

Energy Transition Investment Trends 2025

Abridged report

Tracking global investment in
the low-carbon transition

January 30, 2025

BloombergNEF



Executive summary

Global investment in the energy transition hit a record \$2.1 trillion in 2024, climbing 11% from a year earlier. Mainland China has returned to the driving seat, accounting for two-thirds of the global increase seen last year. The global clean energy supply chain saw \$140 billion in new investment, despite ongoing struggles with overcapacity. Equity and debt issuances for climate and energy transition purposes remained just above \$1 trillion.

- This report is BNEF’s annual review of investment in the energy transition. This includes ‘energy transition investment’ (spending to deploy clean technologies), as well as investment in the clean energy supply chain, equity investment in climate-tech companies, and debt issuance for energy transition purposes.

Energy transition investment

- Global energy transition investment has surpassed \$2 trillion for the first time and more than doubled since 2020, but growth slowed to just 10.7% in 2024, from 24-29% in each of the years 2021-23. By far the largest sectors are electrified transport at \$757 billion, renewable energy at \$728 billion and power grids at \$390 billion. All three of these sectors grew to new records in 2024, as did energy storage, which shrugged off headwinds to reach \$54 billion.
- In contrast, the other seven sectors (nuclear, carbon capture and storage, hydrogen, clean shipping, electrified heat and clean industry), together accounted for just 7.4% of total investment, and actually declined 23% in 2024, illustrating the ongoing challenges in scaling up ‘emerging’ clean technologies.
- The Asia Pacific region grew fastest, at 21% year-on-year, and surpassed \$1 trillion in 2024, accounting for half of the world’s energy transition investment. Mainland China’s growth alone accounted for two-thirds of the global uptick, as the market invested \$818 billion in 2024 – more than double any other economy. US investment was stable at \$338 billion, while EU and UK investment fell. Of the top 10 markets, mainland China invested most as a portion of GDP (4.5%), followed by Germany, the EU-27 bloc and the UK.
- Annual investment is running at just 37% of the levels required for the rest of this decade if the world is to get on track for net zero by 2050.

\$2.08 trillion

Global energy transition investment in 2024

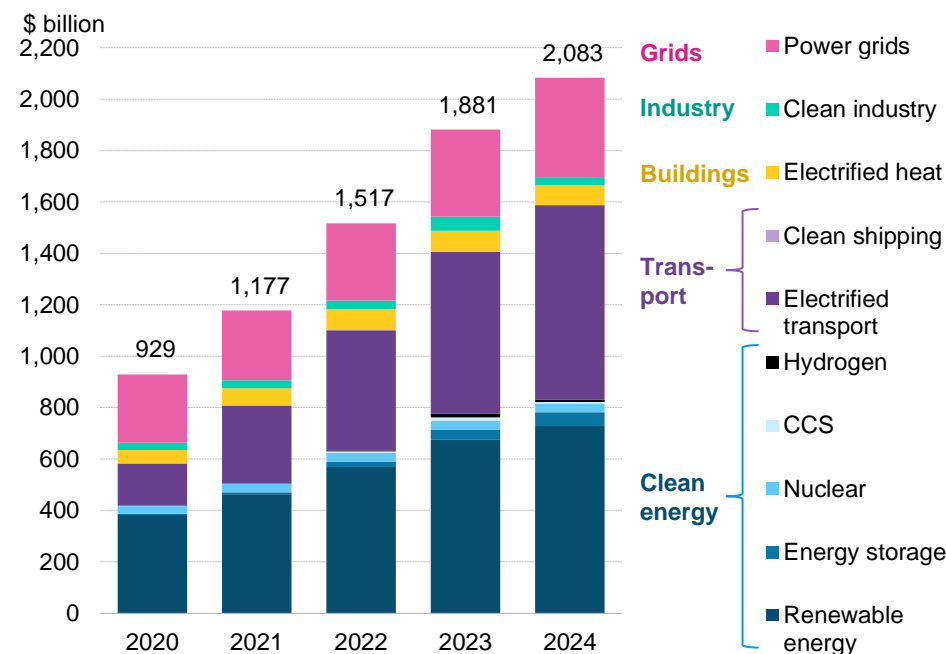
\$140 billion

Global clean energy supply chain investment in 2024

\$1.06 trillion

Total debt and equity raised for climate/energy transition in 2024

Global energy transition investment, by sector



Source: BloombergNEF. Note: Start years differ by sector but all sectors are present from 2020 onwards – see [Methodology](#). Most notably, nuclear figures start in 2015 and power grids in 2020. CCS refers to carbon capture and storage.

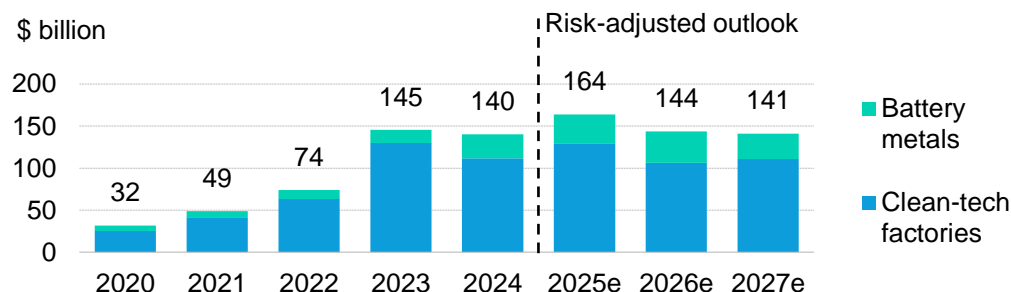
Executive summary

Supply chain investment

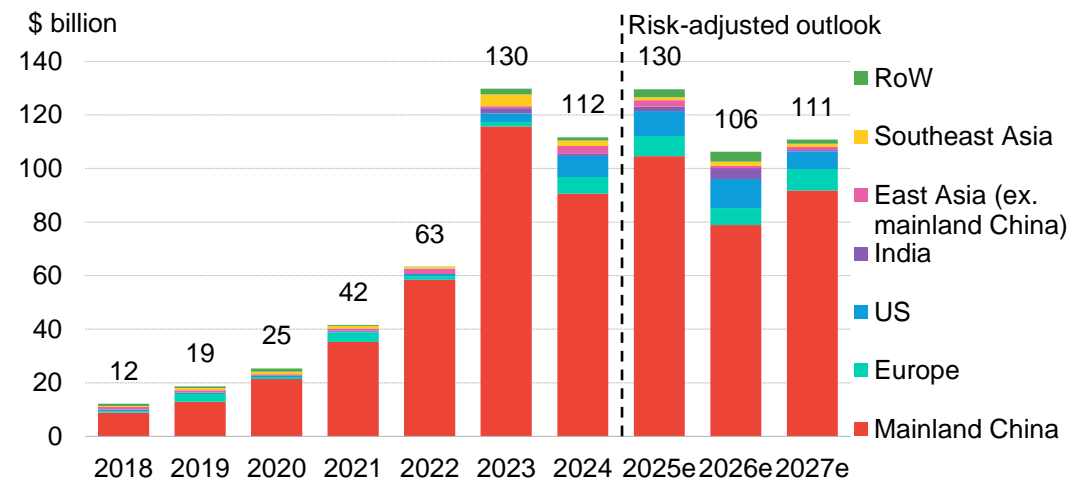
Clean energy supply chain investment

- Clean energy supply chains, including equipment factories and battery-metal production assets, saw \$140 billion in investment in 2024, a slight dip compared to a year earlier. The total reflects the value of new factories commissioned in 2024 producing solar, battery, electrolyzer and wind equipment, as well as mines and processing facilities for battery metals.
- We also estimate future supply chains additions based on company announcements. However, solar, battery, battery metals and electrolyzer manufacturing are all in a state of overcapacity. We have consequently discounted future additions, as many investments are expected to get delayed or canceled. Even after being heavily discounted, investment is set to keep growing: global supply chain spending is expected to rise to \$164 billion in 2025.
- Progress is being made on onshoring supply chains outside of mainland China. But in the US, Europe and India, supply chain investments are also threatened by manufacturing inexperience, high local costs and political risk. Mainland China still accounted for 81% of investment in 2024 – only slightly below the 2020-23 average – and will continue to account for the bulk of spending for years to come.
- Supply chain investment is on track for net zero. BNEF’s Net Zero Scenario requires yearly factory investment to average \$45 billion through 2030; the world already achieved more than that in 2024. Much the same is true of battery metal production. Overcapacity might weaken the case for adding production assets, but equally results in an ample supply of clean energy equipment and inputs at low prices.

Global clean energy supply chain investment, by sector



Global clean-tech factory investment by geography



Source: BloombergNEF. Note: Clean-tech includes factory investment across the manufacture of solar (polysilicon, wafers, cells and modules), batteries (separators, electrolytes, cathodes, anodes and cells), wind turbines (nacelles only), and hydrogen electrolyzer manufacturing (stack assembly only). Battery metal includes lithium, cobalt and nickel mines and the refineries required to process them for batter-making. ‘RoW’ refers to rest of world, and ‘East Asia (ex. mainland China)’ comprises Taiwan, Japan and South Korea.

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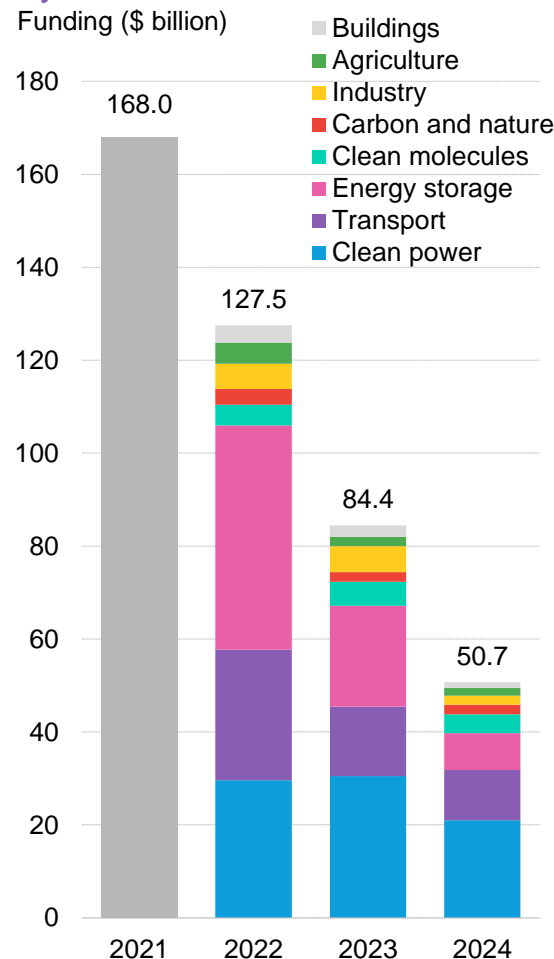
Equity finance

Climate-tech equity finance

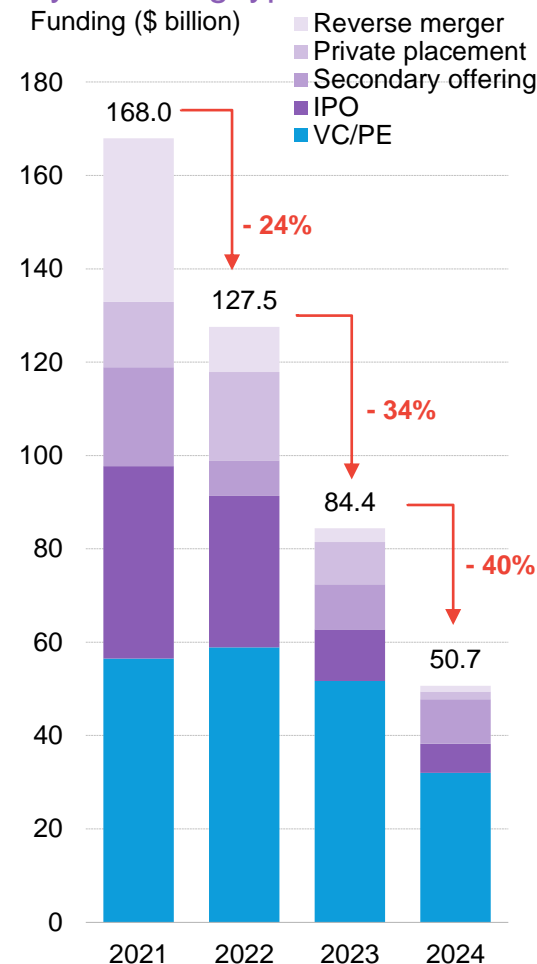
- Climate-tech companies raised \$50.7 billion in private and public equity in 2024, down 40% year-on-year, marking the third consecutive year of contraction. Clean power and transport companies led fundraising, bringing in \$31.8 billion.
- In recent years, the climate venture market was more resilient to the tough funding environment than the broader market. In 2024, this trend reversed. Venture dollars deployed to climate fell 40% despite overall venture funding in the economy increasing. The change can be partially attributed to a new wave of artificial intelligence startups attracting funding.
- Capital raised via initial public offerings (IPOs) totaled \$6.2 billion in 2024, 85% less than in 2021. Funding for already-listed climate-tech companies fared decently with secondary offerings growing 7% annually.
- The US was the largest market for equity raising with \$17.9 billion of new issuances tracked. Mainland China fell to second place with \$9 billion. India saw year-on-year growth of 20%, ending 2024 with \$5.3 billion raised off the back of numerous clean-tech firms listing publicly. Companies based in the European Union raised a total of \$5.6 billion.
- The languishing public market funding environment in the last two years caused an uptick in M&A activity. Volumes totaled \$68.8 billion across 200 deals in 2024. This is a 7% drop from 2023 but 28% jump from 2022. Financials and energy companies have been the most active acquirers.

Climate-tech equity financing, by sector and financing type

By sector



By financing type



Source: BloombergNEF, Bloomberg Terminal MA<GO> and IPO<GO>, Pitchbook. Note: IPO is initial public offering. VC/PE refers to venture capital and private equity.

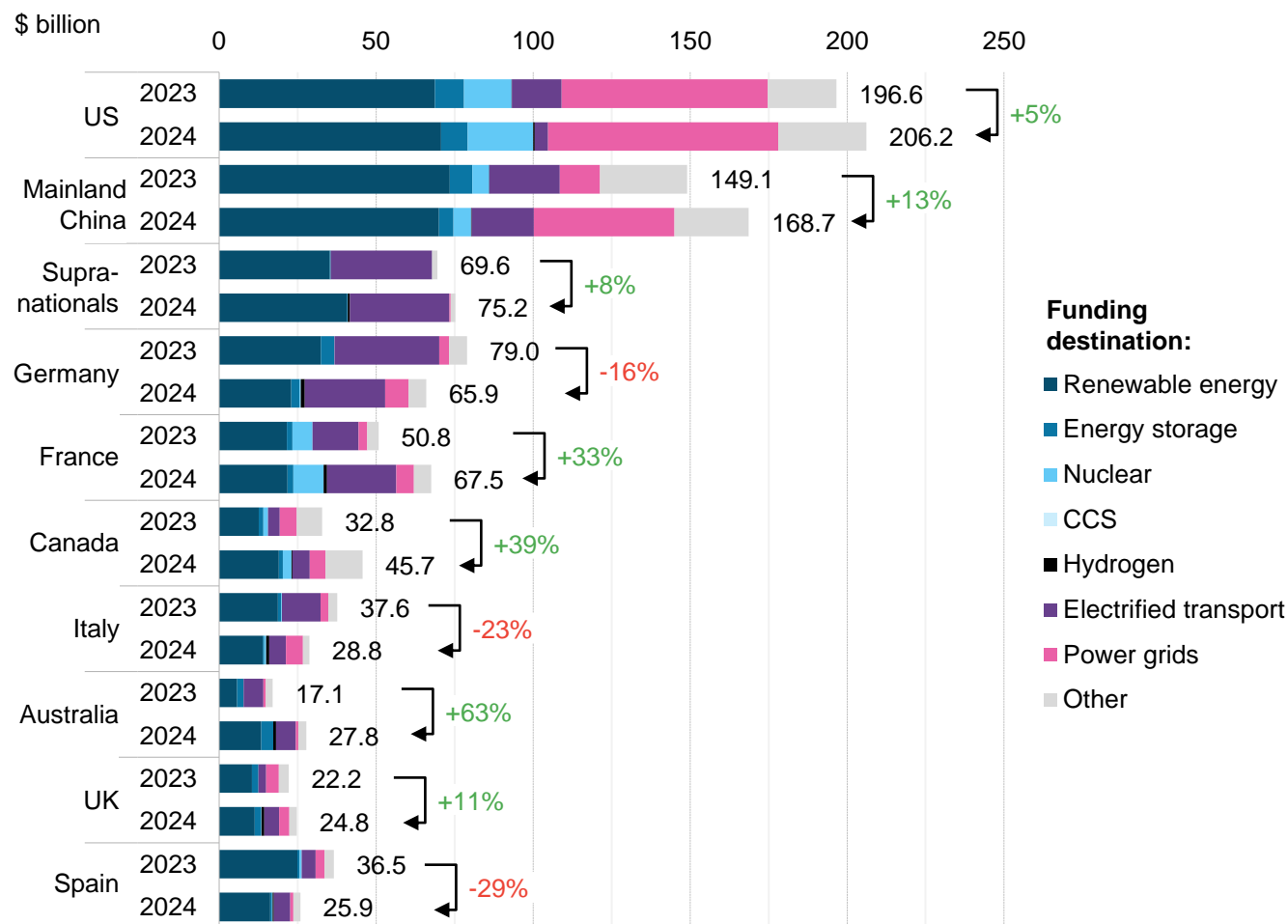
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Debt issuance

Energy transition debt issuance

- Energy transition debt totaled \$1 trillion in 2024, 3% higher than a year earlier. Corporate debt rose 5% on the back of interest rate cuts around the world. Meanwhile, we tracked a slight drop in project debt volumes and stable government energy transition debt levels.
- These issuances include labeled corporate and government loans and bonds with use of proceeds related to the transition, clean energy project debt, and general purpose corporate debt, with deal values discounted by issuers' exposure level to clean energy sectors. Labeled sustainable debt accounted for 64% of energy transition debt in 2024.
- The US and mainland China are by far the biggest markets for energy transition debt. Both markets grew debt sales last year. Europe's issuances slid by 7% due to slowing markets such as Germany, Italy and Spain. The volume in Africa and the Middle East slumped by 35%.
- Many sectors raise debt for the transition – clean energy firms only make up 5% of the total. Utilities are the largest fundraisers. Governments and financials follow as they subsidize, invest or lend to the value chain.

Energy transition debt issuance in 2023-24 in top markets



Source: BloombergNEF, Bloomberg. Note: Market attribution according to instruments' market of risk. Funding destination estimated based on issuer announced use of proceeds or company revenue exposure. CCS is carbon capture and storage.

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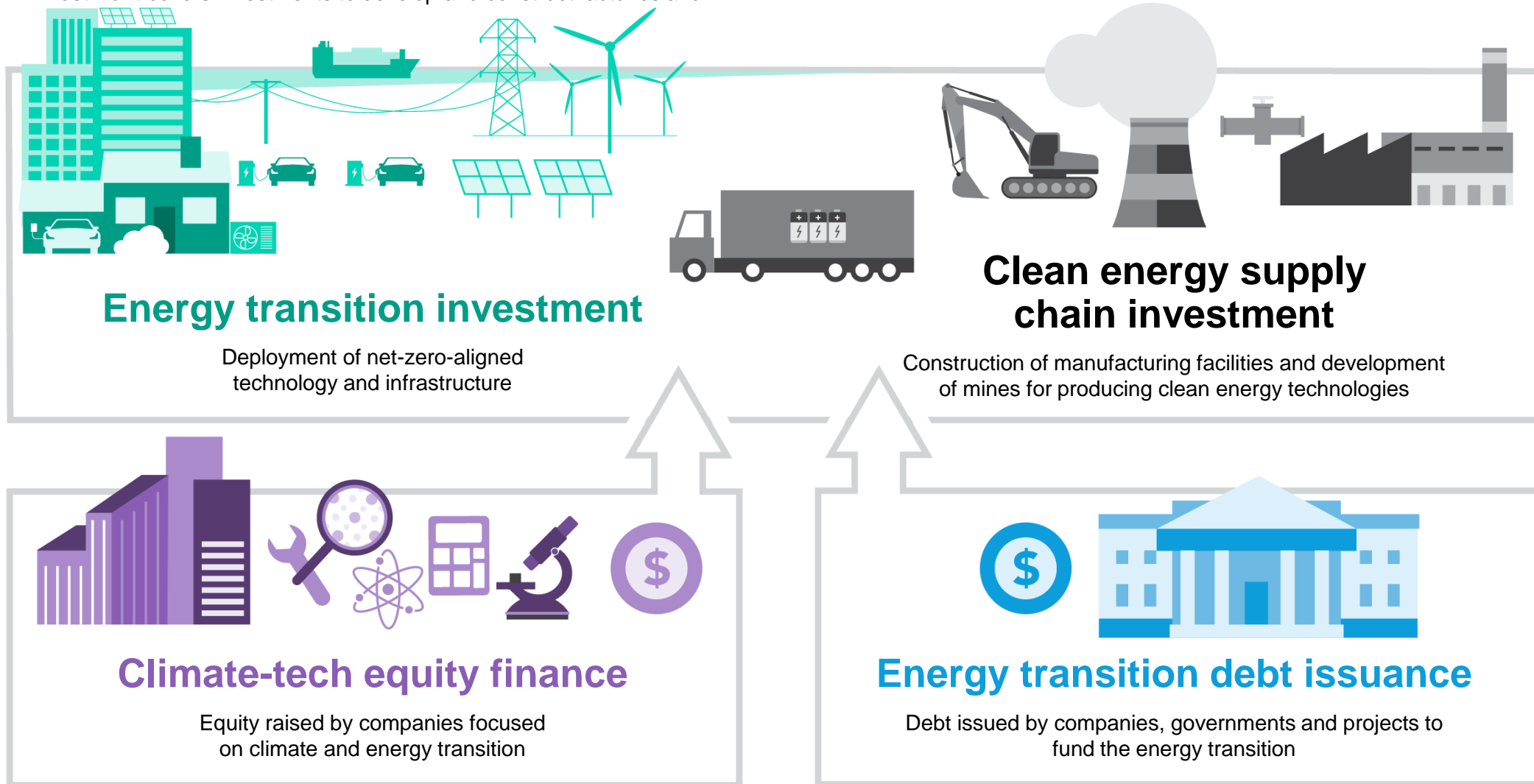
Types of funding covered in this report

This report is BNEF's annual assessment of funding flows relating to the energy transition, covering four distinct types of financial flows.

Energy transition investment denotes real-economy investment commitments and spending to deploy clean-energy technology and infrastructure that is aligned to net zero, while **clean energy supply chain investment** covers investments to develop and construct factories and

materials production facilities to supply technology for the energy transition.

In contrast, **climate-tech equity finance** and **energy transition debt issuance** cover the raising of funds by companies, governments and projects from investors – the proceeds of which can be deployed into energy transition investment or supply chain investment.



More detail on the four funding types in this report

Energy transition investment

The first two sections of this report cover ‘energy transition investment’ – BNEF’s term for money spent to deploy clean technologies such as clean energy, electric vehicles (EVs), heat pumps, hydrogen and carbon capture.

In a word, these sections focus on the **deployment** of technologies that mitigate emissions or are needed for net zero across the supply and use of energy.

With data from as far back as 2004, we track each sector as much as possible from a bottom-up perspective, giving the most robust estimate available for investment in the deployment of net-zero-aligned tech

In 2024, global energy transition investment totaled \$2.08 trillion.

The underlying data for energy transition investment can be found [here](#).

Clean energy supply chain investment

The third and fourth sections of this report cover investment in **factory facilities and materials mining and refining** for clean energy technologies. These sums ensure that the supply of components and systems for the energy transition keeps up with the pace of deployment, though they do not mitigate emissions themselves. Data in this section begins from 2018.

In 2024, supply chain investment totaled \$140 billion.

*These sections track the types of energy transition-related assets **receiving** investment. This can be thought of as gross investment in assets, or capital expenditure.*

Climate-tech equity finance

The fifth and sixth sections of this report cover the raising of equity investment by ‘climate-tech’ companies, either via public equity markets or venture capital and private equity. In short, these sections focus on **equity raising by companies**.

The scope includes companies aiming to decarbonize the energy, transport, buildings and infrastructure, industry and agriculture sectors, or help better understand our planet and environment, assist in tracking greenhouse gas emissions, and mobilize financial (and consumer) markets toward greener investments. Data in this section begins in 2021.

In 2024, global climate-tech equity raising totaled \$50.7 billion.

Our *Investment Radar* ([web](#)) provides the latest update on climate-tech equity investment trends.

Energy transition debt issuance

The final section covers the **issuance of debt** by companies, governments and projects to fund energy transition activities. These are lending instruments such as bonds or loans, raised by entities active in the energy transition sectors.

In 2024, energy transition debt issuance totaled \$1.01 trillion.

*These sections track the types of finance being raised by companies for climate and energy transition purposes. These funds form some of the **sources** of finance flowing into the assets tracked on the left of this divide – though they can also be used for other corporate purposes, including research, development or operations.*

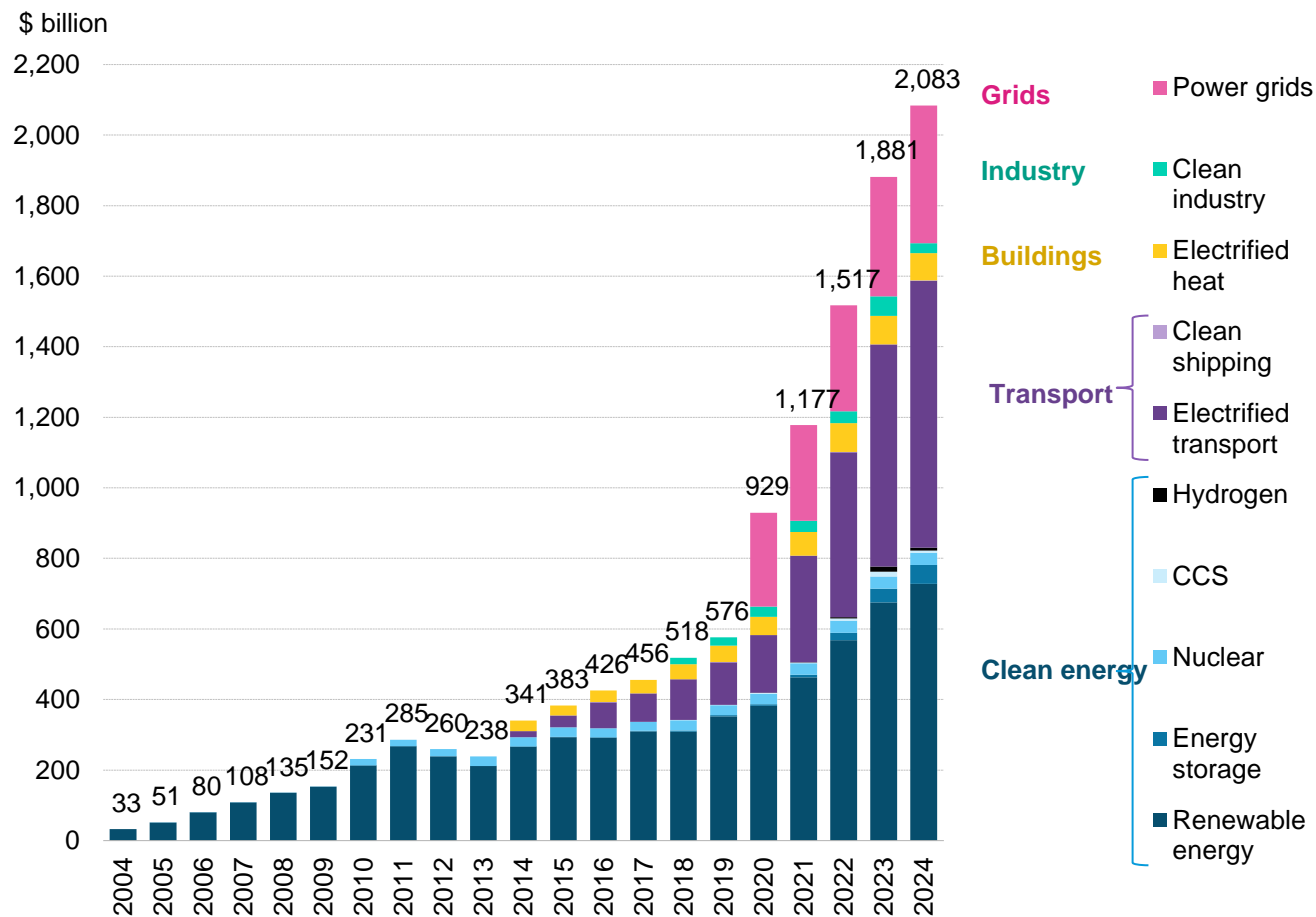
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**Reflects table of contents for the full version of Energy Transition Investment Trends 2025. BNEF clients and Bloomberg Anywhere users can find the full report on the Terminal and [bnef.com](https://www.bnef.com).*

Global energy transition investment exceeded \$2 trillion for the first time

Global investment in energy transition, by sector

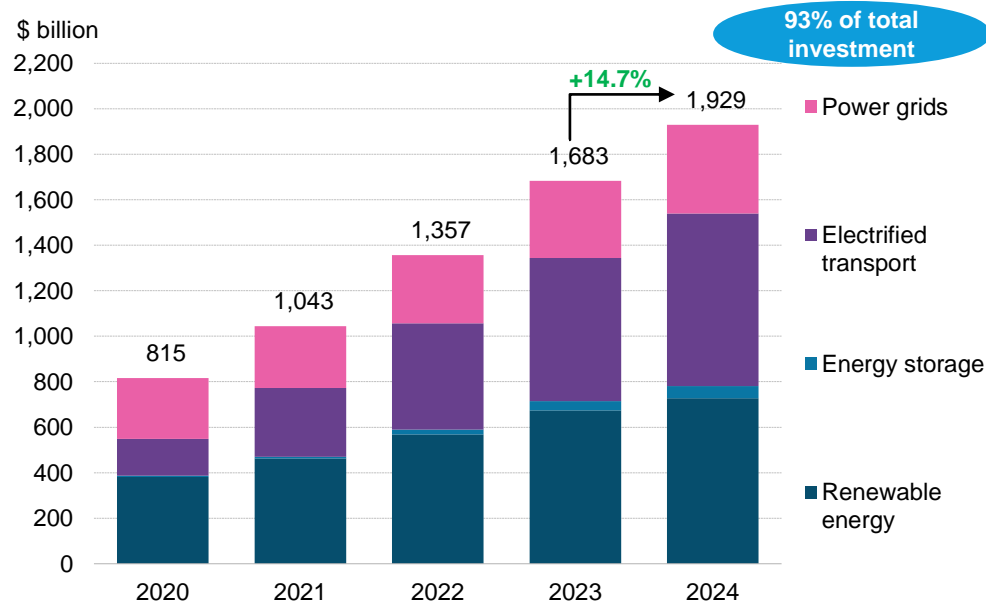


Source: BloombergNEF. Note: Start years differ by sector but all sectors are present from 2020 onwards; see [Methodology](#) for more detail. Most notably, nuclear figures start in 2015 and power grids in 2020. CCS refers to carbon capture and storage.

- Annual global investment in energy transition technologies rose to nearly \$2.1 trillion in 2024, setting a new record. Although investment has accelerated rapidly this decade – more than doubling since 2020 – growth slowed last year, dropping to just 11% from 24-29% in each of three years prior.
- Our figures track spending in 10 different sectors, but by far the largest investment drivers are electrified transport at \$757 billion, renewable energy at \$728 billion, and power grids at \$390 billion. Together these three sectors accounted for 90% of the total investment last year. All three grew to new record levels, with electrified transport up 20% (despite fears of an EV slowdown), power grids up 15% and renewable energy up 8%.
- Energy storage continues to accelerate strongly, with 36% growth in 2024 pushing the committed total to \$53.9 billion. Clean shipping, which tracks purchases of zero-emission-capable vessels, though still tiny in relative terms, quadrupled to \$452 million.
- The other sectors saw contrasting fortunes in 2024:
 - Nuclear investment was flat at \$34.2 billion.
 - Electrified heat fell 5.2% to \$77 billion.
 - CCS and clean industry both halved, to \$6.1 billion and \$27.8 billion respectively.
 - Hydrogen investment dropped 42% to \$8.4 billion.

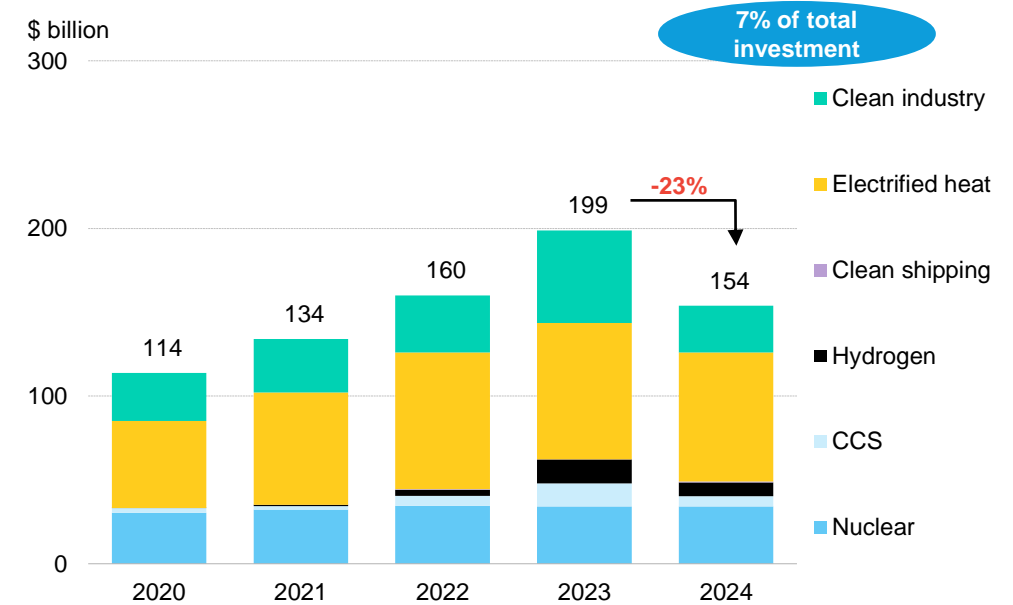
A two-speed transition is emerging

Energy transition investment trends: 'mature' sectors



- This year's data shows a clear distinction between sectors where the technology is proven, commercially scalable and the business models established, and those where the economics are yet to stack up or the technology is yet to be proven at scale.
- 'Mature' technologies such as renewables, energy storage, electric vehicles and power grids form the vast majority of energy transition investment today, and continue to grow strongly despite their maturity. These sectors accounted for \$1.93 trillion of investment in 2024 and posted 14.7% year-on-year growth – a healthy rate given the headwinds seen in the past two years.

Energy transition investment trends: 'emerging' sectors

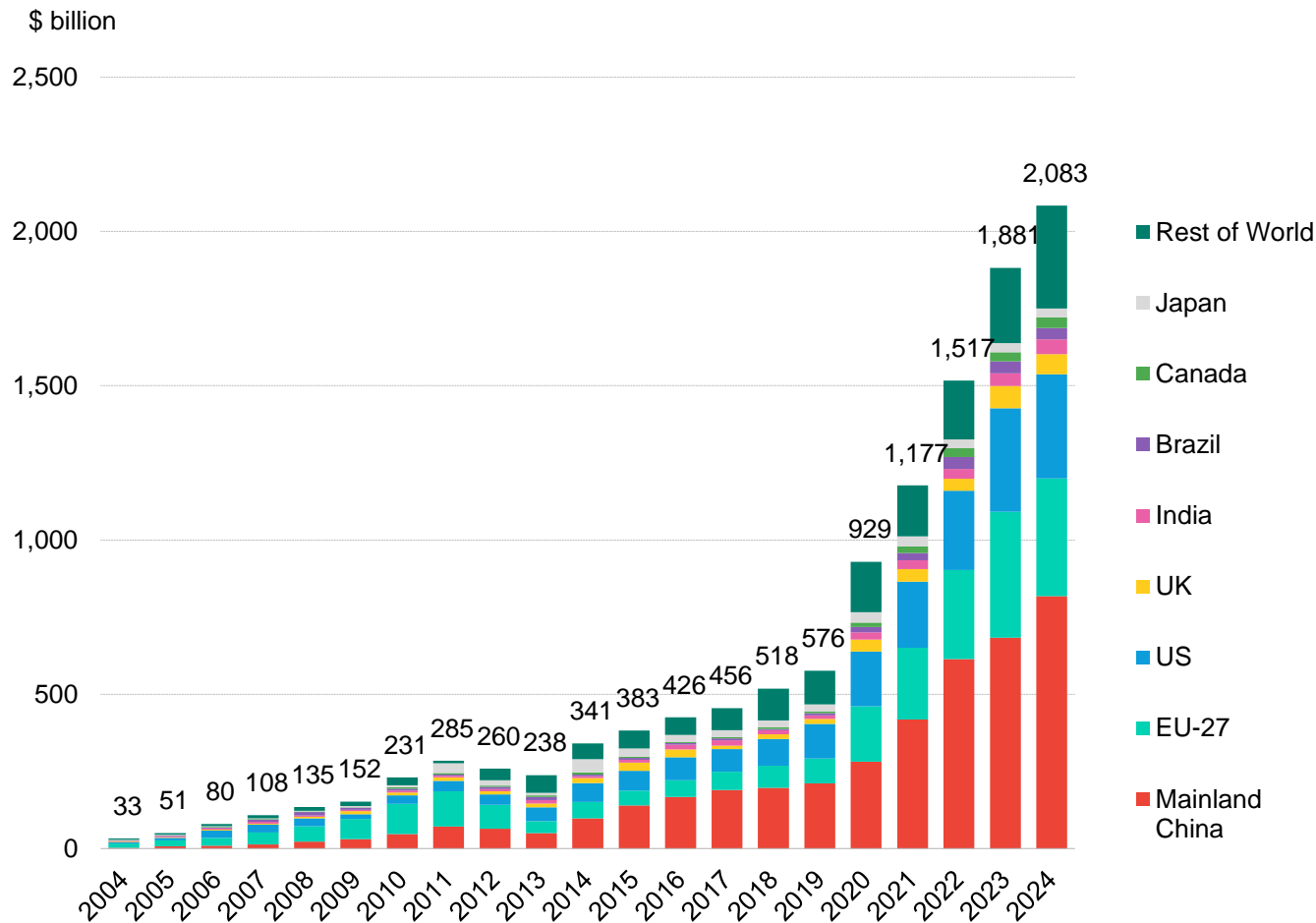


- In contrast, 'emerging' technologies, where we include electrified heat, hydrogen, CCS, nuclear, clean industry and clean shipping, face more fundamental challenges around affordability, technology maturity and commercial scalability. These sectors attracted just \$154 billion in 2024, or 7% of the total, and together saw a 23% decline in investment. Government policy makers and the private sector have more to do to de-risk these technologies if they are to scale up in time to have any meaningful impact on emissions by the end of the decade.

Source: BloombergNEF. Note: CCS refers to carbon capture and storage.

Mainland China is back in the growth-driving seat

Global energy transition investment, by economy/bloc

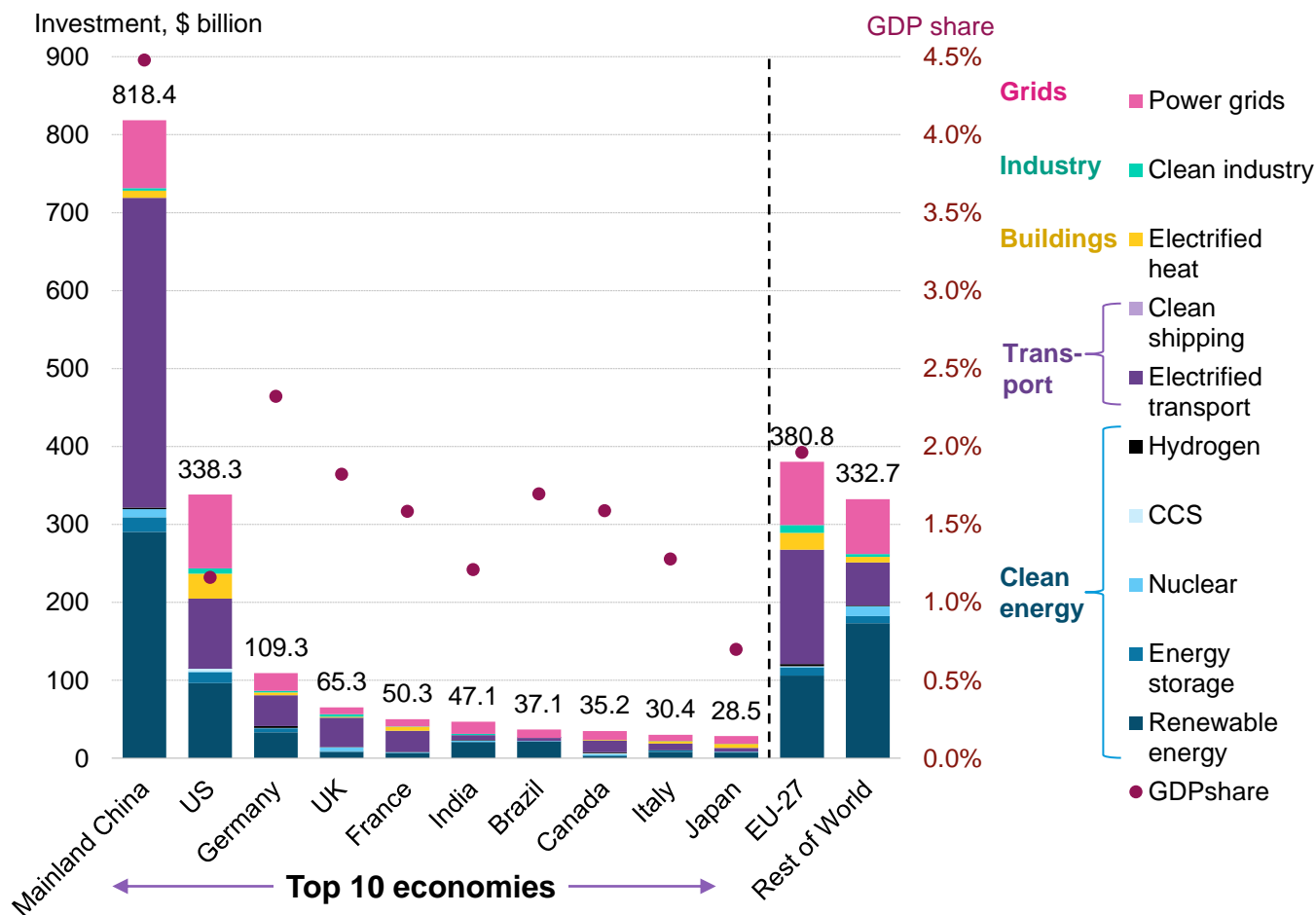


- With 20% year-on-year growth, mainland China alone accounted for \$134 billion of the \$202 billion global investment growth in 2024. The market posted solid growth in a range of sectors, including renewables, energy storage, nuclear, EVs, hydrogen, heat pumps and power grids, ending the year with \$818 billion invested.
- This was a stunning turnaround from 2023, when most of the growth was driven by the EU, US and UK. Those three markets have since seen a reversal of fortune, with investment flat in the US at \$338 billion and down in the EU-27 (\$381 billion) and UK (\$65.3 billion) in 2024. Mainland China invested more than these three markets combined in 2024.
- Of the large markets shown in the chart, India (up 13% to \$47 billion) and Canada (up 19% to \$35 billion) also added to the global growth story.
- Brazil and Japan both saw investment recede, by 4.3% and 3.0% respectively.
- The 'rest of world' category rose 34% to \$364 billion in 2024, reflecting growing investment in other markets across the Americas and Asia Pacific.

Source: BloombergNEF. Note: Start-years differ by sector, but all sectors are present by 2020. The step-change in 2020 is caused in part by the addition of power grids into the scope from that year onward.

Mainland China invested more than double any other economy, Canada entered the top 10

Energy transition investment and GDP share in 2024, top 10 economies plus the EU-27 and rest of the world



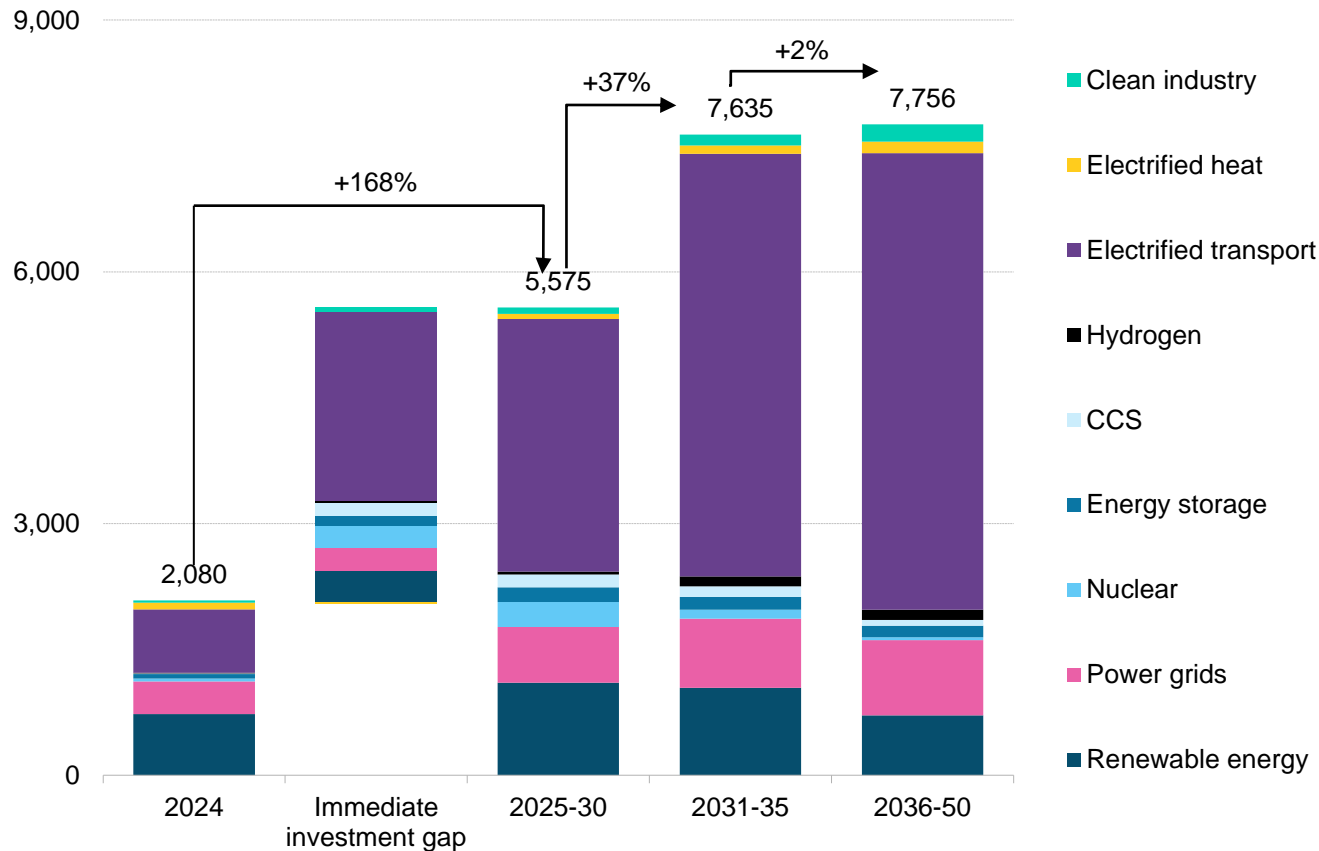
Source: BloombergNEF. Note: EU-27 bar also includes the EU member states shown. 'Rest of world' is global investment excluding the EU and individual economies in the chart. CCS refers to carbon capture and storage.

- Mainland China's accelerated investment in 2024 means that it has widened its investment lead against other countries. With \$818 billion invested in 2024, it is funding the energy transition at more than twice the rate of any other economy. Normalizing for the size of economy gives the same result, with mainland China's investment equivalent to 4.5% of its GDP – a much higher share than the EU-27 (2.0%), the US (1.2%) and others.
- The US is the second-largest destination for energy transition investment, at \$338 billion, while third-place Germany invested \$109 billion in 2024 (equivalent to 2.3% of GDP).
- While the top-five ranking is unchanged from 2023, the UK (fourth place) and France (fifth) have fallen further behind Germany and the US. Both markets saw a steep drop in renewables investment last year.
- The rest of the top 10 has slightly reshuffled, with India rising to sixth place due to growth in renewables, EVs and storage. Brazil was displaced to seventh, while Canada entered the top 10 at the expense of Spain.
- Italy and Japan rounded out the top 10, both with slightly declining investment in 2024.
- The EU as a bloc would be ranked second, with \$381 billion invested in 2024, down 6.5% from 2023.

Aligning with net zero requires almost a tripling of today's spend figures

Comparison: 2024 energy transition investment vs. required annualized levels in NEO 2024 Net Zero Scenario

\$ billion (2024)



Source: BloombergNEF. Note: NZS = Net Zero Scenario. Future values are obtained from the New Energy Outlook (NEO)2024. CCS stands for carbon capture and storage. For more on the methodology, please see [the appendix](#).

- Energy transition investment still falls short of what is required to reach net zero by 2050, despite hitting a new high in 2024. Annual clean spend needs to average \$5.6 trillion between 2025 and 2030, based on BNEF's Net Zero Scenario, a 168% increase from 2024's figure.
- The focus on the remainder of this decade is crucial, given the urgent need for rapid action to lower emissions and prevent reaching undesired climate tipping points.
- Electrified transport accounts for the largest portion of the immediate investment gap – or the difference between the current and required investment figures until 2030. Spending for the sector needs to quadruple to hit \$3 trillion per year over the rest of this decade, making up 54% of the total figure.
- Annual investment for renewable energy and power grids, which account for the second- and third-largest share of the total clean spend required between 2025 and 2030, would need to rise by 58% together from today's levels.
- The curve gets steeper after 2030. Annual clean spend across 2031 to 2035 ticks up to \$7.6 trillion, a 3.6x scale-up from 2024 levels and 37% higher than the annual rate between 2025 and 2030. Electrified transport continues to dominate the total, while supply-side investment starts to dwindle.

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