

ADF Quarterly Climate Review #6

LES ATELIERS DU FUTUR

lesateliersdufutur.org

November 2026

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LES ATELIERS DU FUTUR

Who we are



LES ATELIERS
DU FUTUR



WE ACT TO ENHANCE BUSINESS MOBILIZATION TOWARDS NET ZERO



Our purpose

In response to the interconnected challenges of climate change and biodiversity loss, our **mission** is to **act for the Climate**

Our members

A multidisciplinary group of business executives and senior managers
All volunteers, we are **experts in modeling** (trained in climatology), engineers focused on **energy** and **green technologies**, or **finance specialists**
Our experience facilitates their mastery of business climate strategies

Our strategy

A focus on the **Climate**
An international vocation, as key governance for the normative framework of businesses and citizens is at global and regional levels
An orientation towards corporations, as they alone meet the key conditions to successfully decarbonize our activities: Ability to do, know-how, and, to some extent, willingness to do

Our actions

Raising awareness - policy makers and governing bodies (public or private)
Challenging corporate strategies and public policies with a constructive, optimistic yet ambitious mindset.
Training future generations through Universities/Schools



ADF QCR #6:
Our Call for Action to Global Leaders



OUR CALL FOR ACTION TO GLOBAL LEADERS



RAISE THE BAR
From Pledges to Binding Action

1. NDCs covering 76% of emissions but projecting 2.6°C (2.8°C under current policies — UNEP EGR 2026). **Missing NDCs — Saudi Arabia and Argentina are the last G20 Parties without a 2035 target — must be published urgently. All NDCs must be strengthened to get onto the lowest-overshoot path back to 1.5°C: −18% by 2030 and −45% by 2035 vs 2025, against −11 to −15% delivered by current pledges**. NDCs must include a detailed policy mix and a **binding implementation timeline.**
2. **As part of more ambitious new NDCs, mandatory transition plans, aligned with Paris Agreement targets, must be required, with a precise compliance timeline.** Governments should prioritize power infrastructure, energy storage (×6 needed for NZE), and critical mineral extraction/refining amid shortage risks (lithium, copper).
3. In the absence of such an audited transition plan, **corporates dividend distribution and share buy-back should be capped** e.g. to 20% of net income. The most critical sectors, such as energy production, should be targeted first. Transition plans should include adequate **internal carbon pricing and energy efficiency KPIs**.
4. The COP28 methane pledge from the global energy industry should be closely monitored, with **additional investment needed to reduce methane emissions in the industry by 75% by 2030.** Start working on a global convention requiring good practices implementation from all energy players.
5. **Global Climate Governance System:** US Paris withdrawal creates a critical gap. Quarterly inter-COP meetings of the world leaders should focus on climate urgency to improve decision-making and monitoring. **Institutionalize the US governors coalition (24 states, 57% of US economy)** as recognized UNFCCC interlocutors. Strengthen the **Open Coalition on Carbon Markets (16 countries, 40% of emissions)** launched at Belém.

MONEY WHERE THE CLIMATE IS
Redirecting Trillions, Not Billions

6. **Multilateral Development Banks:** climate finance needs will reach $5.1T by 2030 (vs $1.6T in 2023). **The New Collective Quantified Goal of $300B/yr confirmed at Belém is insufficient (target $1.3T/yr by 2035). Multilateral Development Banks must at least triple their climate commitments,** with preferential rates for power infrastructure ($1T pledged at Belém) and energy storage. Developed countries must collectively bear the cost.
7. Raise conditions to develop **private and Multilateral Development Bank financing in least developed countries** including through global risk insurance as well as secure local regulations.

INVEST IN SOLUTIONS
R&D, Storage, Modelling for 2050

8. Increase R&D to develop **solutions to reach 2050 targets** (e.g. next-generation batteries, low-carbon hydrogen, Sustainable Aviation Fuels, Small Modular nuclear Reactors, Carbon Capture Usage & Storage) by requiring large corporations of high-emission sectors to invest a minimum of **10% of net cash flows.**
9. In order to reach 18% of renewable heat by 2035, **massively increase subsidies for heat pumps and electrification of industrial heat** amid declining heat pump sales and slowing energy efficiency. Increase subsidies to step up efforts in **geothermal, thermal storage and biogas.** O&G companies should be prescribed growing targets for biogas production as a % of fossil gas sales.
10. Urgently increase investment in **climate data and modelling.** US budget cuts are now being implemented (>25% NOAA reduction, job cuts, closure of research offices). **Europe and other Parties must immediately fill this gap** to preserve CMIP6+ model continuity and leverage new capabilities (EarthCARE satellite, km-scale models, climate AI). Investing in models to avoid investing in disaster.



Climate:
Recent Developments & Outlook



2025: THIRD WARMEST YEAR DESPITE LA NIÑA'S COOLING EFFECT

+1.47° C

above pre-industrial levels in 2025 (Copernicus)
3rd warmest year on record, after 2024 (+1.60° C) and 2023 (+1.48° C)

Despite La Niña

Three consecutively hot years

2023–2025 average exceeds 1.5° C for the first time. Since 1980, each decade has become the warmest ever. The last 11 years are the 11 warmest on record.

Several combined drivers

Structural warming (dominant): long-term GHG rise. Short-term boost: record sea-surface heat amplified by El Niño (2023–H1 2024). Modulating factors: aerosols, La Niña in 2025.

Monthly records in 2025

January 2025: warmest January ever. March, April, May: 2nd warmest for their months. Every month except Feb. and Dec. warmer than any year before 2023.

 Source: Copernicus, Berkeley Earth

2026: RECORD OCEAN HEAT FEEDS AN EL NIÑO UNMATCHED SINCE 1950

75 %

NOAA probability that the Oct–Dec 2026 El Niño index exceeds every event since 1950 (RONI ≥ +2.5 °C)

Weekly Niño 3.4 at +3.0 °C mid-September (IRI); all 22 forecast models "very strong" through winter 2026–27; peak Nov–Jan. WMO: near-100 % persistence to February 2027, its most unequivocal update ever.

Oceans in persistent overheating

Extra-polar SST 21.07 °C in August — record for the month, joint record for any month; daily record 21.11 °C on 22 Aug (Copernicus). Marine-heatwave days have tripled since the early 1990s.

Standing references: ocean heat content record in 2025 (+23 ZJ, 0–2000 m); sea level +4.5 mm/yr, rebound expected with El Niño.

Sea ice: no Arctic record, Antarctic near the floor

Arctic minimum 4.60 M km² on 12 Sep, tied 10th lowest (NSIDC). The 20 lowest minima are the last 20 years, but the September trend has flattened for two decades — the winter maximum (tied lowest, March 2026) and thick-ice loss are the robust signals.

Antarctic winter maximum provisionally 3rd lowest.

Reefs and regional impacts

Every strong El Niño since 1998 has coincided with a global coral-bleaching event (NOAA); a fifth event in 2026–27 is plausible, not declared.

Already visible: Indonesian fires intensifying, drought alerts in Central America and the Caribbean. Ahead: drier Australia and southern Africa, wetter Horn of Africa and Peru/Ecuador coast (WMO, IRI).

Sources: NOAA CPC 10 Sep; IRI 21 Sep; WMO 3 Sep; Copernicus 10 Sep; NSIDC 23 Sep; IAP/CAS Jan 2026

A CHEAP FIRST HALF FOR INSURERS, A DEADLY SUMMER FOR THE UNINSURED

$42–47B

insured natural-catastrophe losses in H1 2026 — lowest first half since 2020 (Swiss Re 42, Munich Re 44, Gallagher Re 46, Aon ≥ 47)

Economic losses $100 bn, 42 % insured (above the 33 % long-term share). Low only because severe storms spared Texas and the US South; H2 averages 58 % of annual losses. Verisk lifts its global insured average annual loss benchmark to $171 bn (+19 bn), nearly 3× the 2012 level.

Nepal, 26 Aug: > 1,300 dead, > 5,000 missing

~2 km² of rock and glacier ice fell 1,400 m; the debris flood ran 200 km. WWA: ~+1.5 ° C of attributable summer warming at the site, a "destabilising factor" — an event beyond any early-warning system. Cost $4.7 bn (Nepali authorities), overwhelmingly uninsured.

Hawaii: three cyclones in six weeks

Lowell (twice Cat. 5 at sea) passed ~145 km off Kaua‘i on 7–8 Sep without landfall: gusts 148 km/h, 536 mm of rain, 90 % of Kaua‘i without power, 2 deaths, > $400 m damage (State), $0.5–1 bn insured (Cotality). Nolo grazed the Big Island on 26–28 Sep: up to ~430 mm at altitude, a landslide and road closures, no major flooding reported.

Europe: 679,000 ha burnt, fire season not over

EFFIS at 23 Sep: 1.9× the 2006–2025 average, 34 % below record 2025; danger still "very extreme" in France and northern Iberia. EU summer-crop yields up to 14 % below average (JRC). Insured wildfire losses in Europe +8–11 %/yr since 1970 (Swiss Re).

Japan: Typhoon Dujuan, 21–22 Sep

12 dead, 3 missing (FDMA, provisional); 832 mm in 48 h at Ōshima, a station record since 1991. Quiet Atlantic, active Pacific — the El Niño basin contrast forecast in August. No attribution study yet for Lowell, Nolo or Dujuan.

Sources: Swiss Re 11 Aug; Munich Re; Gallagher Re; Aon; Verisk via Insurance Journal 21 Sep; WWA 17 Sep; NWS Honolulu; State of Hawai‘i; Cotality; EFFIS 24 Sep; FDMA via The Watchers

1.5° C: 2026 ABOVE IT, 2027 SET FOR THE LARGEST OVERSHOOT YET

+1.5° C

2026 annual mean "all but certain" above +1.5 °C (Berkeley Earth); El Niño peaks Nov–Jan and the global response lags by months

2027 becomes the candidate for an annual overshoot well above 2024's (+1.60 °C). Copernicus (Jan 2026): the long-term trend itself reaches 1.5 °C around 2029. One or two years above 1.5 °C ≠ breach of the Paris Agreement, which refers to the long-term trend — but the 2023–25 average is already above it.

WMO 2026–2030 (May 2026)

91 % chance that at least one year exceeds +1.5 ° C; 75 % that the five-year mean does; 86 % that one year beats the 2024 record. The August data have moved the odds only in one direction since.

Dates to watch

8 Oct NOAA ENSO update · **mid-Oct** NOAA/Berkeley Earth September reports · **Oct** nine-month catastrophe bills, EFFIS season close · **Nov** WMO provisional State of the Climate 2026 at COP31, Global Carbon Budget · **Jan 2027** annual rankings, insurers' annual bills.

What can be said without being contradicted

Each El Niño now starts from a higher baseline; the size and duration of the overshoot, not its existence, are the news. Impacts follow probabilities, not certainties: a record index does not guarantee record impacts everywhere (NOAA, WMO).

Where the numbers still disagree

Record year: Berkeley Earth ~93 % vs NOAA "2nd most likely". August Niño 3.4: +1.8 ° C (NOAA) to +2.6 ° C (Berkeley). Nepal's toll and Hawaii's bill are preliminary. Quote the series, the index and the date.

Sources: Berkeley Earth 24 Sep; NOAA CPC 10 Sep; WMO Global Annual-to-Decadal Update May 2026; Copernicus — Les Ateliers du Futur, 27 Sep 2026

INVESTING IN MODELS TO AVOID INVESTING IN DISASTER

Current State of the Art	Key Limitations	Innovative Solutions
CMIP6 Models: coordinated climate model experiments providing the scientific database for IPCC reports.	Cloud-aerosol interactions: largest source of uncertainty, impacting climate sensitivity estimates.	New-gen satellites: EarthCARE (data since early 2025) — unprecedented cloud & aerosol data. AI for pattern recognition and emulators.
Standard resolution: 50–100 km for most global models.	Unresolved sub-grid processes: turbulence, individual cloud formation.	km-scale “storm-resolving” models (nextGEMS, TRACCS): explicitly simulate convection.
Coupled Earth System Models: atmosphere, ocean, sea-ice, land surface, carbon cycle.	High inter-model variability: significant differences in climate sensitivity projections.	Probabilistic ensembles (SMILEs): separate natural variability from forced climate change.
SSP scenarios (SSP1-2.6 to SSP5-8.5): projections based on Shared Socioeconomic Pathways to 2100.	High socio-economic uncertainty: demographics, behaviour, policy, technology pace.	Transdisciplinary co-production: interoperability between data, communication, governance.

Source: WCRP, ESA, Copernicus — slide unchanged since QCR #5



GHG Emissions:
Recent Developments & Outlook

2025 WAS ANOTHER RECORD; 2026 MAY BRING THE FIRST FALL SINCE 2020 — DRIVEN BY A SUPPLY SHOCK

38.1

$GtCO_2$ fossil, 2025

Record, +1.1% vs 2024

Global Carbon Budget 2025

58.4

$GtCO_2e$ all GHG, 2025

Flat vs 2024 (−0.1 Gt), incl. LULUCF

UNEP EGR 2026 (EDGAR, GCB)

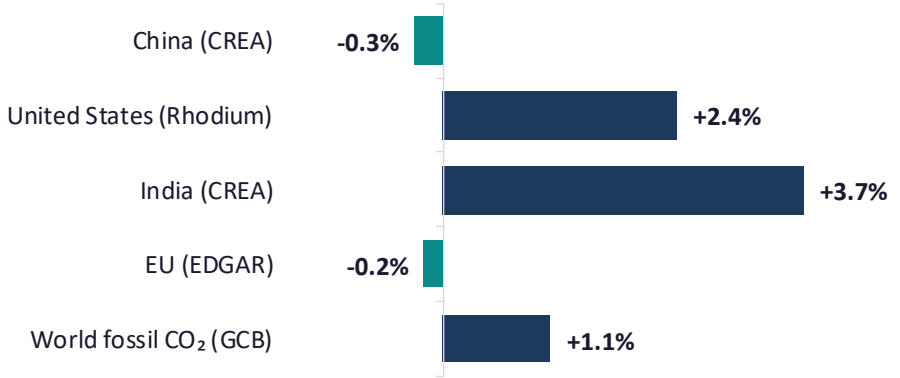
−0.5%

fossil CO_2, 2026 projection

Oil −2.4%, coal +1.2%

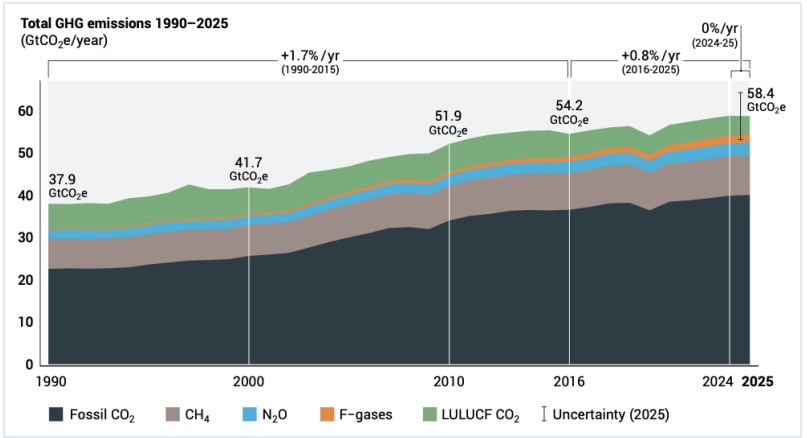
Carbon Brief from IEA, 16 Sep

Who moved in 2025 — CO_2 change vs 2024



China flat or falling for two years; US −1.7% expected in 2026 (EIA); India: power CO_2 flat since 2024, growth from steel and cement.

Total GHG 1990–2025 by gas (UNEP EGR 2026, fig. ES.1)



Growth slowed from +1.7%/yr (1990–2015) to +0.8%/yr (2016–25) and 0% in 2024–25 — but fossil CO_2 is still rising; the dip comes from LULUCF (−0.5 Gt, ±70% uncertainty).

Sources: Global Carbon Budget 2025; UNEP Emissions Gap Report 2026 (Oct 2026, fig. ES.1); Carbon Brief / IEA (16 Sep 2026); CREA; Rhodium; EIA; JRC/IEA EDGAR 2026.

EGR 2026, THE POINT OF RETURN: 1.5 °C WITHOUT OVERSHOOT IS LOST, THE 2035 GAP IS 16 $GtCO_2e$

58.4

$GtCO_2e$ in 2025, incl. LULUCF

Flat vs 2024 (−0.1 Gt), not a peak

Fossil CO_2 still up; LULUCF −0.5 Gt

2.6 °C

with full NDCs (66% chance)

2.8 °C under current policies

Up from 2.3–2.5 °C a year ago (US withdrawal)

−45%

GHG cut by 2035 vs 2025

Lowest-overshoot path: −18% by 2030, −69% by 2040

New NDCs: only −11 to −15% by 2035

16 Gt

2035 gap, conditional NDCs

5 Gt to the below-2 °C path

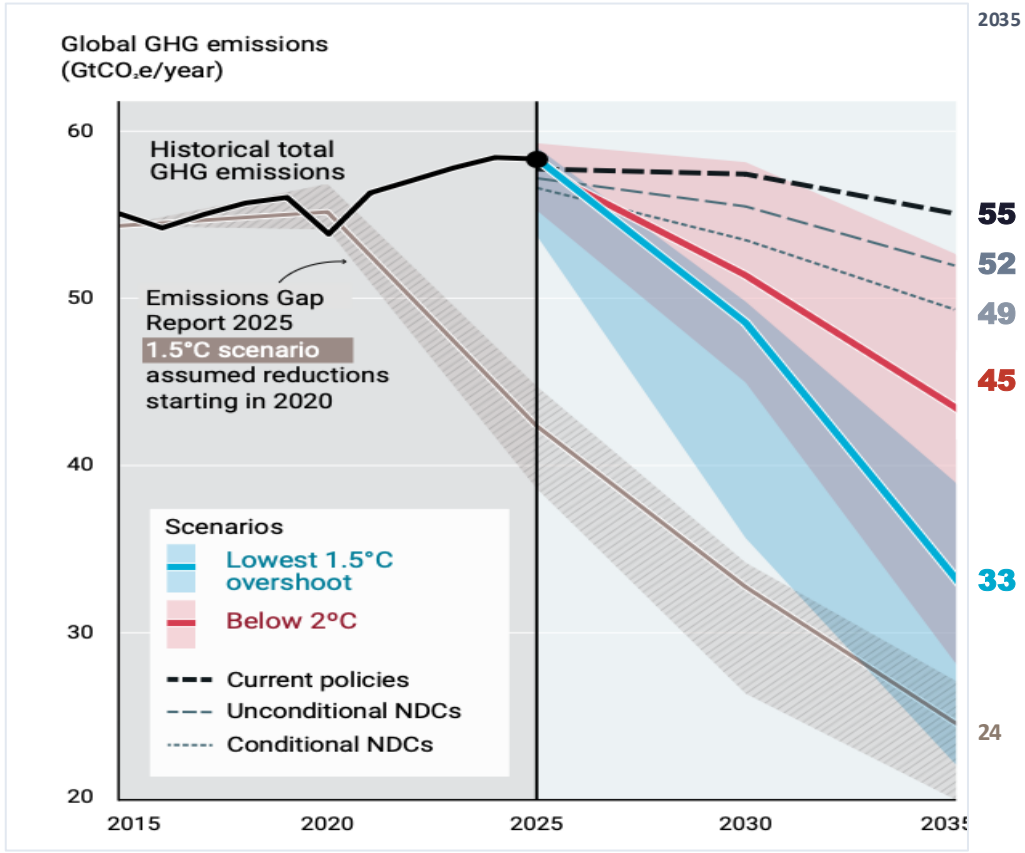
2030 gaps: 5 Gt and 1 Gt

How to read it

The benchmark moved: gaps are measured against a path that starts cutting in 2025 and peaks at 1.7–1.8 °C — not comparable with EGR 2025.

Every five years at current levels add ~200 $GtCO_2$ and +0.1 °C to peak warming. **Net-zero CO_2 around 2050** is still required, with ~320 $GtCO_2$ of removals to return to 1.5 °C by 2100.

GHG trajectories and 2035 levels by scenario ($GtCO_2e$, fig. ES.4)



2035 medians: current policies 55 · unconditional NDCs 52 · conditional NDCs 49 · below 2 °C 45 · lowest 1.5 °C overshoot 33 (gap from conditional NDCs: 16 Gt). Brown: EGR 2025 1.5 °C path (24), no longer reachable.

Source: UNEP Emissions Gap Report 2026, The point of return (Oct 2026) — fig. ES.4, tables ES.1–ES.2 (EDGAR, Crippa et al. 2026; Global Carbon Budget 2026).

G20 (76% OF EMISSIONS): 2035 TARGETS CUT MORE THAN 2030 ONES, BUT FEWER THAN HALF ARE ON TRACK

Only six members are likely to meet their unconditional 2030 targets (China, India, Indonesia, Russia, South Africa, Türkiye); the EU is inconclusive and Mexico is the only one to have raised its 2030 target. The United States posted the largest 2025 increase worldwide (+133 $MtCO_2e$) and has withdrawn its NDC.

Figure ES.2 GHG emissions in 2035 relative to 2030 levels resulting from the full implementation of the new NDCs of G20 members ($MtCO_2e$/yr) and associated per capita emissions (tCO_2e/yr)

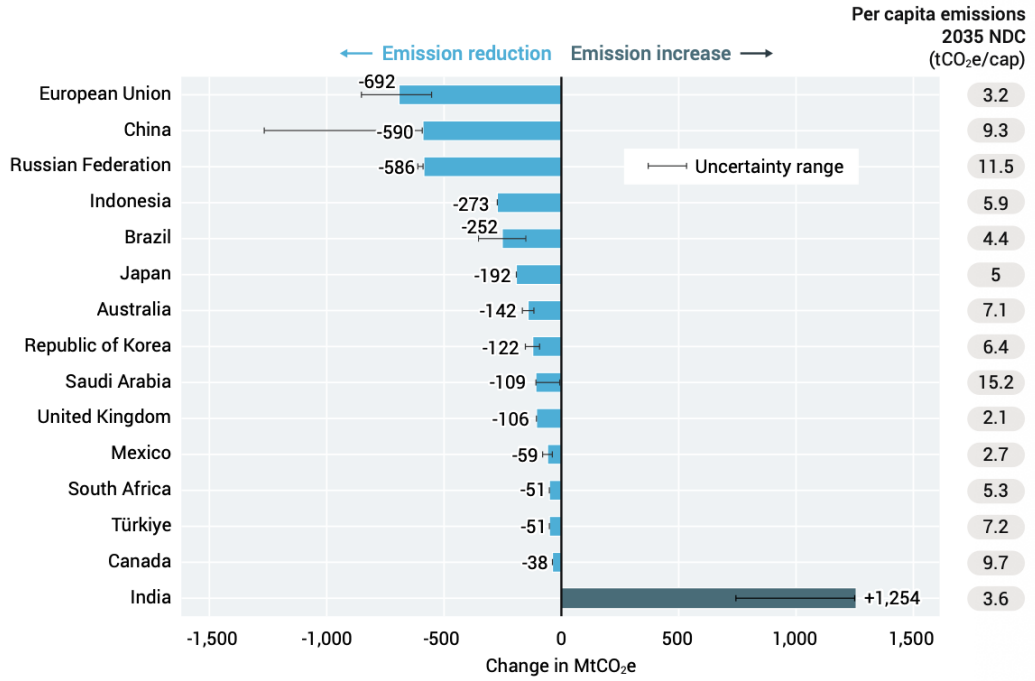


Fig. ES.2 — 2035 vs 2030 under the new NDCs. The EU makes the largest absolute cut (−692 Mt), ahead of China (−590) and Russia (−586). India is the only member still growing (+1,254 Mt), at 3.6 tCO_2e per capita against 9.3 for China and 15.2 for Saudi Arabia.

Figure ES.3 GHG emissions in 2035 resulting from the full implementation of the new NDCs of G20 members compared with current policies projections, absolute ($MtCO_2e$/yr) and percentage (%) change

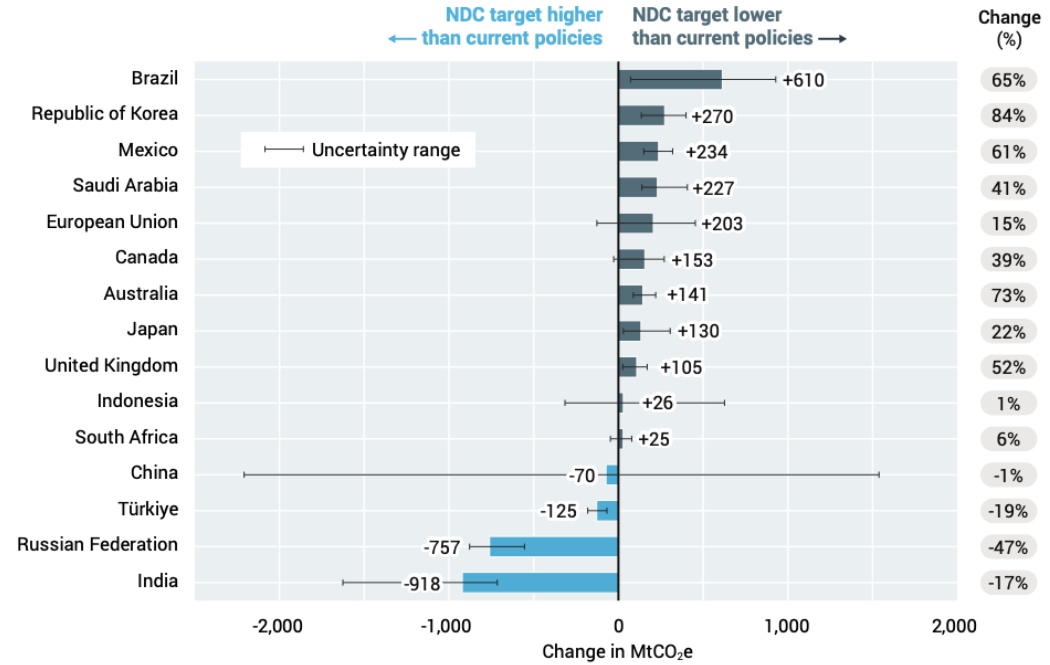


Fig. ES.3 — 2035 NDC vs current-policy projection. Brazil, Korea, Mexico and Saudi Arabia need the most additional policy. Russia (−47%) and Türkiye (−19%) set targets below what their current policies already deliver; India's intensity target is met by growth plus decarbonisation.

Source: UNEP Emissions Gap Report 2026, The point of return (Oct 2026) — figures ES.2 and ES.3; chapter 3 (NDC and G20 assessment).

OUTLOOK: OVERSHOOT IS THE FRAME, AND THE 2026 DIP IS NOT YET A PEAK

2026–2027: three open variables

Hormuz duration (each 940 kb/d oil revision ≈ 150 $MtCO_2$/yr), El Niño intensity through mid-2027, gas-to-coal switching. IEA sees 2027 oil back at the 2025 level, not above. First measured 2026 figure: Global Carbon Budget at COP31 (Antalya, November).

Overshoot and removals

UNEP EGR 2026: 1.5 ° C with no or limited overshoot is lost; the lowest-overshoot path peaks at 1.7–1.8 ° C and needs ~320 $GtCO_2$ of removals to return to 1.5 ° C by 2100. Required cuts vs 2025: −18% by 2030, −45% by 2035, −69% by 2040; new NDCs deliver −5–8% and −11–15%. Warming: 2.8 ° C with current policies, 2.6 ° C with NDCs (2.3–2.5 ° C a year ago). CMIP7: 1.6–3.3 ° C in 2100.

Power sector: off the 2035 path

Solar is above 10% of world generation, yet power-sector CO_2 rises >1% in 2026 to a record (IEA: gas-to-coal switching, demand growth in Asia). The lowest-overshoot path requires energy-system CO_2 −35% by 2035 and coal power −75% (−95% by 2040). China added 50 GW thermal in Jan–Jul; India has 43 GW under construction.

For corporate transition plans

Track hourly grid factors; do not book 2026 fuel savings as structural without evidence; name the inventory convention and scenario (with its overshoot) in every trajectory; widen methane beyond fossil leaks; plan an off-trend El Niño year in South and Southeast Asia.

Sources: IEA Oil Market Report; UNEP Limiting Overshoot (Sep 2026); CMIP7; UNEP Emissions Gap Report 2026 (Oct 2026, ch. 5 milestones); IEA Electricity Mid-Year Update 2026; CREA; Global Carbon Budget



Green Techs:
Recent Developments & Outlook

Global energy consumption continues its growth by 1.4% in 2025. Despite the surge of renewables, the share of fossil fuels remains stable (>80%)

1,4%

Increase of global energy consumption in 2025, in straight line with the past 10-years trend .
The share of fossil fuels remains stable (>80%) despite the surge of clean technologies

Clean energy surge

Clean energy technology adoption surged at an unprecedented pace over the last four years. Total renewable capacity additions increased by a factor of 2 between 2022 and 2024, driven by record solar PV deployment globally. Furthermore, the world installed a record 814 GW of new solar and wind capacity in 2025, 17% more than in 2024 (696 GW).

By the end of 2025, renewables accounted for 49% of global installed power capacity, and comprised 85.6% of annual global power additions

But the gap remains immense

Fossil fuels (coal, oil, gas) still represent >80% of global primary energy consumption. The energy transition is accelerating in electricity, but heating, transport, and industry remain largely fossil-dependent.

Source: Our World in Data, IEA

2× MORE INVESTED IN CLEAN ENERGY THAN IN FOSSIL FUELS

$2,2T

Clean energy investment in 2025 (New high)

Total energy investment in 2025 (IEA) : $3,3T | **Fossil fuels: first decline since 2020**

Clean energy at record highs

Clean energy investment hits $2.2 trillion in 2025, with record additions of renewables, strong EV sales, and rapid battery deployment. Investment now running at 2 ×the fossil fuel level.

Fossil investment retreating

Upstream oil investment in 2025 is set to fall for the first time since 2020. Oil spending revised down amid new economic outlook and cost pressures. Global refinery investment hits a 10-year low. Gas/LNG remains robust.

In 2026, Global upstream investment is expected to rise marginally, with declines in North America and the Middle East offset by increases in Africa and Central and South America

Source: IEA World Energy Investment 2025

RENEWABLES +9% IN ELECTRICITY — COAL FLAT FOR THE FIRST TIME

OK

Low-emission sources surging

Renewables grew +9% in electricity production in 2025, slightly below +9.6% in 2024 (weather dampened wind/hydro). Still well above the 6.4% decade average. Renewables supplied 33.8% of global electricity in 2025, surpassing coal (33%) for the first time in the modern era.

A historic inflection point: for the first time, additional electricity demand is being 100% met by clean sources (solar alone covered 75%).

Coal generation flat

Coal-fired generation remained flat in 2025 after +1.4% in 2024. Declines in China and India were offset by gains in the US and Eurasia.

Energy storage booming

2025 saw record growth in grid-scale battery storage. The increasing share of intermittent renewables creates price volatility in power markets, fostering massive investment in storage solutions. Negative electricity prices are increasingly frequent in key markets.

Source: IEA Electricity 2026

EVS EXCEED 20 MILLION SALES — BUT ENERGY INTENSITY STALLS

20.7M

electric vehicles sold globally in 2025 (+20%)

BEV: 13.6M (+24%) | **PHEV:** 7.0M (+13%)
Europe: 4.3M (+33%), best in class
China: 12.9M (+17%), but Q4 slowdown as incentives cut
North America: stagnating in USA (policy uncertainty) and collapsing in Canada (end of subsidies)

Energy efficiency improvement restarts in 2025 but remains offtrack

1.8%/yr improvement in 2025, close to 2%/yr (2010–2019 trend) but far from COP28 ambition of 4%/yr

Key reasons for this poor result:

- Around two-thirds of global final energy demand growth since 2019 has been concentrated in industry, a sector where energy intensity progress has slowed sharply
- Many appliances being sold today are often only half as efficient as the best available models.
- Increased access to air conditioners has pushed up cooling-related electricity demand.

Heat pumps: global sales declining, except in Europe

Global sales fell –2% in 2025, worse than in 2024 (-1%). Stagnation in China and slowdown in USA. In Europe, annual sales rose by 11%, marking the first year of growth since 2022, thanks to Germany (+55%).

Energy innovation funding is slowing

After years of growth, energy innovation funding appears to be entering a phase marked by slower growth and shifting priorities. Public energy R&D spending globally in 2024 dropped from its recent high point in 2023, and IEA's estimate for 2025 is down a further 2%.
Energy VC fundings is declining since 2022, initially due to higher interest rates and macroeconomic environment. In 2025 energy start-ups faced stiff competition for capital from AI start-ups.

Source: Benchmark Minerals, IEA

THE SHARE OF FOSSIL FUELS IN GLOBAL PRIMARY ENERGY CONSUMPTION IS EXPECTED TO FALL TO 71% BY 2035 (IEA)

71 %

Share of fossil fuels in primary energy demand in 2035 (According to STEPS scenario of IEA)
While Energy demand grows by 0,7%/y until 2035 assuming energy efficiency improves 2.2%/y.

Coal and oil demands peak by 2030

Coal demand remains broadly stable at its current level (6 090 million tons), but it peaks before 2030 and then declines to under 4 900 Mtce in 2035.

Oil demand rises slowly to around 102 mb/d by 2030 before beginning a slow decline, with reductions in oil demand for road transport broadly offset by increased oil use for petrochemicals.

Natural gas grows 1% / year

Natural gas demand rises by 1% per year to 2035, driven mainly by growth in industry and power and then remains stable.

Low-carbon energy demand steeply growing

Demand for renewables increases by an average of 5.5%/y to 2035: most of the additional demand comes from the power sector, but the direct use of renewables also increases, particularly in industry and biofuels in transport.
Renewable power capacity expands 2.6 times from 2022 to 2030, and 3.7-times by 2035.
Nuclear capacity increases by 3% on average to 2035

Source: IEA Electricity 2026

ELECTRICITY DEMAND SET TO ACCELERATE: +3.6%/YR TO 2030

33,600 TWh

global electricity consumption in 2030 (up from 28,200 TWh in 2025)
+1,100 TWh/yr added on average through 2030 (vs 700 TWh/yr over 2015–2025)

Buildings: 49% of the new demand

Largest absolute growth. Space cooling, data centres, and heat pumps make up almost half of buildings sector growth. Electricity share in total final consumption rises from 21% to 24%.

Industry accelerating

Industrial electricity consumption expected to accelerate vs past decade, especially from light industries. Electrification replacing fossil heating in selected processes.

Transport: share doubles

Fueled by rapid EV uptake, transport's share of demand growth rises to >10%, double from the past five years.

Source: IEA Electricity 2026

50% LOW-EMISSION ELECTRICITY BY 2030 — NUCLEAR RESTARTS

Renewables outlook to 2030

+1,050 TWh/yr

renewable electricity generation growth per year

Solar PV alone: +600 TWh/yr. Solar PV overtakes wind and nuclear by 2026, hydropower by 2029.

Low-emission share rises to 50% of global electricity by 2030 (from 42% in 2025). Coal falls to 27% (from 34%).

Gap to COP28 tripling target

Despite strong growth, a gap remains vs the global tripling target announced at COP28. Storage must increase ×6 to support ×3 renewables.

Nuclear restart announced

+2.8%/yr

nuclear generation growth (vs 1.3% in 2021–2025)

China: ~30 GW new nuclear capacity by 2030. Largest build programme globally.

Japan: Continued restarts supporting generation growth.

India & Korea: New reactors being commissioned.

France: Robust output from advancement of maintenance works.

US & EU: Output expected to remain relatively stable.

Source: IEA Electricity 2026

RENEWABLE HEAT, BIOGAS & STORAGE: ACCELERATING BUT INSUFFICIENT

Renewable heat: 18% by 2030

Heat demand rises +8% by 2030. Modern renewables expand +42% but still only 18% of total (from 14%). Industry becomes dominant consumer. China's renewable heat to double, 60% of growth from China+India.

Biogas & biomethane: +22% by 2030

Global production expands 22% by 2030. Growth mainly from biomethane (versatile, uses gas grids). Drivers: energy security post-Ukraine, hard-to-abate decarbonization, circular economy, rural development. EU, India, China setting ambitious 2030 targets.

Storage: ×6 needed for NZE

COP28's ×3 renewables target requires ×6 grid-scale storage. 2025 saw record battery deployments but far below the NZE trajectory. Negative electricity prices increasingly frequent, highlighting the urgency of storage build-out.

Source: IEA Renewables 2025, Rystad Energy

EV FLEET ×4 BY 2030 — BUT CRITICAL MINERALS REMAIN A BOTTLENECK

EV outlook to 2030

250 million EVs

global fleet by 2030 (STEPS) — ×4 vs end 2024

>90% electric cars, stock growing ~25%/yr (vs ~50%/yr in 2018–2024 as the base expands).

Warning signals:
Recent changes in trade policies, tariffs, and demand-side policies (fuel economy standards, tax incentives) may affect EV sales in several markets. US policy changes could have larger impact via demand-side incentives than tariffs alone.

Critical minerals: lithium highest risk

IEA warns of future lithium & copper shortages despite current oversupply and price collapse.

Concentration worsening:
Top 3 countries: 86% of refining (vs 82% in 2020), 77% of mining (vs 73%). China dominates. 55% of strategic metals subject to export restrictions.

Supply shock risk: 40–50% price increase for consumers or loss of competitiveness for manufacturers (IEA).

Solutions: geographic diversification, recycling, and technological innovation. But progress toward diversified supply chains expected to be slow.

Source: IEA Global EV Outlook 2025, IEA Critical Minerals 2025

HYDROGEN & CCUS: ESSENTIAL BUT STILL IN INFANCY

Low-carbon hydrogen

Low-emissions hydrogen production grew by 20% in 2025 to reach almost 1 Mt (1% of global production), but progress is concentrated in a small number of projects, in countries with support policy (China, Europ and Japan).
The **pipeline of announced projects** for low-emissions hydrogen production **has shrunk to 27 Mt by 2030**, mostly due to delays post 2030 and cancellations.

IEA recommendations: develop long term ambitions and accelerate policy implementation to create demand.

Carbon capture (CCUS)

Average annual investment in CCUS has grown more than 15-fold since 2020 to over USD 5 billion in 2025, with several landmark projects reaching final investment decisions (FIDs), though almost 90% of announced projects have not yet reached that milestone.

Seen as essential for hard-to-abate industries (steel, cement, refining) that cannot be easily electrified.

Currently capturing only 0.1% of global CO_2 emissions per year — still in its infancy.

Key challenge: scaling from demonstration to commercial deployment while reducing costs and ensuring permanent storage.

Source: IEA Global Hydrogen Review 2026 and IEA Energy Technology Perspective 2026



Public Policies:
Recent Developments & Outlook

ENERGY SHOCK DRIVES POLICY DIVERGENCE AMONG TOP EMITTERS

China

- CO2 plateau for more than two years: +2% in Q1 2026, then -1% in Q2 as oil use fell 9%.
- EVs displaced 36 Mtoe of oil in H1 2026, more than the UK uses in six months.
- Curtailment lifted coal power; 30 GW of new coal online in H1, the most since 2016.
- 15th Five-Year Plan: carbon intensity down 17% and 25% non-fossil energy by 2030; coal use to plateau, not decline.
- ETS covers about 60% of national CO2; absolute cap planned around 2030.

European Union

- 2040 target (-90% net, up to 5% international credits from 2036) in force since April 2026.
- ETS review (17 July): free allocation extended to 2040, conditional from 2031; new Industrial Decarbonisation Bank.
- NGOs estimate about 2 GtCO2 of extra headroom; 2030 price outlook about 22% lower.
- ETS2 postponed to 2028; 2035 car CO2 revision (to -90%) still under negotiation.
- EV sales up 29% year to date.

United States

- Outside Paris since 27 January 2026; UNFCCC exit effective 27 February 2027.
- Wind and solar credit window closed on 4 July; a court restored the 5% safe harbor on 6 June.
- Endangerment Finding repeal challenged by 25 states and NGOs at the D.C. Circuit.
- Clean investment of $75bn in Q2 (+22% on Q1), led by household storage and solar.
- About $40bn of clean manufacturing projects cancelled since early 2025.

NDC COVERAGE WIDENS, BUT PLEDGES STILL POINT TO 2.3-2.5° C

136 Parties had submitted a new NDC by end-March 2026. Full implementation would leave 2035 emissions about 17% below 2019, against about 60% needed for 1.5° C. **Argentina is the last G20 member without a 2035 NDC.**

India

NDC 2031-2035 (April 2026): emissions intensity -47% by 2035 vs 2005, 60% non-fossil power capacity (52.6% already reached). Power-sector emissions flat for two years, but coal still supplies about 55% of generation.

Turkey (COP31 host)

Antalya, 9-20 November. The NDC caps 2035 emissions at 643 MtCO2e, about 32% above 2022. ETS pilot from 2026; coal at 36% of power. CAT: critically insufficient.

France

SNBC 3 adopted by decree on 16 July: -50% by 2030 vs 1990, 2024-2028 budget cut to 342 MtCO2e a year, first national footprint target. The HCC notes cuts slowed to about -2.1% in 2025.

Argentina and other gaps

Only G20 member without a 2035 NDC; climate directorates dissolved in April 2026. The US is outside Paris, and Saudi Arabia's December 2025 NDC adds no ambition (CAT).

ROAD TO COP31: UN TALKS STALL AS A FOSSIL-FUEL COALITION EMERGES

Bonn (SB64, June) produced few tangible outcomes, and current policies still point to about 2.6-2.8°C. COP31 opens in Antalya on 9 November; the Belém Mission to 1.5 report is due beforehand.

Santa Marta process

First conference on transitioning away from fossil fuels (24-29 April), with 57 countries including producers and the COP31 co-hosts. Held outside the UNFCCC; second conference in Tuvalu and Ireland in 2027.

Just transition and trade

Progress in Bonn on the Belém-Antalya Mechanism for a just transition, expected as a key COP31 outcome, and a first UNFCCC dialogue on climate and trade.

Climate finance

Record $136.7bn from developed countries in 2024, but almost no new pledges for 2026 onwards. The tripling of adaptation finance agreed in Belém remains unresolved.

COP31 calendar

Pre-COP in Fiji (5-8 October) and leaders' event in Tuvalu; Antalya 9-20 November, leaders' summit 11-12 November. The US remains a Party until 27 February 2027.

$ CARBON PRICING, RENEWABLES AND EVS UNDER THE ENERGY SHOCK

Carbon pricing

- 87 instruments cover 29% of global GHG emissions; revenues above $107bn in 2025; average price about $21/t (World Bank 2026).
- EU ETS review extends free allocation to 2040 under conditions; 2030 price outlook about 22% lower.
- China ETS: about 60% of national CO2; absolute cap planned around 2030.
- Paris crediting (Art. 6.4): first PACM credits in February 2026, about 40% below former CDM crediting.

Renewable energy

- 2025: renewables (33.8%) overtook coal (33.0%) in global power generation for the first time (Ember).
- China: solar additions slowed in 2026; curtailment pushed coal power up.
- US: wind and solar credit window closed on 4 July; $24bn of clean power announced in Q2.
- IEA: coal demand +1.2% in 2026 on high gas prices and El Niño.

Electric vehicles

- 13.4 million EVs sold from January to August 2026 (+4%).
- Europe +29% year to date; 41% of new cars in France in August.
- China above 60% of passenger car sales; record 518,000 NEV exports in August.
- North America -33% year on year in August after federal credits ended.

Sources: World Bank (2026), Ember (2026), IEA, Benchmark Mineral Intelligence, Carbon Brief, Rhodium Group

SCIENCE AND MARKETS: BUDGET NEARLY SPENT, CORPORATES OFF TRACK

Carbon budget nearly spent

- Human-induced warming reached 1.37° C in 2025, rising at a record 0.27° C per decade.
- Remaining budget for a 50% chance of 1.5° C: 130 GtCO2 from January 2026, a little over three years of emissions.
- Human-induced warming projected to reach 1.5° C around 2030: the debate moves to limiting overshoot.

Source: Forster et al., ESSD (June 2026)

Policy mix matters

- Emissions trading cut emissions intensity by 15.4% and carbon taxes by 8.5% at historical price levels.
- Outcomes depend on interactions with the rest of the policy mix.
- Policy portfolios avoided 27.5 GtCO2 in 43 countries over 2000-2022.

Sources: Wu et al., Nature Climate Change (2026); Arvanitopoulos et al., Nature Communications (2026)

Corporate alignment gap

- 20% of listed companies have SBTi-validated targets (18% a year earlier); 34% have net-zero targets.
- Aggregate trajectory: 3° C, with 64% of companies above 2° C.
- Climate fund assets: $710bn; carbon credit retirements +15% year on year in Q2.

Source: MSCI Transition Finance Tracker (July 2026)



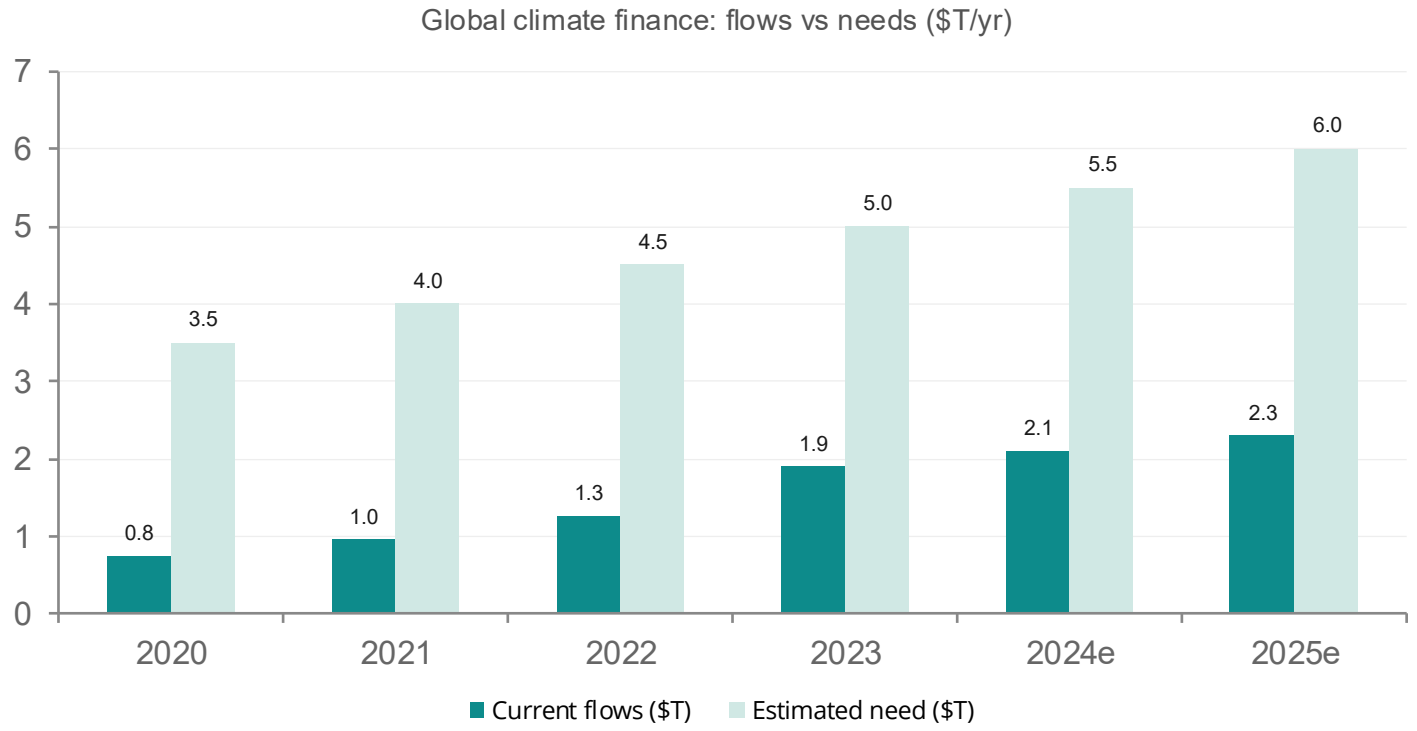
Finance:
Recent Developments & Outlook

TRANSITION FINANCING NEEDS: A GAP THAT REMAINS TOO WIDE

$5–6.5T

Annual needs by 2030 (low end of estimates)

Current flows cover barely 1/3 of needs. In 2024, global climate finance is estimated at $2–2.3T depending on the source (CPI, BNEF, IEA). Estimates for 2030 converge on a minimum of $5T, with an upper bound of $12.1T in the most ambitious scenarios.



$2.3T	> $4T	$1.3T
Energy transition investment 2025 (BNEF, +8% YoY)	Annual SDG financing gap	Baku-to-Belém target for EMDEs by 2035

Sources: IEA World Energy Investment 2026; BloombergNEF ETIT 2026; CPI GLCF 2026; OECD Global Debt Report 2025; UNFCCC Baku-to-Belém Roadmap

PUBLIC FINANCE: DECLINING DESPITE APPARENT RECORDS

$136.7B

Total North→South public finance in 2024 (OECD)

A target exceeded, but contested. The $100B goal was met ($106.2B in public finance), but the share of grants remains insufficient. For the first time, the bilateral public component is declining. Vulnerable countries are taking on debt through loans where grants are needed.

MULTILATERAL DEVELOPMENT BANKS (MDBs)

$137B

2024 record (+10% YoY). 2025 targets met.

$85.1B → Low- and middle-income countries (+14%), of which 69% mitigation and 31% adaptation

$134B → Private capital mobilised (+33%)

$120B → Annual target for 2030 (COP29), incl. $42B for adaptation

KEY CONTRIBUTORS

$42.6B

World Bank Group (FY2024)

Record, +10% vs FY2023. Ending poverty on a livable planet.

$47.5B

European Investment Bank

Through EIB Global for LMICs, mobilising $84.3B in private finance.

$106.2B

Bilateral public finance 2024

First-ever decline in the public component (OECD, May 2026).

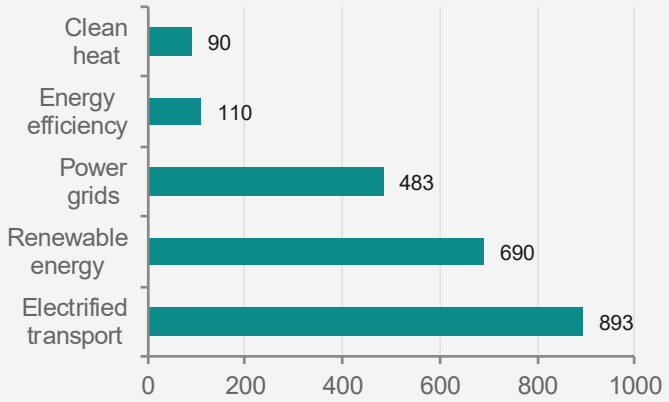
Sources: 2024 Joint Report on MDBs' Climate Finance; OECD Climate Finance 2013-2024 (May 2026); World Bank; EIB; Publish What You Fund (2026)

PRIVATE FINANCE: RECORD VOLUMES, UNEVEN DISTRIBUTION

ENERGY TRANSITION

$2.3T

Global energy transition investment 2025 (BNEF, +8%)

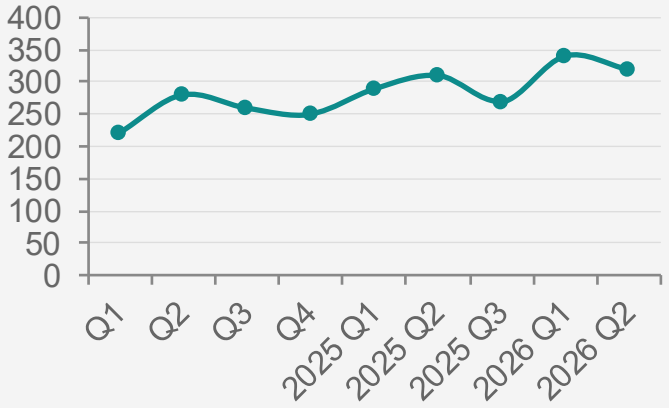


Asia-Pac. 47% of flows · EU $534B · China $800B (but renewables down)

GREEN CAPITAL MARKETS

$7.3T

Cumulative aligned sustainable debt (end-June 2026)

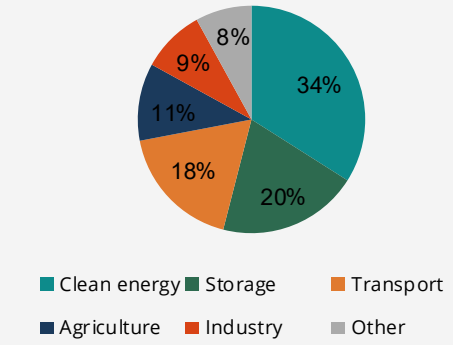


H1 2026: $529.7B (−1% YoY) · Record green quarter $210.8B · France + Germany = 27% of global total

PRIVATE CAPITAL & CLIMATE TECH

$77.3B

Capital raised by climate tech in 2025 (+53% vs 2024)



EMDEs: $36B of international private capital received in 2023 (need: $1,000B). European sustainable funds back to net inflows in Q1 2026 (+$3.5B).

Sources: BloombergNEF ETIT 2026; IEA WEI 2026; Climate Bonds Initiative (Sept. 2026); Morningstar; CPI GLCF 2026; KPMG & WEF (2025)

LOSS & DAMAGE FUND: AN INSTITUTIONAL SET-UP UNDERFUNDED IN THE FACE OF URGENT NEEDS

$342M

Available capital (total pledges received)

The Fund holds $342M against $2.8B in requests registered by 119 countries. Nothing has been disbursed to date.

$2.8B

Pending requests (176 requests, 119 countries)

A coverage ratio of only 12%. Nepal filed an urgent $20M request after the August 2025 floods (1,500 deaths, $4.8B in costs) — no funds allocated to date.

$0

Actual disbursements to date

The Fund has not yet made any disbursement. First agreements expected at Board meeting B.10 (Manila, 15–18 Dec. 2026). Condition: $10B required by Norway before end-2026.

TIMELINE

March 2025	Fund operational · Headquarters: Philippines
August 2025	Nepal floods: 1,500 deaths, $4.8B in damage
3 Sept. 2025	Nepal submits urgent $20M request — no response
9–20 Nov. 2026	COP31 Antalya: discussions on the funding mechanism
15–18 Dec. 2026	Board B.10 Manila: first disbursements expected
31 Dec. 2026	TFFF condition: $10B or the $3B loan lapses

WHAT IS AT STAKE AT COP31 — ANTALYA

Capitalisation

Two decisive indicators in Antalya: the share of grants, and whether a formal pledging session for the Fund takes place.

BRICS governance

The New Delhi Declaration (Sept. 2026) acknowledges gaps in adaptation finance. The NDB is positioned as an alternative without conditionality.

EU architecture

The Commission launched a Climate Insurance Alliance (Sept. 2026) — only 25% of catastrophe losses are insured.

Sources: FRLD Board B.9 (10 July 2026); Nepal statement (3 Sept. 2026); Climate Home News (22–23 Sept. 2026); BRICS New Delhi Declaration (12 Sept. 2026); European Commission (16 Sept. 2026)



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