashpoint, reflecting long-standing disputes about adequacy, fairness, sovereignty, and negative perceptions of "colonial" finance structures. The Fourth International Conference on Financing for Development (FfD4) in Seville reinforced the same theme, focusing on development effectiveness, reforming international finance, and aligning capital with climate and SDG goals. Together these processes underscored that climate diplomacy now hinges as much on financial governance as on emissions targets.

Climate diplomacy is also broadening beyond the UNFCCC core—sometimes as a supplement to it, and sometimes as a necessary workaround. Nearly 100 nations used the UN Secretary-General's Climate Summit to unveil or reaffirm updated NDCs, signaling their engagement even as ambition remains uneven. In the Pacific, an inaugural Loss & Damage symposium in Fiji convened Small Island Developing States around the permanent costs of climate change, backed by partners including Denmark and New Zealand, an example of regionally anchored diplomacy trying to keep equity and lived impacts central.

Ocean governance saw both promise and limits. The UN Ocean Conference in Nice sought to accelerate SDG-14 action and elevate the ocean's role in climate regulation, carbon sequestration, and biodiversity, even as pollution and degradation remain difficult to regulate. In contrast, the landmark UN High Seas Treaty passed a major threshold, surpassing 60 ratifications in September 2025 and set to enter into force in early 2026, marking a multilateral breakthrough for biodiversity protection beyond national waters. However, a major push for a legally binding plastics treaty failed to reach consensus after 10 days in Geneva, with a small number of oil-producing states accused of blocking progress, highlighting how production caps, chemicals of concern, and implementation finance remain fault lines in environmental diplomacy.

Finally, the year underscored how climate diplomacy is increasingly shaped by domestic politics, subnational action, and strategic competition. In the U.S., five Democratic governors on the East Coast publicly urged the Trump administration to uphold previously granted offshore wind permits—an illustration of state-level actors trying to stabilize their decarbonization pathways when federal priorities shift. China, by contrast, announced its first-ever emissions reduction target of 7–10% over the next decade, implying peak emissions within that window, though substantially deeper cuts are needed to keep a 2060 net-zero trajectory plausible. At the very least, China is setting new targets and reaching them ahead of schedule.

These contrasting signals, alongside moves from the U.S. Department of Energy to revisit the peer-reviewed literature on GHG climate impacts, reinforce a central lesson: climate diplomacy is no longer only about the negotiated text. It is increasingly a contest over information integrity, industrial strategy, trade rules, financial credibility, and the ability of coalitions to deliver on implementation when multilateral consensus is slow. In this context, initiatives like the Climate Action Coalition, hosting high-profile events on nature finance and sustainable investment across Paris, London Climate Week, and New York Climate Week, reflect a pragmatic shift — when inter-state diplomacy stalls, it is up to cities, regional blocs, investors, and sectoral alliances to become a parallel track for sustaining momentum and translating climate pledges into action.

Decarbonization

Decarbonization showed that structural progress is real, but the arithmetic is still running against it. By one measure, the transition is widening beyond a small club of rich economies. The number of countries whose economies grew while their emissions fell doubled to roughly 35 over the period from 2015–2024, up from 18 in 2004–2014, and accounting for about 27% of global emissions. That is not trivial, as it signals that decoupling carbon from growth is no longer a policy experiment, but it also speaks to a wider problem. A quarter of global emissions may be bending downward, while the remaining three-quarters continues to rise or plateau, and simply won't fall fast enough. Looking ahead to 2026, the remaining carbon budget consistent with staying below +1.5°C is effectively already exhausted. In practical terms, 1.5°C-aligned decarbonization moves from a planning target baseline into a damage-limitation exercise focused on limiting the amount of overshoot.

As shown in the climate data, in 2025 concentrations of carbon dioxide, methane, and nitrous oxide all reached new record highs, with the acceleration across all three gases highlighting the lag between slowing emissions growth and the accumulation that drives warming. The lag matters as even where emissions growth is flattening, concentrations can still rise at record rates for years because the world is still emitting far more than natural carbon sinks can absorb. In other words, a plateau in emissions is not a plateau in climate risk, it is merely slowing acceleration.

Rising energy demands ensure the gap remains open. The IEA's mid-year electricity update pointed to strong global electricity demand growth (~3.3–3.7%), driven increasingly by hotter months and higher cooling loads. That demand surge is one reason emissions growth can appear to plateau in the aggregate even while the system remains carbon intensive. Renewables are expanding rapidly enough to blunt this growth in meeting new demand, but not yet rapidly enough to actually displace fossil generation at scale everywhere, especially during peak-demand periods. Heat does double damage—raising energy demand while simultaneously stressing grids and forcing higher utilization of dispatchable fossil capacity when clean supply and flexibility falls short. Energy storage is a key hurdle.

The fossil system, meanwhile, retains more resilience than the transition narrative often admits. BP's outlook revision captured this drift as it forecast for Peak Oil demand by 2025 is now pushed back into 2030, with weaker efficiency gains expected to raise oil demand from roughly 102 to 103.4 million barrels per day, and potentially toward 106 million bpd by 2035 if the trend persists. More than a forecasting footnote, it is a reminder that decarbonization is not just a technology contest, but a challenge over substitution and displacement. Additional clean energy is not enough if they sit alongside continued growth in fossil demand just to keep pace.

That substitution problem is increasingly visible in political decisions that lock in high-carbon assets. Queensland, Australia's coal-exporting state, reversed its plans to close some coal-fired power plants, committing AUD$1.6 billion over 5 years to keep them operating for longer. The local justification is based upon reliability and affordability, but it is a symptom of global inertia. Queensland exports roughly 1/8th of the world's coal, and global coal consumption continues to set records year over year. Keeping plants online for longer may be politically or economically convenient, but it pushes the global decarbonization burden elsewhere and tightens the window for credible national targets.

China embodies the central ambiguity of decarbonization. Its 2060 carbon-neutrality goal remains technically on track, supported by the scale and speed of its clean-energy deployment. In April, wind and solar supplied 25% of China's electricity mix at 951 TWh, up 19% year-on-year, with total renewables nearing 40%. These figures signal industrial capacity and policy execution that few countries can match. Yet China's trajectory remains contingent on the sectors it has historically treated as second-order, above all coal. Near-term peaking is now plausible and full GHG neutrality remains achievable, but coal policy and uneven implementation are the fault lines that may keep it off track.

The U.S. by contrast, spent much of 2025 raising its own policy risk premium. On July 29, the EPA proposed rescinding its 2009 "endangerment finding," the very legal foundation for regulating GHGs under the Clean Air Act. If followed through, it would constrict federal regulatory tools for cutting emissions in power and transport and reshape investment signals across both sectors.

The Department of Energy also cancelled USD$3.7 billion in funding for 24 decarbonization demonstration projects —spanning from carbon capture, industrial decarbonization, and clean energy—on the grounds they would not deliver a positive return for taxpayers. Among the cancelled pilots were a first-of-its-kind net-zero cement project in a sector responsible for roughly 8% of global emissions. The broader significance is that industrial decarbonization typically depends on early demonstrations to establish cost curves and build a pipeline of bankable projects.

Pockets of industrial and regulatory progress still emerged, often outside the usual transatlantic center of gravity. Oman offered a case study in how hydrocarbon producers are experimenting with transition hedges. Nama Power and Water Procurement Company solicited proposals to assess geothermal potential in northern hot springs, building on research suggesting low-to-medium geothermal reservoirs remain underexplored. Meanwhile OQ Gas Networks announced $2 billion in renewable investments tied to green hydrogen and ammonia, aligned with Vision 2040 targets and a stated goal of reaching 30% renewables in the energy mix by 2030. Such moves may be modest in global emissions terms but reflect a broader shift as decarbonization is increasingly framed as industrial diversification and an export strategy, rather than only domestic climate policy.

One of the more consequential governance developments came from a sector long treated as diplomatically difficult —international shipping. The International Maritime Organization reached consensus on introducing a global carbon levy on shipping emissions, with formal adoption slated for October 2025 and implementation in 2027 for ships above 5,000 tons. If delivered as planned, it would be among the most influential sector-wide global pricing mechanisms yet agreed, and a template for regulating emissions in hard-to-abate, transboundary industries.

Decarbonization in 2025 was not a story of collapse, but of insufficient velocity and uneven political durability. More economies are proving that emissions can fall without sacrificing economic growth. Energy efficiency gains remain the low-hanging fruit. Clean electricity is expanding fast enough to slow emissions growth in the aggregate. New sectoral rules are also beginning to bite. Yet rising demand, persistent fossil-fuel strength, and policy reversals in key markets continue to delay the point at which global emissions decisively decline. Decarbonization is now less about discovering new solutions than about executing known ones at sufficient speed, while managing the political and economic risks that can undo years of incremental gains in a single electoral cycle.

Bloomberg - *Australia's Coal State Reverses Plan to Close Power Plants*

Renewable Energy

Renewable energy advanced in two directions at once. Rapid global deployment was driven by falling costs and rising electricity demand, while the world's largest markets sent conflicting policy and investment signals. Overall, renewables still won the year. IRENA's Renewable Capacity Statistics 2025 recorded total renewable power capacity reaching 4,448 GW, an increase of 585 GW in a single year, representing 15% growth and 92.5% of total net capacity additions. However, to meet the COP28 pledge to triple renewables by 2030, growth needs to run closer to 16.6% annually. Record additions are now a baseline requirement, not a victory lap.

The U.S. again illustrated this new volatility. Federal policy shifts hit both the supply side and demand side of renewables deployment. The DOE cancelled USD$7.56 billion in funding across 223 projects supporting clean-energy research and deployment, and the administration imposed new constraints on parts of the solar industry through trade measures and permitting delays. A separate $20bn tranche from the Greenhouse Gas Reduction Fund that supported heat pumps and electric vehicles, and $7bn from the Solar for All program aimed at rooftop solar for low- and middle-income households, were part of the same reversal. These programs had been designed to accelerate consumer adoption and broaden the base for electrification. On utility-scale solar, the cancellation of the Esmeralda 7 project in Nevada, planned at a scale large enough to power nearly two million homes, became a visible example of how policy risk can halt projects even as technology costs fall.

Wind fared far worse. The U.S. Department of Transportation terminated or withdrew USD$679 million for 12 offshore wind-related projects, with its Secretary framing the move as shifting funds from "fantasy wind projects" toward greater needs in ports and domestic shipbuilding. At the legislative level, new rules tightened the timelines for wind and solar to qualify for Inflation Reduction Act-era incentives, with projects set to lose these benefits unless they break ground in prescribed ways by mid-2026 or enter service by 2027. In practice, these constraints land hardest on wind and large solar projects, which have longer development cycles. Hydropower, geothermal, and nuclear fare far better under the new framework, reinforcing a broader U.S. shift toward firm and dispatchable low-carbon power rather than variable renewables as its political priority.

Yet even within this turbulence, the American energy transition did not stop but rebalanced. Renewables deployment still reached record levels in the U.S. and battery storage expanded rapidly, particularly in California and Texas, reflecting grid needs and power-market economics that do not disappear when policy shifts. The most consequential constraint is less generation cost than grid access. In that context, the Federal Energy Regulatory Commission's reforms to the interconnection process mattered. They pushed the regional grid operator to speed queue processing and better account for storage and grid-enhancing technologies. The FERC introduced near-term structural changes that should reduce connection delays for new wind and solar projects. This kind of procedural reform rarely attracts headlines but can materially shift buildout timelines.

China, meanwhile, continued to industrialize the transition at scale. Solar installations accelerated sharply. Month-on-month additions reportedly jumped around 30% from October to November, and the record 277 GW surge of 2024 is widely expected to be surpassed, approaching ~300 GW in 2025, with some projections as high as ~380 GW of PV deployments. China's overall renewables mix hovered around 40%, driven heavily by wind (roughly 13%) while solar (around 10%) is growing even faster. The physical buildout is increasingly matched by headline projects that double as geopolitical signals.

China completed the world's highest PV solar park on the Xizang plateau in Tibet and advanced construction of what is described as the world's largest and highest concentrated solar power (CSP) plant using mirrors and molten salt storage. The region's ~2,800 annual sunlight hours make it among the richest solar resources on earth. These plants are framed as replacing large quantities of coal and abating substantial CO_2. In the same geography, China has also launched a major dam project in a biodiversity hotspot, raising downstream tensions with India and Bangladesh, an example of how "clean energy" can still trigger environmental and geopolitical conflict.

Elsewhere, the renewables story was increasingly about system resilience and diversification rather than pure capacity additions. Brazil reached a four-year low in hydropower output, but solar and wind together supplied more than a third of the country's energy mix for the first time, an important marker of how renewables are beginning to substitute during periods of hydrological weakness. Globally, costs continued to slide as over 90% of new renewable additions are now cheaper than natural gas generation, especially as gas price volatility persists. There are outliers pulling back from solar citing integration and balancing costs. The broader economic signal remains clear. In most markets, renewables are winning on marginal cost and build speed, and the main limiting factors are grids, flexibility, and political durability.

The year also reinforced that the clean power transition is not purely a wind and solar story. Nuclear energy re-entered strategic thinking with notable speed. In the U.S., the DOE began fast tracking reactor test pilots and is aiming to reach criticality for at least 3 test reactors by July 2026, which signals a policy pivot toward firm low carbon supply. The IEA World Energy Outlook 2025 echoed this shift globally and pointed to a revival of nuclear generation and capacity and to its growing inclusion in national energy strategies as a complement to renewables. The rise of AI and data centers will very likely continue this momentum for the sector.

Regional Spotlight: Oman's Transition Hedge

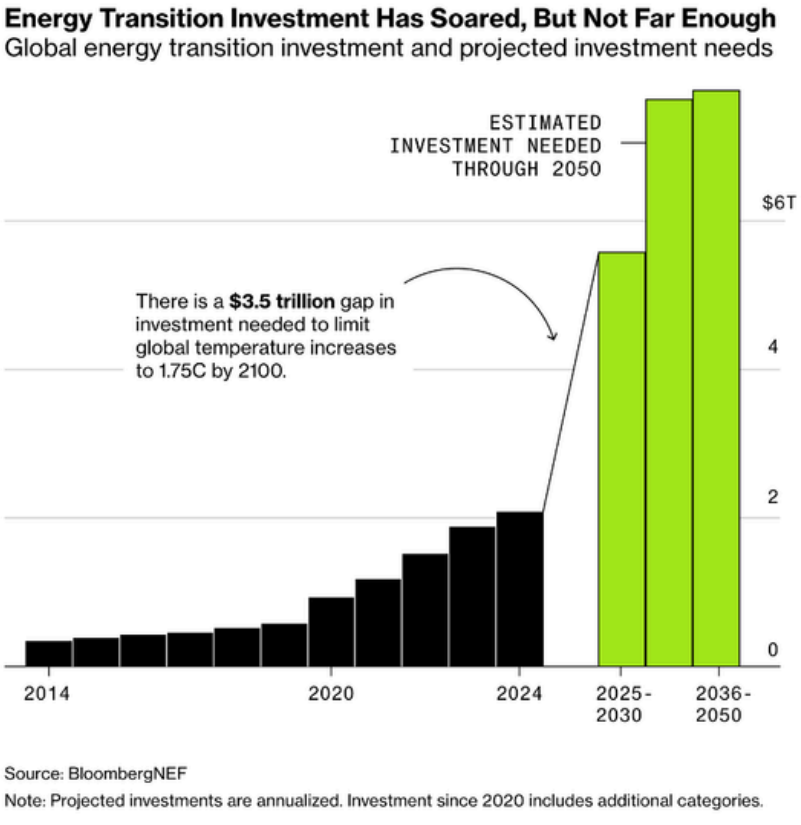
Oman's 2025 moves reflect a Gulf pattern of using hydrocarbon revenues to finance energy transition infrastructure. Nama Power and Water Procurement solicited proposals to assess geothermal potential in the country's northern hot springs while OQ Gas Networks announced a $2 billion 5-year investment plan covering gas network expansion alongside green hydrogen and ammonia infrastructure, aligned with Vision 2040's goal of 30% renewables by 2030, up from ~5% today. For Gulf states integrating solar and wind alongside continued hydrocarbon production, storage capacity and grid flexibility are the defining constraints between renewable additions and fossil fuel substitution.

Geothermal also moved from niche to a plausible scale up candidate thanks to new drilling methods. Quaise Energy, an MIT spinoff with more than $100m in funding, is adapting gyrotrons originally developed for nuclear fusion plasma heating to drill geothermal wells using millimeter wave radiation rather than mechanical grinding. The approach uses high frequency electromagnetic energy to break and vaporize rock, enabling faster penetration through hard formations and avoiding the temperature and wear limits that constrain conventional drills.

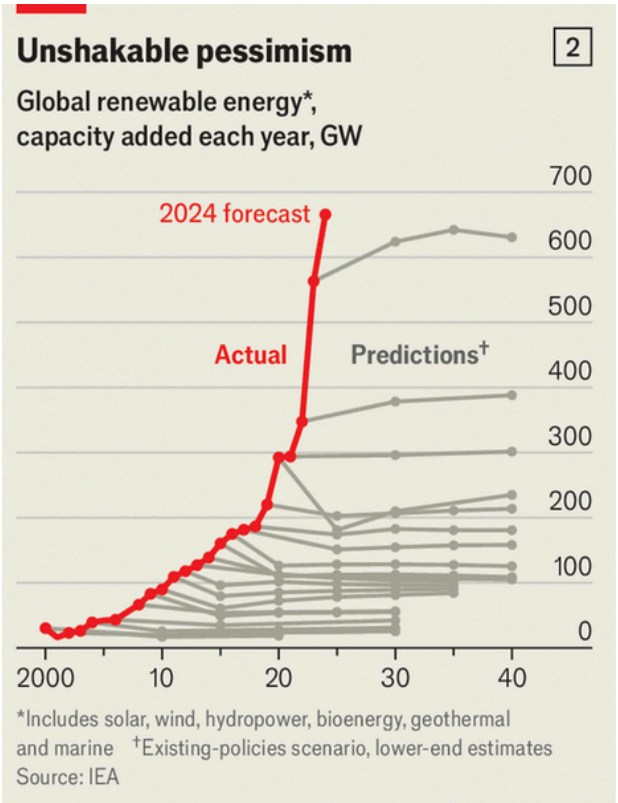
If it proves commercially viable, it could make ultra deep geothermal systems possible at depths approaching 20 km and turn geothermal into a scalable, always on source of low carbon power well beyond volcanic regions. Better assessment tools are also improving project identification, and New Mexico's Lightning Dock is often cited as evidence that an unproductive well can be converted into a high performing geothermal asset. If these technologies mature, they will provide grids with clean dispatchable heat and power and do so with a small land footprint.

The investment picture explains why renewables are scaling and why they are still not displacing fossil power fast enough. The IEA reported that the Middle East and the United States together accounted for roughly half of all new natural gas fired investment in 2024, even as low emission power investment doubled over the past 5 years led by PV solar and even as nuclear investment rose by around 50%. Coal trends were split. Advanced economies placed no new turbine orders for coal plants, yet China and India still approved 115 gigawatts of new coal capacity to meet rising electricity demand. Africa remained structurally underfunded, with energy investment about one third below 2015 levels and receiving only around 2% of global renewable investment. That imbalance will shape both emissions and development outcomes for years.

Renewable energy technology is winning the cost race and expanding fast enough to rewrite electricity systems in several major markets. But the transition is increasingly constrained by grid connection delays, the need for greater flexibility, and weak political durability, with unequal capital allocation across regions. Renewables deployment is no longer the only metric. The transition now hinges on whether institutions can keep permitting, interconnection, storage, and financing aligned long enough for renewable additions to translate into fossil fuel substitution, rather than simply meeting a growing appetite for electricity alongside an undiminished fossil base.



Bloomberg Green - *There's a $10 Trillion Antidote to Trump's Climate Backlash*



The Economist - *The energy transition will be much cheaper than you think*

Climate Finance

At COP30 in Belem, climate finance was not the headline item, yet it dominated the proceedings and ultimately entered the formal outcomes. The conference's "Global mutirão" called for tripling finance to climate-impacted countries by 2035 and re-affirmed earlier pleas to double adaptation support by 2025, while the outcome text again leaned heavily on the need to scale funding for resilience in developing economies. The problem, as ever, was credibility, as these gestures landed in a context where the targets agreed the prior year—roughly USD$300 billion a year and USD$1.3 trillion by 2035—are simultaneously defended by donors as politically and fiscally difficult, and dismissed by many developing countries as inadequate, performative, or both. A central demand from vulnerable countries is that these flows be public funds and additional, not the product of "crowding in", or creative interpretations of what can be counted under Article 9. In effect, the debate is over whether climate finance is a real transfer of capacity or merely a re-labelling exercise.

The COP30 Presidency attempted to impose structure on this ambiguity through the "Baku to Belém Roadmap," designed to show how the $300bn pathway links to the $1.3tn ambition via a mix of grants, concessional instruments, private mobilization, and portfolio shifts. Yet the roadmap also underlined how far the system is from a stable settlement: some observers have labelled the targets "fantasy," while many developing countries still describe last year's headline numbers as a joke or betrayal. Since then, the environment has worsened rather than improved —higher interest rates, constrained aid budgets, rising debt vulnerabilities, and a general degradation in the development finance landscape have tightened fiscal space precisely when adaptation and resilience spending must accelerate. The result is a familiar asymmetry: the countries facing the sharpest physical impacts also face the highest cost of capital and the thinnest margins to borrow their way to safety.

Against this political stalemate, the financing ecosystem itself continued to evolve, and in some areas expand. The Green Climate Fund had a record year, with its board channeling more than $3bn to developing countries over 2025 —10 years after its first projects in 2015—while also releasing $1.2bn for 17 projects across Asia and Africa despite a tense international environment and cuts to aid funding. Its portfolio now totals roughly $18 billion across 133 countries, backed by about $30bn pledged and $21bn paid in. Capital markets provided a parallel channel as green debt sales reached roughly $947bn by late December, and Moody's projected sustainable bond issuance could again approach $1 trillion in 2025. Green bonds are expected to lead (around $620bn), while social and transition segments show mixed momentum. The immediate driver is structural, not ideological. Electricity and cooling demand are rising, and electrification is accelerating as AI and data centres expand. That creates bankable infrastructure demand even when politics is unstable.

Several initiatives during the year illustrated how climate finance is increasingly being engineered through vehicles that try to solve specific frictions—currency risk, investor-grade structure, pipeline scarcity—rather than waiting for sweeping multilateral consensus. Brazil's $1bn pledge to the Tropical Forests Forever Facility uses a results-based payments model and points toward a far larger ambition of a $125bn endowment, intended to leverage $100bn in private capital for forest conservation. In Latin America, the Inter-American Development Bank launched ReInvest+, targeting up to $500bn in local loans to be transformed into investment-grade, hard-currency securities—explicitly designed to bring global institutional investors into climate-related projects in the region. Blended finance also remained central. The Bezos-backed Global Energy Alliance for People and Planet signaled plans to mobilize roughly $7.5bn for renewable projects in developing countries by using concessional capital to absorb risk and lower funding costs. None of these vehicles resolves the core public finance dispute at successive COPs. They do reflect a pragmatic shift. When grant flows are politically constrained, the system relies more on structuring, de-risking, and capital market access to move capital at scale.

The year also showed how climate finance is being pulled into sectoral regulation and trade-linked decarbonization. The IMO's shipping agreement included proposals for a greenhouse-gas levy, with one design outlining a two-tier carbon charge of $100 and $380 per ton of CO_2e for ships over 5,000 gross tons—an example of how international rulemaking can create durable funding streams and incentives for transition in hard-to-abate sectors.

Meanwhile, an OECD and UNDP analysis made a practical point. Ambitious NDCs that are also investable now function as a core financing tool because they create credible project pipelines and reduce perceived policy risk. Those conditions can unlock both public and private capital. The same logic was visible at Bonn, where the means of implementation for adaptation remained a central dispute. Developing countries pushed for firmer commitments on finance, technology transfer, and capacity building, arguing that resilience cannot be funded on rhetoric and cannot be financed at punitive borrowing costs without becoming a fiscal trap.

Behind the institutional debate sits a rising bill for climate impacts that is increasingly quantifiable by sector. IFPRI's 2025 Global Food Policy Report modeled that offsetting the additional hunger driven by climate change could cost more than $24.7bn each year, including investments in agricultural R&D, water infrastructure, and related adaptation measures. This is not a niche figure. It is a reminder that adaptation finance is a real budget line that competes with health, education, and debt service. The implication is straightforward. If climate finance does not scale, the costs do, often through humanitarian emergencies, macroeconomic instability, and forced migration.

Private capital now dominates energy investment, but public capital remains the binding constraint for resilience and for unlocking investment where risk is highest. The IEA World Energy Investment 2025 projected total energy investment rising to $3.3tn, with $2.2tn going to clean energy, roughly double the amount directed toward fossil fuels. The composition matters. Private finance leads, while public and concessional resources remain inadequate relative to need. Efforts to close part of the gap through risk pooling and insurance also advanced. The Frankfurt School convened a CEO Summit on disaster risk finance to strengthen collaboration among regional risk pools and backed it with a €4.7m grant. The amount is small in absolute terms, but it reflects a growing recognition that loss and damage requires instruments rather than sympathy.

Climate finance is defined by a widening gap between political promises and bankable delivery, even as the broader market for green capital remains active. Multilateral targets grew larger and more contested. Their credibility weakened as fiscal and geopolitical conditions tightened. The financing system adapted in incremental ways through risk pools, structured vehicles, and capital market channels. These innovations do not substitute for predictable public flows where they are most needed. The question is not whether finance exists. It is whether finance can be made additional, investable, and deliverable at the required speed, particularly for adaptation where costs are immediate and revenue models are thin.

Climate Resilience & Biodiversity

In the U.S., 2025 ranked as the 3rd-highest year for billion-dollar weather and climate disasters, with 23 events costing an estimated $115bn. The costliest was the January Los Angeles wildfires, estimated at $61.2bn. Hot, dry, and windy conditions worsened the damage, but the fires were triggered by arson per investigators. The accounting itself became part of the story. NOAA's long-running Billion Dollar Weather & Climate Disasters dataset was stopped in May 2025, and Climate Central took over its tracking. Events elsewhere reinforced that the hazard profile is broadening rather than shifting neatly from one category to another. An unusually intense atmospheric river and record rainfall produced catastrophic flooding across the northwest, prompting statewide emergency declarations, large-scale evacuations, water rescues, and widespread infrastructure damage as rivers reached historic levels.

The year also made clear that resilience is becoming a governance problem, not only an engineering problem. The Race to Resilience 2025 progress report stated that 437 million people across 134 countries are living with improved resilience outcomes linked to $4.18bn in scaled adaptation finance—an important milestone toward 2030 targets and the Global Goal on Adaptation. COP30's Resilience Hub further mainstreamed resilience as a core theme in political and technical discourse, even as the finance needed for resilience remains thin relative to risk.

In multiple regions, resilience pressures moved from projection to planning. Fiji announced that up to 676 communities may eventually require relocation as sea-level rise, extreme rainfall, and landslides intensify. Roughly 40–50 villages were assessed as being of major concern, with 17 on an urgent "red list." Oman and the UNDRR agreed to deepen cooperation to integrate disaster risk reduction into national planning, including emergency centers, a digital platform for coordinated response, and joint capacity-building. Resilience depends on institutions, early warning systems, response coordination, and the political acceptance of relocation.

Water and land risks sharpened further. The OECD's Global Drought Outlook described a world in which around 40% of land area is experiencing more frequent and intense drought, with economic losses projected to rise by at least 35% by 2035. It emphasized the need to integrate drought resilience into national policy, strengthen water-demand management, and invest in sustainable water infrastructure. Ramsar's Global Wetland Outlook 2025 added a parallel warning that wetlands are being lost rapidly, putting significant economic value and ecosystem services at risk while strengthening the case for wetland focused finance and restoration planning. These reports converge on an uncomfortable point that many of the cheapest resilience gains come from protecting natural systems that stabilize hydrology, reduce flood peaks, buffer drought, and protect coasts, yet those systems remain systematically underfunded. Nature-based solutions must be more deeply considered as a first plan of action.

Biodiversity governance produced some substantive institutional signals. The UN High Seas Treaty crossed the 60-ratification threshold in mid-September 2025, starting the countdown to entry into force and creating the first global legal framework to protect biodiversity beyond national jurisdictions. It establishes processes for marine protected areas and frameworks for benefit-sharing, technology transfer, and capacity building, while several major nations—including the U.S., China, Russia, and Japan—remain outside the ratifying group. On land, the IUCN World Conservation Congress adopted a new 20-year global conservation strategy ("Unite for Nature on the Path to 2045") and launched the IUCN Program 2026–2029, aiming to scale biodiversity protection and integrate nature into policy and climate frameworks. UNESCO reported progress through Biosphere Reserves contributing to the Kunming–Montreal Global Biodiversity Framework, and the Finance for Biodiversity Foundation issued its first impact report with recommendations to align finance with biodiversity targets.

Brazil formally launched the Tropical Forests Forever Facility on November 6th ahead of COP30, using a payment-for-performance model backed by satellite monitoring to reward tropical forest countries as long as forests are preserved. The funding ambition is $125bn—$25bn from governments and $100bn from private finance—but initial pledges totaled just $6.7bn, far short of the target. The model reflects a broader push to create durable revenue streams for forest protection in countries where public budgets and political cycles make conservation fragile. Related discussions continued through high-profile convenings such as the Nature Finance Forum in Paris, which focused on sustainable finance, market transformation, and regulatory frameworks for a net-zero and nature-positive economy. Nature finance remains misaligned with the scale of degradation and the value at risk.

At sea, resilience and biodiversity stories converged. NOAA's Coral Reef Watch continued to document widespread heat stress and global coral bleaching through 2025, reinforcing that protecting ecosystems increasingly requires both rapid emissions reductions and local resilience measures. At the UN Ocean Conference in Nice, UNEP and FAO announced the first World Restoration Flagship initiatives—East Africa, Mexico, and Spain—aimed at restoring five million hectares of marine ecosystems. These initiatives reflect growing recognition that ocean health is not a side issue: it affects fisheries, coastal protection, carbon sinks, and regional stability.

The capacity to measure and manage risk shifted in parts of the U.S. system. Funding cuts placed one-third of the USGS Climate Adaptation Science Centers at risk of closure after September 30th, affecting work intended to help communities, wildlife, land, and water adapt locally; the centers slated to close cover large multi-state areas from the south-central U.S. through the Northeast and include Hawaii. Climate monitoring was also narrowed. The U.S. cut some Earth-observing satellite programs used to monitor water contamination, air pollution, and greenhouse gases, arguing they went beyond essential forecasting. Hundreds of contributors to the next U.S. National Climate Assessment were released as the scope was re-evaluated. The assessment is congressionally mandated under the 1990 Global Change Research Act. These shifts have implications for data quality, institutional memory, and risk management capacity, with downstream effects for insurance, municipal planning, disaster response, and infrastructure investment.

Insurance markets signaled an emerging systemic risk. Rising premiums, escalating climate stress, and housing affordability constraints began to threaten local and regional economies. Premiums rose faster than inflation, insurers exited high risk markets, and homeowners faced shrinking coverage options, which shifted risk toward households and governments and reduced the financial system's ability to absorb shocks. This is a resilience issue as much as a finance issue because when risk cannot be priced or pooled, the burden is pushed onto governments through post disaster spending and broader economic disruption.

Technology is being pulled into the biodiversity response as institutions strain. Research from McGill University highlighted the use of AI to analyze large biodiversity datasets more quickly, fill knowledge gaps, and improve decision-making on where protections are most effective. At the same time, the year included a growing ecosystem of public engagement and field monitoring, such as Oman3165's community-scale sampling efforts and coastal kayak journey collecting water samples, illustrating how formal science, applied technology, and civil society monitoring are increasingly being used to compensate for institutional gaps.

2025 left a clear risk picture. The cost and frequency of disasters are rising, water stress and ecosystem decline are intensifying, and the capacity to anticipate and manage these pressures is strengthening in some regions and weakening in others. Resilience outcomes are improving for hundreds of millions of people, but the finance and institutional stability needed to keep pace remain uneven. Biodiversity protection is advancing through new treaties, strategies, and finance mechanisms, yet warming, land use change, and chronic underinvestment continue to outstrip the response.

There is clear progress across each of these areas from climate diplomacy to renewables and decarbonization and building resilience to climate impacts and biodiversity loss. But this vitally needed progress is being delayed at a crucial time period when climate tipping points are being reached and the knock-on effects, and their cost to global economies and people, are increasing with each wasted year. MEDRC is tracking and analyzing global progress on each of these fronts in our Quarterly Climate Update reports, synthesized in this brief.

Sources for Further Learning

Climate Trace – https://climatetrace.org/

NOAA National Centers for Environmental Information – https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/2025

Copernicus Climate Change Service (C3S) – https://climate.copernicus.eu/

Bloomberg Green Data Dashboard – https://www.bloomberg.com/graphics/climate-change-data-green/

Key Reports

[1] MEDRC Quarterly Climate Update Reports, Q1-Q4 2025 – https://medrc.org/publications/

[2] IEA – Renewables 2025, October

[3] IEA – World Energy Outlook 2025, November

[4] UNEP – Adaptation Gap Report 2025, October

[5] UNEP – Emissions Gap Report 2025, November

[6] Global Carbon Project – Global Carbon Budget 2025, November

[7] Race to Resilience - Progress Report 2025, November

Acknowledgements

MEDRC's Transboundary Environments Practitioner Briefing series has been developed for industry practitioners and government officials at the request of MEDRC's member countries, with sponsorship provided by the Netherlands. The briefings are meant to be informative and practical, providing an overview of the subject matter material, while remaining accessible to various backgrounds and disciplines. The briefings serve to develop shared knowledge and serve as a basis for further discussions between partners. If you would like to learn more about these subjects, please see the section 'Sources for Further Learning'.

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Developed for water industry practitioners and government officials at the request of MEDRC's member countries, MEDRC's Practitioner Briefing series serve as a guide to trends in transboundary environmental cooperation. The initiative is intended to bridge the academic-practitioner gap in the sector by providing short, accessible and practical overviews, focusing on a different theme.

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