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2025 CLIMATE REVIEW

How much progress have we made?

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This year marks a quarter into the 21st century and halfway to 2050, the widely accepted target for net-zero emissions to limit global warming. How are we doing? What's going right and what's going wrong? It is probably no surprise that we are collectively falling short. According to BloombergNEF, global energy transition investment reached a record $2.1tn in 2024, but more than $5tn annually is needed through 2030. This means that current flows are covering less than half of what is required. Emissions are also not falling fast enough: the required 43% cut by 2030 compares with annual reductions of less than 1% (source: International Energy Agency, IEA). Capital is not only insufficient, but also increasingly concentrated: infrastructure and late-stage assets continue to attract inflows, while early-stage climate technology remains funding constrained, at least according to official data. Proven renewables and infrastructure are now mature investment classes and can provide stability, but earlier-stage technology and industrial transport require risk capital. Broader climate investment levels are actually well ahead of pre-2020 baselines, and the sector has proved more resilient than broader venture markets, but more is needed to meet climate goals. This funding gap therefore signals not only the scale of the challenge but also the opportunity for investors.

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Earth Capital is a specialist corporate adviser, supporting early-stage and scale-up ventures with fundraising and M&A advisory services. The firm focuses on working with innovative, sustainability-driven businesses that are addressing the challenges of the Sustainable Development Goals. It offers relationship-driven services centered on providing venture builders with a clear path for capital, growth and eventual exit.

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Climate goals progress assessment

The 1.5°C target is slipping away

To limit warming to 1.5°C,[1] global greenhouse gas emissions must peak before end-2025 and fall 43% by 2030 (United Nations Environment Programme, UNEP). Instead, they are broadly stabilising. Industrial emissions were about 9 Gt CO_2 in 2022 and need to decline to 7 Gt by 2030, a 3% annual reduction. In 2023, progress was only 0.9% (IEA).

We often think of power generation and cars when considering emissions, but major industrial and agricultural sectors are equally material, and solutions are not yet clear. Steel produced roughly 3.5 Gt CO_2 in 2022 (World Steel Association), requiring intensity cuts of a quarter by 2030. Cement contributed more than 2.5 Gt CO_2 in 2020 (Global Cement and Concrete Association, GCCA), split between limestone decomposition (60%) and fuel combustion (40%). Primary chemicals generated about 935 Mt CO_2 in 2022, with ammonia accounting for nearly half of this (IEA).

Hard-to-abate sectors remain the challenge. Steel needs electric arc furnaces, scrap utilisation and hydrogen-based direct reduction to move the needle this decade. Cement requires clinker substitution, alternative fuels and carbon capture utilisation and storage (CCUS). Chemicals needs low-carbon hydrogen and electrified heat. These interventions are only likely to succeed with predictable carbon pricing and stable policy.

Aviation and shipping are also challenging. Aviation emitted almost 950 Mt CO_2 in 2023, rebounding from pandemic lows (International Air Transport Association). International shipping contributed 0.86 Gt CO_2 (International Maritime Organization). Both sectors rely on efficiency and alternative fuels, but commercial supply chains are immature and capital-intensive.

Technology solutions are still at the demonstration stage. Hydrogen direct-reduced iron in steelmaking, CCUS in cement and chemicals, and sustainable aviation fuels have not yet reached commercial readiness. The IEA estimates that US$90bn of public support is needed by 2030 to bridge this gap, but only around US$25bn has been committed.

The funding gap is real, not theoretical. Steel alone requires about 30 additional hydrogen-based direct-reduction plants this decade, drawing around 250TWh of low-carbon electricity (IEA). The GCCA calls for industrial-scale carbon capture at 10 plants by 2030, tripling thereafter. Both require offtake certainty and carbon price floors.

Politics plays a part and is often slow and unpredictable. The EU is advancing the Carbon Border Adjustment Mechanism and expanding the Emissions Trading System (ETS). The US Inflation Reduction Act (IRA) provides industrial decarbonisation support and generous tax credits for clean hydrogen and aviation fuels, although climate change has become part of partisan politics. China is widening ETS coverage to more industrial subsectors. The UK's decision to delay the petrol and diesel vehicle ban to 2035 is another example of policy adjustment. The Zero-Emission Vehicle (ZEV) Mandate still requires 80% ZEV sales by 2030.

International coordination remains weak. The UNEP's Emissions Gap Report 2024 suggests current pledges imply 2.6–3.1°C warming above pre-industrial levels. Finance commitments agreed at COP, while directionally positive, are below the required scale and lack clarity on deployment. For investors, execution risk is critical. Projects backed by clear policy frameworks move forward; those that rely on ambition alone do not.

[1] 1.5 °C target refers to a global goal set under the Paris Agreement (2015) to limit human-caused global warming to no more than 1.5 degrees Celsius above pre-industrial levels (1850–1900).

How are capital markets stepping up?

Climate finance is at record levels, but headline numbers mask slowing momentum. BloombergNEF recorded $2.1tn in clean energy investment in 2024, up 11% year-on-year, despite slowing from 24-29% in 2021–23. The IEA projects $2.2tn in 2025, more than double fossil fuel spending for the first time. This 2:1 ratio is a milestone.

Headwinds explain much of the deceleration. Higher financing costs have lifted hurdle rates, grid bottlenecks have constrained growth in several markets and policy delays have slowed offshore wind and industrial-scale projects. Interest rates are central. At 5–6% risk-free yields, far fewer marginal projects clear hurdle rates than in a 1–2% world. Developers have responded with higher Power Purchase Agreement (PPA) requirements, deferred final investment decisions and tighter capital discipline.

Private markets show a clear divide. Infrastructure funds continue to raise at scale, with EQT Infrastructure VI securing $23.2bn in 2025, Blackstone's Energy Transition Partners IV raising $5.6bn and Brookfield's BGTF II securing $10bn at first close. By contrast, venture capital (VC) has fallen sharply, with AI being an exception. AI's dominance of recent VC flows, nearly $100bn in 2024, risks obscuring the overlap between the two sectors. An estimated 40% of AI funding already supports climate-related applications, from grid optimisation to emissions monitoring. This suggests convergence rather than competition, with climate solutions embedded in broader technology waves.

Global climate tech VC dropped to $12.9bn in 2024 from $19.9bn in 2021 (PitchBook). Clean energy VC was $3.9bn in Q225, down 6% quarter-on-quarter, while carbon and emissions tech VC fell 44% to $2.1bn, the lowest since 2020. In context, this contraction is less severe than the broader VC market, which has fallen to near-2020 levels after an unsustainable 2021 peak. PitchBook data show clean energy VC declined just 3.1% in 2024, compared with a 14% drop across climate tech as a whole, and a steeper fall in wider VC activity. Current levels remain around 50% above 2019 baselines, pointing to sector resilience rather than collapse.

Debt markets are more resilient. Sustainable debt issuance reached around $1.5tn in 2024, taking cumulative aligned issuance above $6tn by mid-2025 (Climate Bonds Initiative). Green and transition bonds dominate, with sustainability-linked loans particularly strong in Europe and Asia. Structured finance is deepening, with growth in electric vehicle (EV) asset-backed securities and green mortgages. In the US, IRA-enabled tax-credit transfers are widening access to corporate and insurance investors.

Public equity has been weak. Sustainable equity funds saw record outflows in Q125 before stabilising with modest inflows in Q2. UK renewables trusts raised only £845m of secondary issuance in 2024 and saw no IPOs (London Stock Exchange (LSE) data). Discounts widened sharply, although buybacks have restored some stability, a pattern which is also evident in European listed vehicles and US Yieldcos.

The investment in different sectors also reflects the maturity of technology. More than 90% of renewable and transport flows in 2023 were based on purely commercial terms. By contrast, industry decarbonisation remains at near $25bn annually against needs of almost $600bn (IEA). High capital intensity, technology risk and carbon pricing uncertainty remain barriers. Buildings and efficiency drew $288bn in 2023, but growth slowed in 2024 as rates rose and incentives weakened. Adaptation is even further behind, with the UNEP estimating an annual financing gap of $200–350bn. Headline statistics understate the role of climate-adjacent sectors. Alternative materials, water technology and industrial efficiency platforms are critical to net zero but are often classified outside 'climate tech'. For example, water technology VC funding was just $1.2bn in 2023, yet industrial water treatment and agricultural efficiency investments are multiples of this when embedded in larger platforms. Similarly, efficiency software that reduces industrial energy use by up

to 75% is typically logged as ‘industrial IT’ rather than climate, although it delivers immediate cost savings and rapid adoption.

The outlook hinges on three levers:

- Cost of capital: lower interest rates would reopen investment windows and allow more marginal projects to move ahead, but a return to the ultra-low-rate era looks unlikely.
- Policy credibility: stable frameworks such as the IRA in the US or Contracts for Differences (CfDs) in Europe anchor confidence. Policy drift or reversals quickly erode valuations and delay commitments.
- Financing innovation: expanding tools like tax-credit transfers, blended finance and support from public development banks could bring private capital into projects that are close to commercial but not yet fully viable.

UK investment issues and opportunities

UK industrial decarbonisation represents a £100bn investment requirement by 2030 (UK Climate Change Committee). To cut emissions by 25%, large capital is needed across steel, cement, chemicals and manufacturing. The broader transition economy is also significant. The UK’s net-zero economy already supports nearly one million jobs and £83bn of gross value added (GVA), growing 10% in 2024 (CBI Economics). Water sector modernisation alone represents a £60bn investment opportunity by 2030, with technologies such as smart metering and leakage detection scaling rapidly. These adjacent markets are less visible in VC statistics, but are highly investible.

Steel is the clearest case. Availability of scrap and access to offshore wind make the UK competitive in green steel. Abatement costs, meaning the price of cutting a tonne of CO_2, are estimated at $25–60/t, among the lowest globally (Material Economics). With such economics, as much as 30% of domestic production could shift to electric arc furnaces by 2030. To make projects bankable, policy support such as CfDs for industrial power, green procurement and carbon border adjustments is essential.

Hydrogen-based direct reduction will follow where power is abundant and carbon pricing is credible. Early pilots in Humber and Teesside industrial clusters show potential, especially once CCUS infrastructure is operational. Stable power prices and long-term offtakes are prerequisites.

Cement is tougher. Abatement costs are estimated at $110–130/t (GCCA), reflecting the difficulty of tackling process emissions. Still, demand for low-carbon cement is growing, and alternative fuels, clinker substitution and early CCUS could deliver meaningful reductions this decade.

Chemicals and refining also face transitions. Electrified heat and low-carbon hydrogen can cut emissions, but abatement costs remain high and depend on further falls in renewable power prices and tighter carbon markets. Offtake agreements and policy guarantees are crucial.

The UK has been an innovator in green finance. London remains a hub for green bonds, sustainability-linked loans and risk analytics (LSE, Climate Bonds Initiative). Fintech platforms are expanding in carbon accounting and disclosure, Lloyd’s is broadening parametric insurance and the Bank of England’s stress testing is sharpening demand for reliable climate risk management.

Where the UK lags is in growth finance for climate tech with industrial customers. Venture debt and structured credit remain underdeveloped compared with the US. There is space for specialist lenders to fill this middle lane, especially for business-to-business (B2B) climate solutions with recurring revenues.

Technology pipelines are credible. Industrial heat pumps, electrification, CCUS and sustainable aviation fuels all have active development in the UK. Policies such as the Jet Zero Strategy, the Industrial Energy Transformation Fund and CCUS clusters provide anchor demand and support infrastructure.

Sequencing will matter. The ZEV mandate requires 80% of new car sales to be zero emission by 2030. The UK ETS will gradually expand to more sectors. Carbon border adjustments, aligned with the EU, will help support domestic producers of low-carbon materials. Disclosure rules, through Task Force on Climate-related Financial disclosures and the Strategic Disclosure Requirement, increase transparency and create demand for data and analytics.

For investors, the UK opportunity narrows to three themes:

- Infrastructure: offshore wind, grid expansion and EV charging, offering scale and contracted returns.
- Industrial decarbonisation: steel recycling, cement fuel-switching and industrial heat pumps, backed by policy and proven technical pathways.
- Climate technology: asset-light, B2B solutions with defensible intellectual property and near-term revenues, particularly where regulation on measurement and verification is tightening.

Conclusion: Navigating the transition

Energy transition investment is larger than ever but still falls short of what is required. The gap of more than $3tn annually defines both the risk and the opportunity.

Capital continues to flow unevenly. Renewables, storage and transport attract institutional money with proven economics and contracted revenues. Infrastructure funds raise at scale, debt markets remain deep and project finance is accessible where cash flows are predictable. By contrast, early-stage climate technologies remain capital-starved, with venture capital investment falling from nearly $20bn in 2021 to $13bn in 2024 (PitchBook).

This divergence is rational. Proven projects remain clear even at today's higher cost of capital. Emerging technologies must wait for cheaper finance or stronger policy signals. The investment edge lies in identifying where policy credibility or financing innovation shortens the wait.

The UK still offers advantages: an industrial base, financial depth and a policy framework that, despite adjustments such as the petrol and diesel vehicle ban delay, remains anchored on the target of net-zero by 2050. Near-term opportunities in steel recycling, low-carbon cement and industrial electrification are visible. Finance innovation, CCUS deployment and sustainable aviation fuels add further scope.

Execution will be decisive. Investors should focus on technologies supported by multiple policy levers, clear cost-down pathways and reliable offtakes. Projects that depend on a single policy instrument carry higher risk.

The funding gap is demanding, but that also helps to define the opportunity. Current levels reflect stabilisation from the 2021 peak rather than collapse, with climate allocations proving more resilient than wider VC. The next five years will determine whether flows rise toward $5tn (IEA, UNEP). That shortfall defines the investment opportunity. Investors in climate technology are likely to be rewarded given the scale of the task required, notably in proven infrastructure, scalable industrial solutions and enabling technologies that do not always appear in headline data. In that sense, today's funding shortfall makes the investment landscape clearer, not smaller.

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