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Allianz Transition Tracker 2025

A decade after Paris: Progress, paralysis and the race to net zero

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Allianz Research

Content

Executive Summary

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- **The global transition stands at a critical crossroads.** A decade after the Paris Agreement climate impacts are accelerating: 2024 was the hottest year on record, with direct climate damages reaching USD300bn and broader economic losses in the trillions. Current trends point toward warming above +3°C by 2100, as global emissions failed to fully decouple from economic growth and continued their upward trend over the past decade. Keeping warming below 2°C will require rapid electrification, steep cuts in fossil-fuel use, and accelerated deployment of clean technologies. With COP30 underway in Belém, the decisions made this year will be pivotal in shaping the global climate trajectory for the next decade.

- **Progress has accelerated, but major (investment) gaps remain.** Renewables overtook coal in global power production in the first half of 2025 and low-carbon electricity capacity has expanded +53% since 2015. Clean-energy costs have fallen sharply - solar by 87%, wind by 48–55% and batteries by over 80% - making them broadly cost-competitive with fossil fuel based alternatives. Low carbon investment has reached USD2.1trn, up 78% over the decade, yet a USD2.6trn annual mitigation gap remains through 2030.

- **The Allianz Green Transition Tracker reveals both growing momentum and widening divergence.** The Tracker evaluates 69 countries across five indicators - carbon and energy intensity, consumption- and territorial-based emissions per capita, and the share of low-carbon electricity - through two dimensions: the Peer Score, which compares current performance across countries, and the Progress Score, which measures each country's pace of decarbonization relative to its 2015 baseline and the 2050 net-zero target. The results reveal that while many countries are moving faster than commonly assumed, the gap between leaders and laggards is increasing.

- **Performance today reflects familiar structural differences.** The Peer Score highlights that lower-income countries such as Sri Lanka and Colombia perform strongly due to low per-capita emissions, while advanced European economies - led by Sweden, Denmark and Switzerland - score highly thanks to sustained decarbonization and clean-power expansion. In contrast, fossil-fuel-dependent and high-emitting nations, including Saudi Arabia, Qatar, China and the United States, continue to lag, reflecting persistent structural reliance on hydrocarbons.

- **The pace of decarbonization is encouraging, but still not sufficient.** The Progress Score indicates that 15 countries have already covered at least one-third of the distance toward net zero, led by Luxembourg and Switzerland, supported by high energy efficiency and power systems that are over 90% low-carbon. Another 20 countries - including Spain, Brazil, Poland and Australia - have progressed by at least 20%, showing measurable but still insufficient momentum. Meanwhile, major emitters - such as the United States and China, which together account for about 40% of global emissions - have shown only marginal improvement since 2015, underscoring the scale of the remaining challenge.

- **The ones to watch: A handful of major economies will determine the global outcome.** Several countries and regions play a decisive role in the global energy transition, each offering lessons and highlighting persistent challenges. China drives the global clean-energy expansion, accounting for 42% of international renewable investment and over 60% of wind, solar and battery manufacturing. Yet, it remains the world's largest emitter, with fossil fuels supplying around 90% of primary energy. The United States shows partial decoupling, with rising renewables reducing power-sector emissions, but fossil fuels still dominate the energy mix. India is scaling renewables rapidly and has met non-fossil power targets early, yet fossil fuels supply over 93% of energy amid growing demand. Europe leads in emissions reductions and structural decoupling, but consumption-based emissions and fossil reliance persist. Brazil combines a clean electricity supply with large carbon sinks, though deforestation and agriculture-related emissions offset progress. Decarbonizing these key economies - together responsible for more than 56% of global emissions - will be critical to keeping global warming in check and advancing a low-carbon future.

Global climate transition: State, progress and outlook

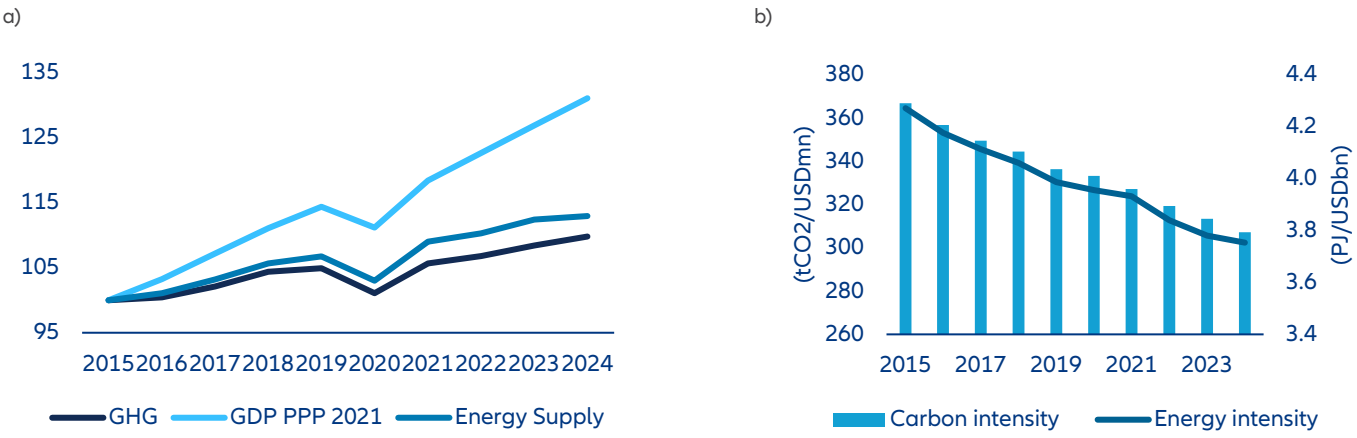
Ten years after the Paris Agreement, the global green transition stands once again at a decisive crossroads. Climate change is accelerating, with 2024 confirmed as the hottest year on record and direct climate-related damages reaching USD300bn, while indirect macroeconomic losses are estimated in the trillions.[1] Meanwhile, due to a combination of factors, including geopolitical uncertainty, political fragmentation and economic pressures, climate action momentum appears to be faltering in major economies, undermining collective progress. In this context, the next decade will determine whether the goals of the Paris Agreement can still be met. The ambition to limit warming to 1.5°C is now widely seen as slipping out of reach. This makes the remaining target – keeping the global temperature rise well below 2°C – all the more critical. Achieving this will require mobilizing trillions of dollars annually for low-carbon infrastructure, renewable energy systems and climate-resilient supply chains, underpinned by credible carbon-pricing mechanisms and transparent transition taxonomies to steer public and private finance. Against this backdrop, COP30 in Belém must deliver clear, measurable pathways that both track progress and set ambitious yet achievable targets to guide the global transition through 2035 and beyond.

While the scale of the remaining challenge is immense, the past decade demonstrates that meaningful progress is achievable. Global low-carbon electricity capacity has expanded by +53% since 2015 and renewables overtook coal in global power production for the first time in the first half of 2025, highlighting a structural shift in the energy sector. Deforestation rates have also declined, with annual global deforestation down -19% compared to 2000–2015 and by -38% relative to 1990–2000. Meanwhile, carbon-pricing mechanisms now cover 28% of global emissions, up from roughly 12% in 2015, signaling growing adoption of market-based approaches to incentivize emission reductions.

Growth and emissions are no longer moving in lockstep. But to meet global climate goals, they must fully sever ties. Between 2015 and 2024, global GDP grew by over +31%, while greenhouse gas (GHG) emissions and total energy supply rose by only +8% and +12%, respectively (Figure 1a). This encouraging trend, observed in more than 75% of countries worldwide, shows that economies are becoming more efficient and sustainable in pursuing growth. Yet, much stronger progress is needed to achieve a complete decoupling of growth from emissions. By 2035, the global average carbon intensity must fall by 70% to 91.9 tCO2/USD mn, and energy intensity by 40% to 2.2 PJ/USD bn. At the current pace, global progress would fall short by approximately 155% in carbon intensity and 41% in energy intensity, underscoring the need for faster decarbonization and efficiency gains.

[1] For total annual estimated damages see COP30 Brazil: Uncertainty Grows 10 Years After Paris | BloombergNEF and for aggregate counterfactual losses Nature study on economic damages from climate change revised — Potsdam Institute for Climate Impact Research

Figure 1: Global growth and emissions dynamics: a) Relative change in GDP, emissions and energy supply (base year = 2015) and b) Development of global carbon intensity and energy efficiency



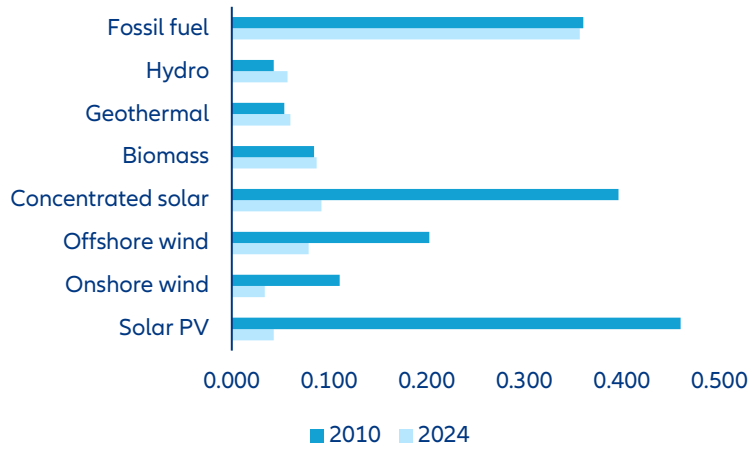
Sources: Allianz Research based on JRC EDGAR, International Energy Agency and World Bank

Global investment in low-carbon energy has surged by +78% over the past decade, reaching an estimated USD2.1trn by 2025 – more than double the investment in fossil-fuel supply.[2] Renewables have driven this growth, rising +109%, followed by a +62% increase in nuclear power and a +25% expansion in grid infrastructure, while investments in coal and oil & gas generation have fallen by -12% and -28%, respectively. International climate finance has also gained momentum, surpassing USD100bn in 2022 and reaching an estimated USD151bn in 2023.[3] Yet, to achieve the target of USD300bn in annual climate finance from advanced economies by 2035 – and the broader global goal of USD1.3trn – substantial gaps remain. By 2030, we still observe USD2.6trn mitigation gap and a USD323bn adaptation shortfall, highlighting the urgent need to scale up investments and strengthen international cooperation to ensure a just and effective energy transition.

Technological advancements and economies of scale, driven by strong investments in manufacturing capacity – particularly in China – have established clean technologies as serious competitors to fossil fuels. Since 2010, (intermittent) renewable technologies have become far more affordable: installed costs have fallen -87% for solar and -48–55% for wind, while levelized costs of electricity have dropped -90% and -70%, respectively (Figure 2). These reductions have made renewables significantly cheaper than fossil fuels in terms of lifetime generation costs, creating clear economic benefits. Between 2010 and 2023, the expansion of renewable capacity in non-OECD economies alone is estimated to have delivered USD132bn in cumulative savings compared with fossil alternatives (Figure 3).[4] Battery costs have also fallen sharply, dropping by over -80% since 2013, which has accelerated the adoption of electric vehicles and the deployment of grid-scale storage. While these trends demonstrate significant potential for decarbonizing both emerging and advanced economies, their full impact will depend on complementary investments in grid and charging infrastructure, a continued expansion of energy storage and system flexibility to ensure a reliable, cost-efficient and resilient low-carbon energy system.

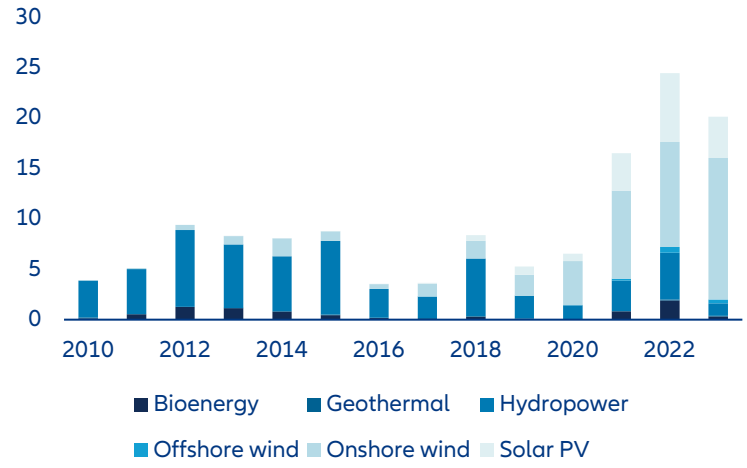
[2] World Energy Investment 2025 – Analysis - IEA
[3] Global Landscape of Climate Finance 2025 - CPI
[4] Renewable Power Generation Costs in 2023

Figure 2: Levelized cost of electricity (LCOE) in 2010 and 2024 (in USD/kWh)



Sources: Allianz Research, IRENA

Figure 3: Net savings from renewable deployment in non-OECD economies (in USD bn)

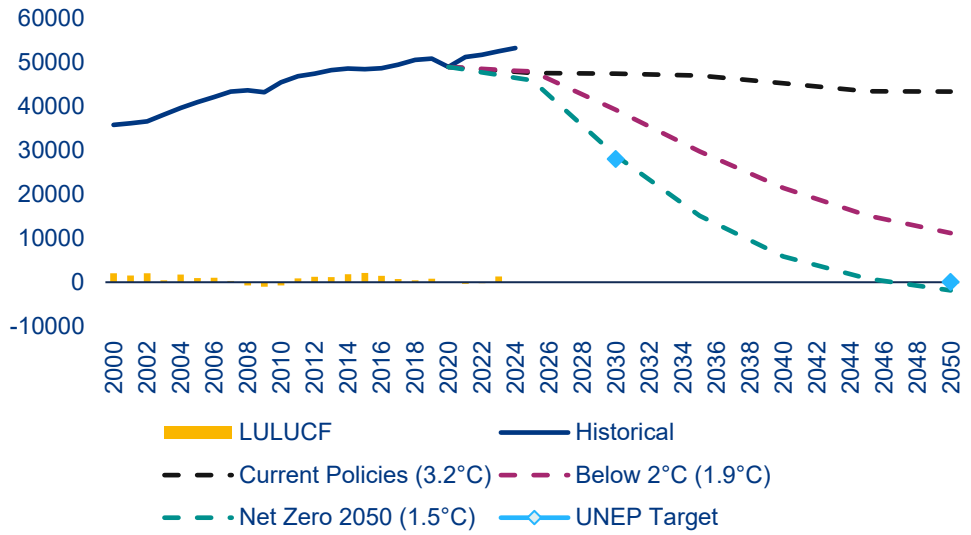


Sources: Allianz Research, IRENA

Despite intensifying decarbonization efforts, the global climate transition remains off track, with emissions reaching a record 53 GtCO2 in 2024 (Figure 4). The brief pandemic-related dip has been fully reversed, and there is still no sign of the leveling or decline in emissions needed within the next five years to stay below the Paris Agreement's 2°C target. The main driver is the continued rise in fossil-fuel use, with coal (165 EJ, +4.9% since 2015), gas (149 EJ, +18.7%) and oil (199 EJ, +7.8%) all reaching new record highs in 2024. While the share of fossil fuels in power generation has declined modestly from 65.8% in 2015 to 59.8% today, electrification has advanced only slowly, with the electricity share in final energy use increasing by just 2.4pps between 2015 and 2023.

At the current pace, the world is still heading toward +3°C of warming by the end of the century. Even as climate damages intensify and mitigation efforts scale up, staying within the Paris temperature boundaries will become increasingly difficult without a structural shift in global energy systems and consumption patterns. An accelerated transition – driven by faster electrification, deep reductions in fossil-fuel dependence and universal access to clean power – could still limit warming to below 2.3°C, but only if decisive action is taken within this decade.

Figure 4: Historical emission and decarbonization pathways: global (in MtCo2eq)



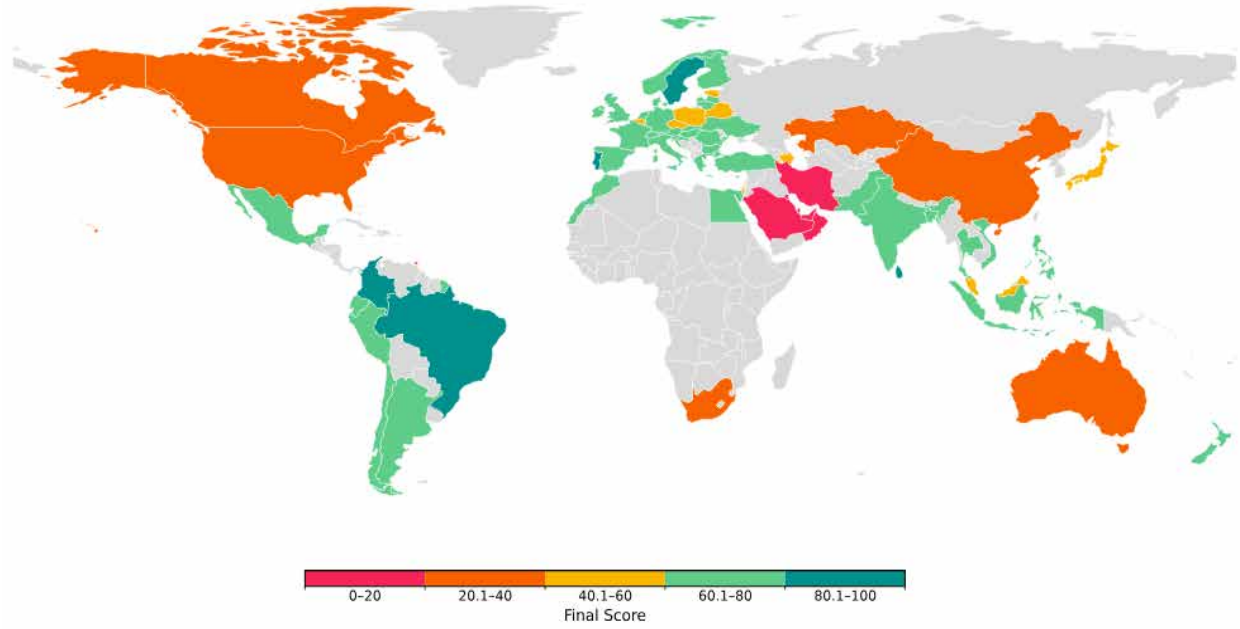
Sources: Allianz Research based on JRC EDGAR, NGFS and UNEP; NGFS climate scenarios represent a 67% probability of not exceeding the following global warming thresholds by 2100: Current Policies (3.2°C), 2°C Scenario (1.9°C), and Net Zero 2050 (1.5°C). LULUCF (land use, land-use change and forestry) emissions include those from deforestation, fires, forest land, organic soils and other sources.

To support effective climate-change mitigation, target setting and gap identification, it is essential to evaluate countries' progress and relative performance. To this end, we conduct peer and progress assessments for 69 countries, benchmarking them across five core indicators: *(1) carbon intensity of the economy, (2) energy intensity, (3) consumption-based emissions per capita, (4) territorial emissions per capita and (5) the share of low-carbon sources in the national power mix.*

Our transition scoring framework quantifies the relative gap between each country's current state and its 2050 benchmark consistent with a global net-zero pathway. The peer score measures how far a country's current performance deviates from leading or lagging peers, with the 90th percentile of the weakest performers serving as the reference point for comparison – thereby illustrating a country's relative transition position within its global cohort. The progress score, in contrast, captures how much of the initial gap (measured from 2015) a country has already closed, indicating the rate of transition progress toward the 2050 net-zero target. The evaluation of this score depends not only on the absolute progress achieved, but also on the time elapsed, establishing whether a country is advancing at a pace consistent with a linear trajectory toward full alignment by 2050.[5]

Comparing relative peer performance reveals three key determinants of transition outcomes: the level of development, abundance of fossil-fuel resources and strength of climate action (Figure 5). In general, advanced economies perform worse on per-capita emission indicators, reflecting their higher levels of resource consumption, greater industrial output and reliance on imported products.[6] Emerging economies such as Sri Lanka, Colombia or Peru perform better on these metrics but are at risk of rising emissions as their economies grow and energy demand increases. Fossil-fuel-producing countries such as Saudi Arabia, Qatar, the US and China often exhibit higher emissions due to low domestic fossil-fuel prices (linked to resource abundance) and comparatively weaker regulations limiting emissions. For these countries, further diversification of the energy mix and revenue streams will be essential to reduce fossil dependencies. Finally, the score highlights differences in the stringency of climate policy. Several European economies, including Sweden, Portugal and France, which have implemented strict carbon pricing and achieved a high share of low-carbon power in their electricity mix, perform better overall, demonstrating that strong policy frameworks can significantly improve transition outcomes, even in developed economies.

Figure 5: Climate transition peer score

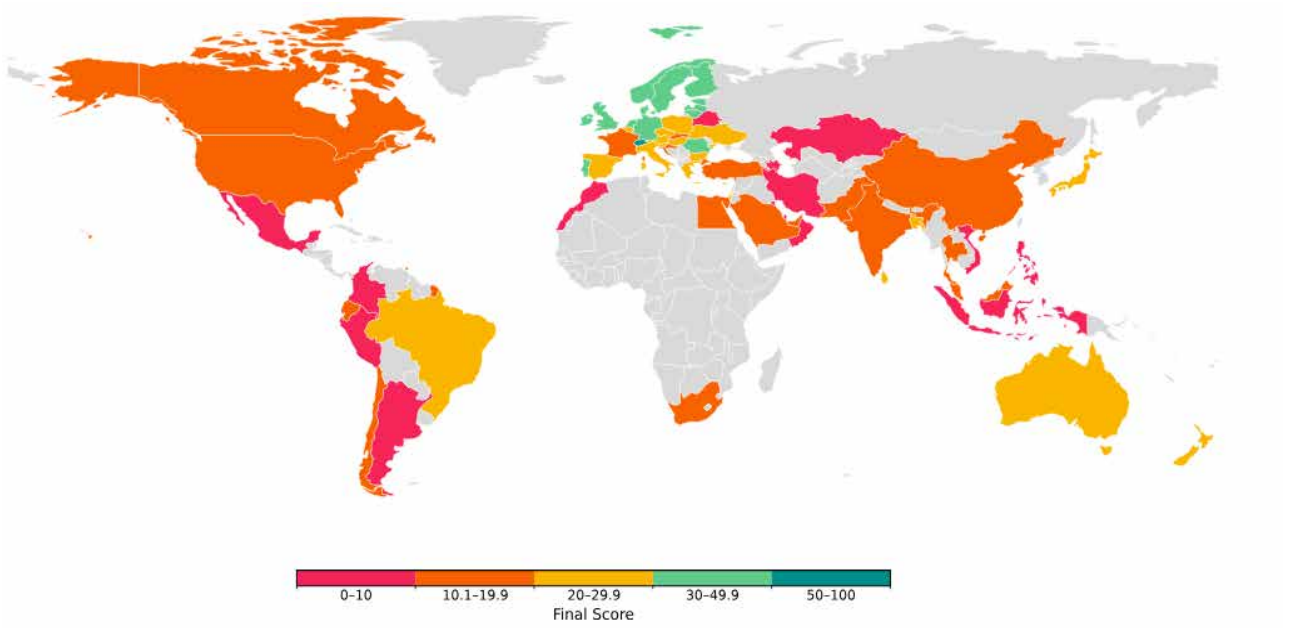


Source: Allianz Research

[5] For a more detailed description see Appendix A2
[6] See Appendix A1 for the full set of climate scores and underlying indicator results.

Cross-country comparisons of progress scores reveal a more nuanced picture (Figure 6). While most countries have made measurable advances in closing the gap to the 2050 target, many have achieved only single-digit improvements, with some even widening their gap since 2015. Considering that over 28% of the time between the Paris Agreement (2015) and 2050 has already elapsed, only a small number of countries – primarily in Europe – have closed more than 30% of their initial gap. Luxembourg, Switzerland and Denmark lead the transition progress ranking, supported by both a high share of low-carbon power generation and energy-efficiency levels consistent with global 2050 benchmarks. In contrast, several countries that rank relatively high in the peer analysis, such as Colombia, Indonesia or India, have shown slower progress relative to their 2015 starting points. Limiting factors, beyond level effects, include rising energy demand, fossil-fuel–dependent growth models and insufficient policy incentives to accelerate the transition. Globally, most countries continue to struggle with reducing per-capita consumption emissions, underscoring a persistent gap in demand-side climate action and the need for more effective measures to curb resource use and promote sustainable consumption patterns.

Figure 6: Climate transition progress score



Source: Allianz Research

Country profiles

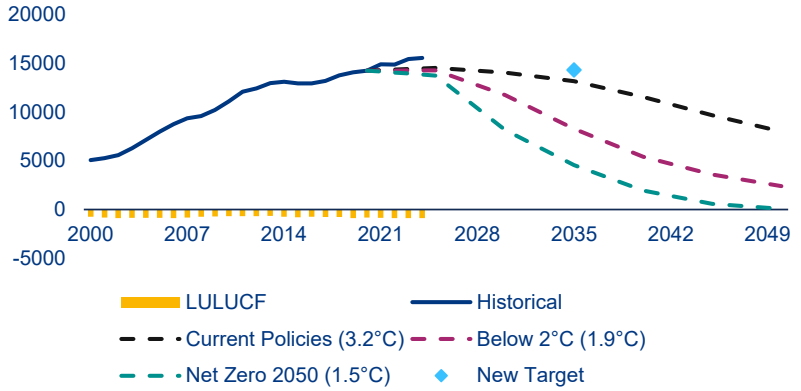
China – Global enabler with domestic transition gaps

Over the past decade, China has become an enabler of the global climate transition, accounting for 42% of international renewable investments and over 60% of manufacturing capacity for wind, solar and batteries. Seventy percent of its total energy investments in recent years has gone to low-carbon energy sources, driving a 3.6-fold increase in clean electricity-generation capacity between 2015 and 2024. Strategic planning, targeted subsidies and rapid innovation have not only established China as a key global supplier of clean technologies but have also contributed to significant cost reductions in solar panels, batteries and electric vehicles, enabling other economies to accelerate their energy transitions (Box 1 – rapid expansion of solar energy in Pakistan). These investments have also delivered substantial economic benefits domestically, with roughly USD1.8trn or 10% of China's GDP now linked to clean energy growth, demonstrating that the country's climate-focused strategy has paid off.

On the domestic front, progress in China's climate transition remains limited. The country now accounts for roughly 29% of global CO2 emissions, making it the world's largest emitter by a wide margin. Over the past decade, the country's CO2 emissions have increased by around +20%, reaching 15.5 GtCO2 in 2024. China accounted for roughly 80% of the global rise in emissions during this period (Figure 7). Both territorial and consumption-based emissions per capita have continued to climb – by 19% and 14%, respectively – bringing China's per-capita emissions broadly in line with those of most industrialized Western nations (Figure 8a). Despite improvements in carbon intensity (emissions per unit of GDP) and energy intensity (energy consumption per unit of GDP) in line with global efficiency trends, China still ranks among the least efficient major economies, placing around the 77th and 72nd percentiles in emissions and energy use per unit of output. As a result, China currently ranks 57th and 48th out of 69 countries in our peer and progress assessments, highlighting substantial room for improvement.

Figure 7: a) Historical emission & decarbonization pathways (MtCo2eq) and b) climate performance scores

a)

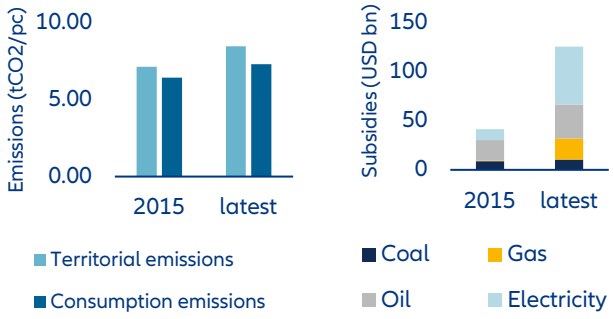


b)

Sources: Allianz Research based on JRC EDGAR, NGFS and UNEP; NGFS climate scenarios represent a 67% probability of not exceeding the following global warming thresholds by 2100: Current Policies (3.2°C), 2°C Scenario (1.9°C), and Net Zero 2050 (1.5°C). LULUCF (land use, land-use change and forestry) emissions include those from deforestation, fires, forest land, organic soils and other sources.

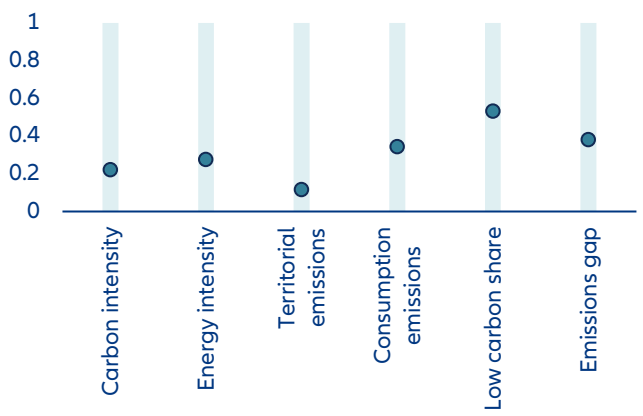
Figure 8: a) Climate performance indicators and b) percentile rank of the country for each indicator

a)



Indicator	Unit	2015	latest
Carbon intensity	tCO2/USD mn	630.77	462.30
Energy intensity	PJ/USD bn	10.46	8.35

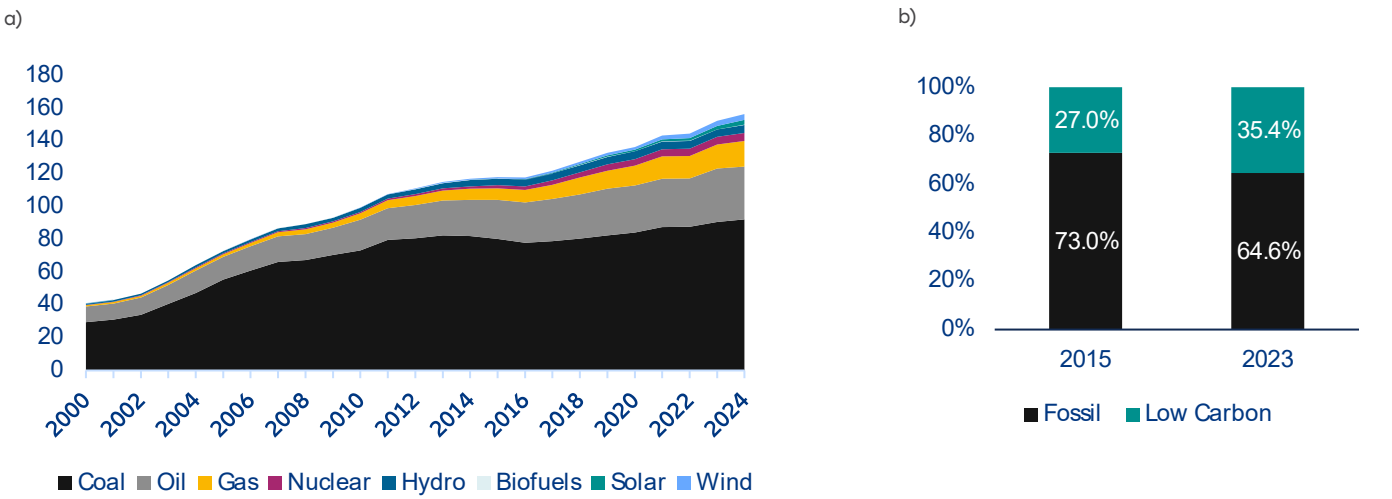
b)



Sources: Allianz Research based on JRC EDGAR, Energy Institute, Global Carbon Budget, World Bank, IRENA, NGFS

On the energy front, progress has been more tangible. The share of low-carbon electricity in China's power mix rose from 27% a decade ago to 35% in 2023 (Figure 9b), supported by large-scale investments in renewables and grid infrastructure. However, this clean-energy expansion has unfolded alongside a resurgence in coal-related investment, which increased from USD87bn ten years ago to an expected USD114bn in 2025. Driven by continued demand growth and energy-security concerns, this parallel investment path has meant that China's fossil-fuel dependence has declined only marginally over the past decade and still represents roughly 90% of total energy supply (Figure 9a).

Figure 9: a) Total energy supply (EJ) and b) low-carbon share in power mix (%)



Sources: Allianz Research, Energy Institute, IRENA

China has demonstrated a strong track record in meeting its climate and energy commitments, but greater ambition remains necessary. The country achieved its wind and solar capacity targets five years ahead of schedule, highlighting its ability to rapidly scale up clean energy infrastructure. Although overall emissions continue to rise, the robust expansion of low-carbon electricity and a growing shift in energy demand toward cleaner technologies, such as electric vehicles, could allow China to reach peak emissions within the next two years, a milestone with significant implications for global mitigation efforts. Progress toward carbon intensity reduction remains on track for 2030, with a -52% reduction from 2005 levels already achieved by 2024, approaching the official -65% target. Similarly, the goal of raising the share of non-fossil energy to 25% of primary energy consumption appears attainable given a current share of 20%. Despite these achievements and the country's remarkable growth in its green supply chain, the new target of a -7-10% reduction in overall emissions by 2035 is underwhelming. If implemented as stated, it would place China on a +3°C climate pathway, rather than leveraging its potential to lead the global green transition. While exceeding this target is possible, the -46% reduction required to remain below 2°C appears highly unlikely under current policy ambitions.

Looking ahead, several challenges could affect China's transition success. On the power side, the rapid expansion of generation capacity must be matched by sufficient grid and storage infrastructure. Without adequate transmission and balancing capacity, short-term bottlenecks could slow renewable deployment, making grid integration and energy storage strategic priorities. Therefore, large-scale investments in ultra-high-voltage (UHV) lines and battery storage should be accelerated to improve system flexibility and deliver renewable power across wider regions. On the manufacturing side, oversupply in battery and solar production is emerging, sometimes even exceeding demand projected under a net-zero scenario. While this has lowered global clean technology prices, it is also pressuring profit margins, potentially leading to consolidation and financial stress among smaller producers. Domestically, the mismatch between production and installation demand risks idle assets and inefficient capital allocation, while internationally, excess output is raising concerns about market distortions and trade tensions as more is exported.

Table 1: Key challenges and policy recommendations

Key Challences	Policy Recommendations
Converting supply chain leadership into domestic gains	Extend domestic carbon pricing and increase the current price to incentivize fuel switching
Provide supply chain and energy security	Address oversupply issues to stabilize the global green supply chain, support domestic market alignment, and mitigate financial stress among smaller producers
Balancing clean energy growth with grid and storage infrastructure	Increase investments in ultra-high-voltage (UHV) transmission lines and battery storage to avoid grid bottlenecks and ensure smooth renewable deployment

Source: Allianz Research

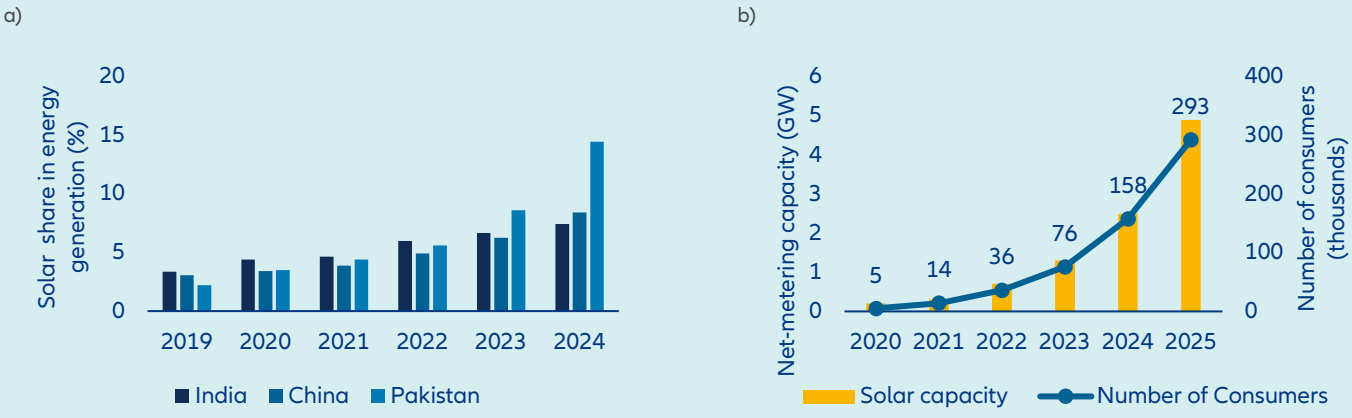
Box 1: Renewable power boom – The case of Pakistan

Pakistan is experiencing a rapid expansion in solar-energy adoption, driven by soaring electricity prices and persistent power-supply disruptions. The country has long faced frequent power shortages, and the 2022-23 energy crisis further intensified cost pressures as Pakistan's reliance on imported coal and gas left it highly exposed to global market volatility. These challenges prompted many large consumers, including businesses, farms and high-consumption households, to invest in self-generation, particularly through solar photovoltaic systems.

Plummeting solar panel prices have been a key catalyst behind one of the country's fastest and most unexpected clean-energy transitions. Over the past 15 years, the cost of solar PV modules has declined by about -90% percent (Figure 2), largely due to Chinese manufacturing overcapacity. This sharp cost reduction has created new opportunities for Pakistani consumers to adopt more affordable, decentralized, and increasingly grid-independent electricity solutions. As a result, the share of solar energy in Pakistan's power-generation mix rose sharply from around 2% in 2019 to nearly 14% in 2024 (Figure 10a), faster than India and China, each with 4.1pp and 5.4pp increase in the share of solar energy.

The surge in solar adoption is particularly visible across rooftops nationwide. Residential and commercial uptake has accelerated dramatically, with net-metered rooftop capacity expanding by +257% between 2022 and 2024, and projected to be almost seven times higher by the end of 2025 compared with 2022 levels (Figure 10b). In 2025, Pakistan continues to scale up its solar capacity, having imported about USD1.5bn worth of Chinese solar panels this year, making it the world's third-largest importer according to BloombergNEF.

Figure 10: a) Development of solar share in electricity generation between 2019 and 2024 (%), b) Solar capacity in Pakistan (2020 – 2025)

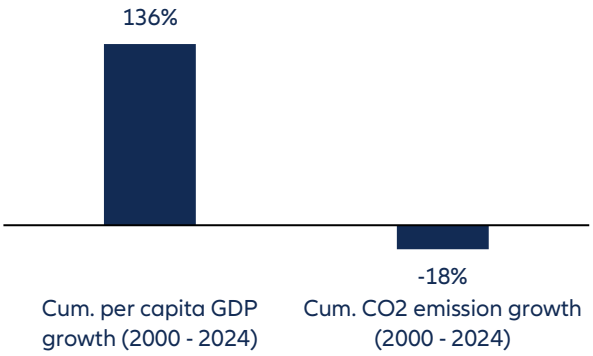


Sources: EMBER, Renewables First, Allianz Research

United States – Climate commitments at a crossroads

Since the onset of industrialization, the expansion of the US economy has been closely intertwined with rising greenhouse gas (GHG) emissions, largely driven by dependence on fossil fuels. Yet over the past two decades, this historical coupling between economic growth and carbon output has begun to loosen. Following a long upward trajectory, US emissions reached their highest level in 2000 and have since trended downward in most subsequent years, declining by -18% between 2000 and 2024 (Figure 11), while the nation's per capita GDP expanded by about +136% over the same period. This emerging decoupling underscores progress in energy efficiency, cleaner power generation and structural economic shifts.

Figure 11: GDP Growth and emissions decoupling in the US



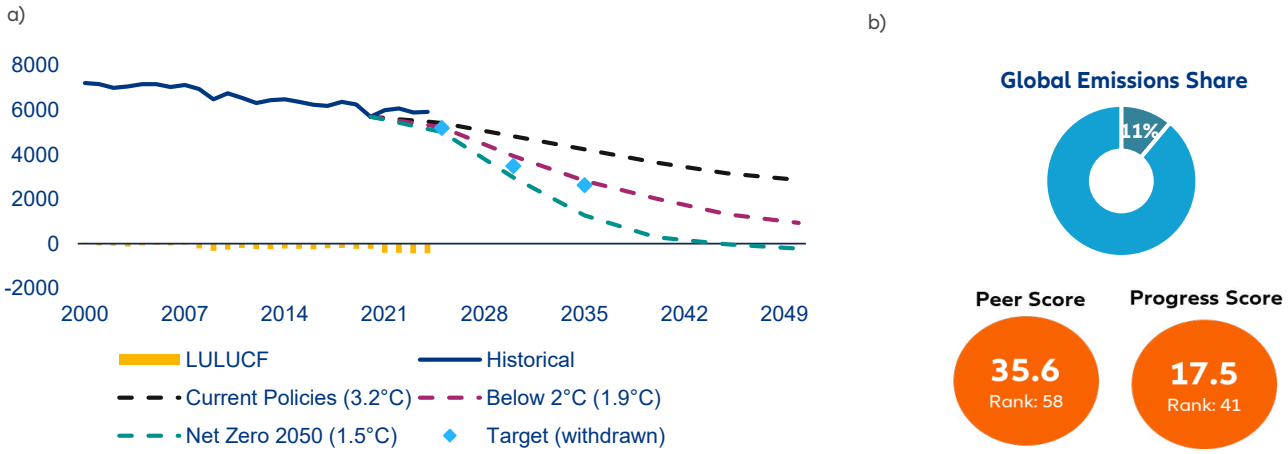
Sources: Allianz Research based on JRC EDGAR

However, the pace of change remains uneven across sectors, and current reductions fall short of what is required to align with 2035 climate targets (Figure 12). Since 2015, the country has achieved measurable improvements – not only in absolute emissions reductions but also in efficiency – by lowering both carbon intensity and energy intensity. These gains reflect structural changes in the economy and cleaner energy production, yet they remain insufficient to align with the temperature goals of the Paris Agreement. Compared with its peers, the US ranks 58th out of 69 economies in carbon neutrality performance and 41st out of 69 in progress toward the climate transition. The poor ranking is driven mainly by poor performance in terms of territorial and consumption emissions.

Current emission levels still deviate significantly from pathways compatible with limiting global warming to 1.5°C above pre-industrial levels, as outlined in the Net-Zero 2050 scenario (Figure 12). Previous US climate commitments – the targets shown in Figure 12 – were already insufficient to meet the 1.5 °C goal, but would be aligned with a below 2 °C pathway. However, current emission trends, combined with rising power demand from data centers and other sectors, and the US withdrawal from the Paris Agreement, now place the country on a trajectory that could exceed +3 °C of global warming by the end of the century.

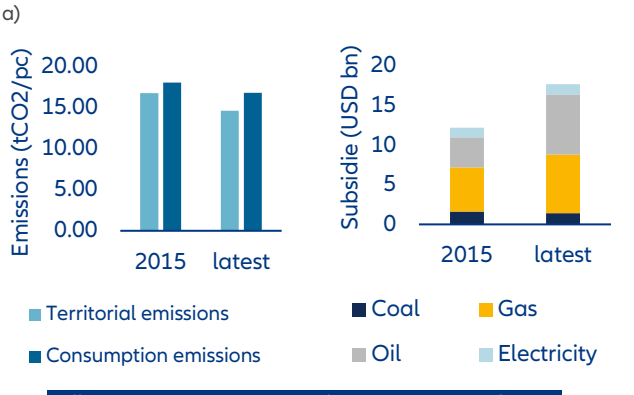
Despite its climate ambitions, the US continues to provide substantial subsidies to fossil fuels, undermining efforts to achieve deep decarbonization. Between 2015 and 2023, total fossil-fuel subsidies rose by +45%, increasing from USD12.2bn to USD17.7bn (Figure 13a). This surge was largely driven by oil and natural gas, whose subsidies expanded by approximately +100% and +30%, respectively, reflecting both price volatility and policy measures introduced to stabilize domestic energy markets during recent crises. In contrast, coal subsidies declined modestly, falling from USD1.6bn in 2015 to USD1.4bn in 2023 as coal's role in the national energy mix continues to shrink. Nonetheless, the overall rise in fossil-fuel support signals a persistent structural dependence on hydrocarbons, reinforced by tax breaks, production incentives and support for fossil-fuel infrastructure.

Figure 12: a) Historical emission & decarbonization pathways (MtCo2eq) and b) climate performance indicators

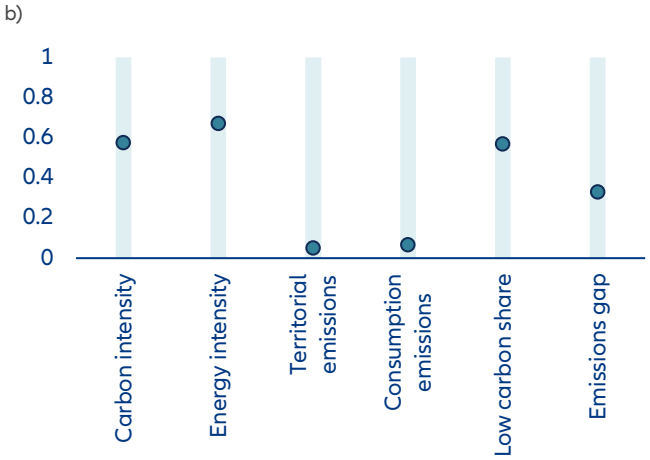


Sources: Allianz Research based on JRC EDGAR, NGFS and UNEP; NGFS climate scenarios represent a 67% probability of not exceeding the following global warming thresholds by 2100: Current Policies (3.2°C), 2°C Scenario (1.9°C), and Net Zero 2050 (1.5°C). LULUCF (land use, land-use change and forestry) emissions include those from deforestation, fires, forest land, organic soils and other sources.

Figure 13: a) Climate performance indicators and b) percentile rank of the country for each indicator



Indicator	Unit	2015	latest
Carbon intensity	tCO2/USD mn	307.26	230.28
Energy intensity	PJ/USD bn	4.93	3.11

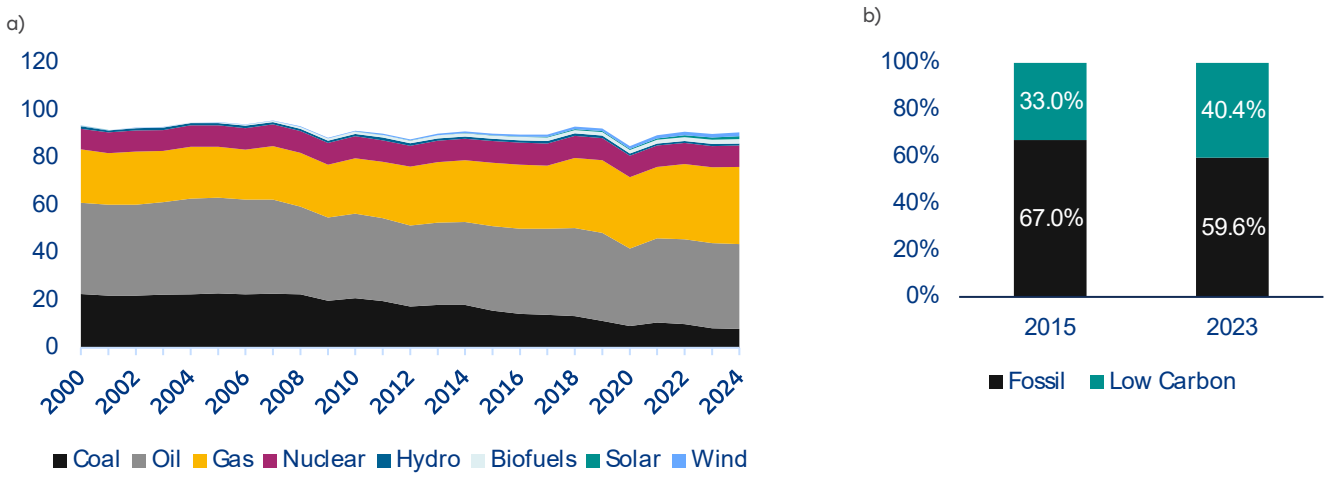


Sources: Allianz Research based on JRC EDGAR, Energy Institute, Global Carbon Budget, World Bank, IRENA, NGFS

Over the past two decades, the electric power sector has been the primary engine of US emission reductions. Between 2005 and 2019, carbon dioxide emissions from electricity generation fell by roughly one-third[7], a shift driven by a structural transformation of the power mix (Figure 14). The retirement of aging, inefficient coal plants coincided with a rapid expansion of natural gas generation and a surge in renewable power, especially wind and solar. In terms of total energy supply, natural gas increased its market share by about +11pps between 2000 and 2024, while wind and solar grew by +1.8pps and +1.2pp , respectively. In the same period, the share of coal energy declined by -15.5pps.

[7] Accelerating Decarbonization of the U.S. Energy System | The National Academies Press

Figure 14: a) Total energy supply (EJ) and b) low-carbon share in power mix (%)



Sources: Allianz Research, Energy Institute, IRENA

Nonetheless, structural and institutional barriers remain (Figure 14a). Several coal plants are insulated from market competition due to cost recovery rules in regulated utilities, and some are retained for local reliability needs. Likewise, many nuclear units struggle to compete in wholesale markets that undervalue their zero-carbon generation. Without supportive policy mechanisms, further closures of nuclear plants could erode gains in emissions reductions. Looking ahead, reaching a fully carbon-free power system will depend on deploying a new generation of "clean firm" technologies, such as advanced nuclear, geothermal, biogas, hydrogen and natural gas with carbon capture and storage. These sources can deliver dispatchable, weather-independent, zero-carbon power, complementing variable renewables and ensuring system reliability. Sustained policy commitment and targeted innovation will be essential to scale these technologies and complete the decarbonization of the US electricity sector.

Unlike the power sector, emissions from end-use sectors – transportation, industry, buildings and agriculture – have shown only modest progress in recent decades, and in some cases, emissions have continued to rise. Since 2005, direct emissions have declined slightly in transportation (-5%) and industry (-2%), but have increased in agriculture (+5%) and buildings (+6%). These trends reflect a broader pattern: economic and population growth have largely outpaced efficiency gains, leading to only marginal changes in total emissions. In transportation, improvements in vehicle fuel economy have offset some of the growth in vehicle miles traveled, but overall emissions reductions have been limited by the continued dominance of internal combustion engines and expanding mobility demand. The industrial sector has achieved small efficiency gains and partial decarbonization through process optimization and structural economic shifts – from heavy manufacturing toward less energy-intensive services – but overall emissions have plateaued rather than declined sharply. In buildings, rising demand for floor space and energy services has largely counterbalanced gains from improved insulation, appliance efficiency and heating technologies.

Achieving deep decarbonization in these sectors will require a broader transformation that goes beyond incremental efficiency improvements. This includes:

- Accelerating efficiency and material productivity to curb total energy and resource demand;
- Electrifying end uses – for example, through electric vehicles, heat pumps and induction systems – while ensuring that electricity itself becomes carbon-free;
- Deploying low- or zero-carbon fuels, such as sustainable biofuels, synthetic fuels and hydrogen, for applications where electrification is difficult;
- Capturing or offsetting residual emissions through carbon capture and storage (CCS), enhanced land carbon sinks and emerging negative-emission technologies; and
- Extending domestic carbon pricing and increase the current price to incentivize the green transition.

Only by integrating these strategies across sectors can the US achieve a comprehensive and durable decline in emissions consistent with its long-term climate goals.

Table 2: Key challenges and policy recommendations

Key Challenges	Policy Recommendations
Achieving a carbon-free and reliable power system	1. Accelerate grid expansion and interconnection through streamlined federal permitting. 2. Preserve and expand clean firm capacity (nuclear, geothermal, CCS) to ensure reliability. 3. Scale renewables and storage deployment using IRA incentives and long-term contracts. 4. Retire remaining coal assets and phase down unabated gas generation.
Decarbonizing transport, buildings, and industry	1. Expand EV infrastructure and tighten vehicle efficiency and zero-emission standards. 2. Promote building electrification via heat-pump incentives and stricter codes. 3. Support industrial decarbonization through 45Q/48C tax credits (IRA) and federal procurement ("Buy Clean"). 4. Invest in low-carbon fuels and hydrogen for hard-to-electrify sectors.
Ensuring affordability, equity, and political durability	1. Direct IRA funds and GHG Reduction Fund toward low-income and frontline communities. 2. Establish Just Transition compacts for fossil-dependent regions. 3. Maintain public support through visible local benefits: jobs, lower bills, cleaner air.
Mobilizing finance and securing clean supply chains	1. Strengthen domestic manufacturing of batteries, solar, and critical minerals with clear environmental safeguards. 2. Expand DOE Loan Programs and federal green bank leverage to crowd in private capital. 3. Use federal procurement and tax credits to anchor clean-tech markets. 4. Build trade partnerships ("friend-shoring") for resilient, low-carbon supply chains.

Source: Allianz Research

India – Rapid growth and rising stakes

India, the fastest-growing major economy, faces the dual challenge of sustaining robust growth while advancing a clean energy transition. Already responsible for 8.2% of global emissions, the country's economy is projected to expand by around +6% annually through the end of the decade. According to the International Energy Agency (IEA), India's energy demand is set to grow by roughly +35% by 2035, outpacing that of any other nation, with total power generation capacity projected to triple. Meeting this surge while limiting emissions will require substantial investment in low-emission energy sources, grid expansion and storage infrastructure.

Despite these challenges, India has made significant progress, achieving its 50% non-fossil power capacity target five years ahead of schedule. In the first half of 2025, the country also recorded a landmark increase in renewable generation, with wind and solar output nearly doubling from previous years.[8] Looking ahead, India holds considerable potential to strengthen its position in the global clean energy economy – particularly through scaling domestic solar manufacturing and becoming a major player in the international hydrogen supply chain. India's role in the global climate transition will be defined in the next five years. While short-term emission growth has been anticipated and incorporated into climate-modeling frameworks, India's projected pathways to 2035 are beginning to diverge, underscoring the critical importance of policy choices made in this decade in determining whether the country aligns with a low-carbon trajectory or locks in higher-emission development (Figure 15). While net-zero emissions by 2050 may remain an ambitious target, accelerating investment in low-carbon power generation and end-use efficiency could enable India to sustain economic growth while moving toward a below-2°C trajectory. Achieving this pathway, however, would require the country to reach peak emissions as early as 2030.

Reaching emission-reduction targets will hinge on the carbon intensity and energy efficiency gains that India can realize. For now, India's per-capita emissions – both territorial and consumption-based – remain relatively low, reflected in a peer score that ranks the country 30th globally, placing it in the upper half of observed nations (Figure 16b). However, per-capita emissions are increasing, and progress in the low-carbon energy transition has been sluggish, placing India among the laggards in the progress score ranking (50th). As the economy expands and living standards rise, energy demand and associated emissions are expected to

[8] See Global Electricity Mid-Year Insights 2025 | Ember

grow. If this occurs without significant improvements in efficiency, the result could be a sharp increase in national emissions. To avoid this trajectory, India must design its emerging energy system with net-zero growth in mind. This will require not only a large-scale shift to low-carbon electricity, but also demand-side management, industrial decarbonization and the adoption of cleaner fuels. In this context, India's forthcoming carbon trading mechanism, set to begin in 2026, will play a pivotal role in driving cost-effective emission reductions, incentivizing innovation and integrating carbon pricing into the broader transition strategy.

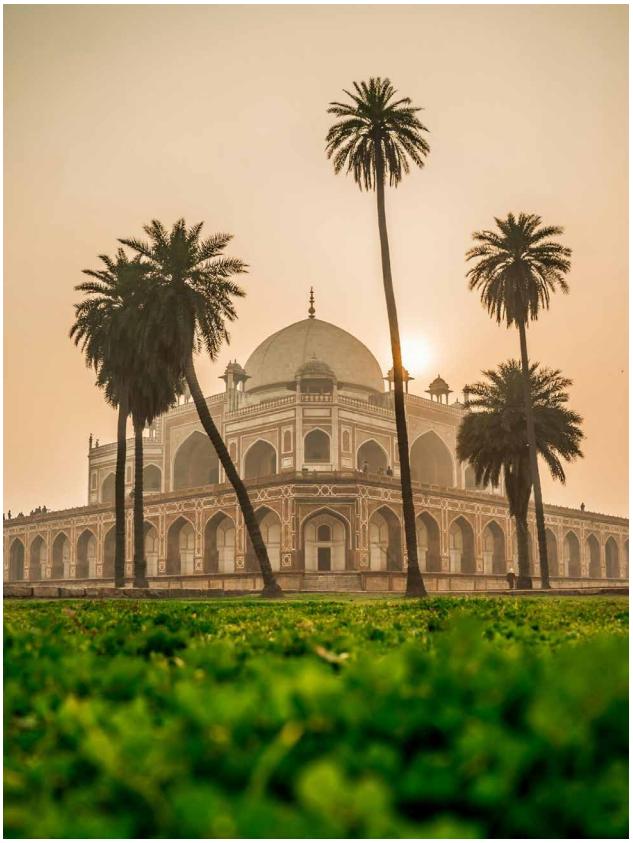
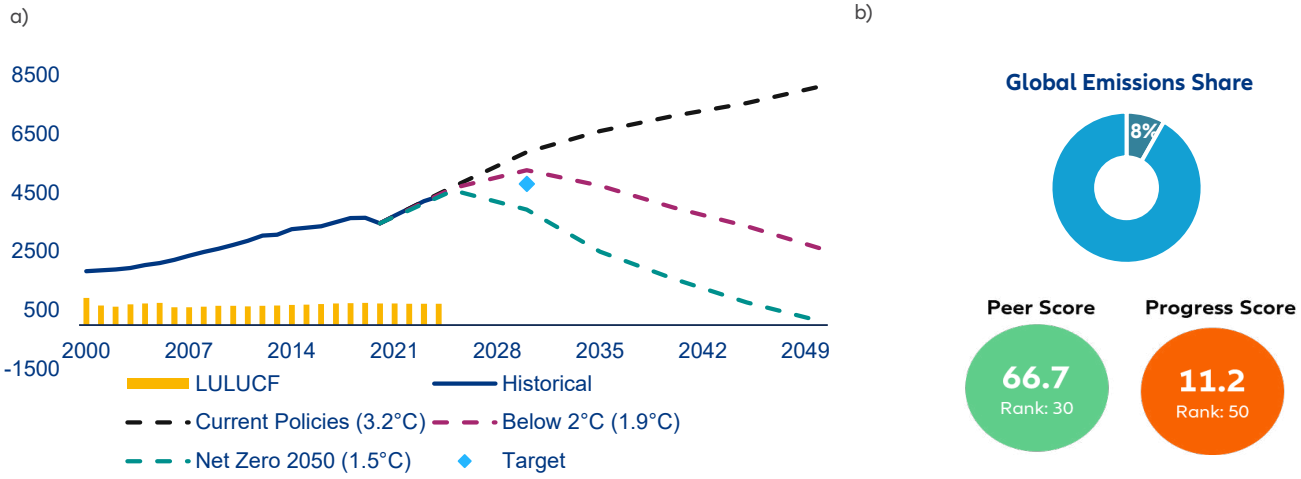
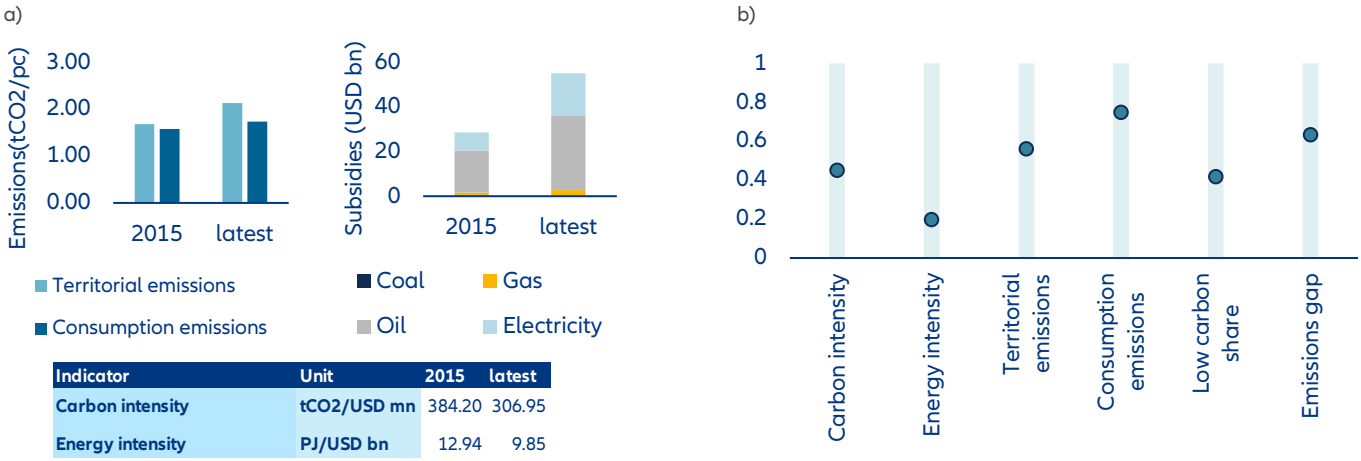


Figure 15: a) Historical emission & decarbonization pathways (MtCo2eq,) and b) climate performance indicators



Sources: Allianz Research based on JRC EDGAR, NGFS and UNEP; NGFS climate scenarios represent a 67% probability of not exceeding the following global warming thresholds by 2100: Current Policies (3.2°C), 2°C Scenario (1.9°C), and Net Zero 2050 (1.5°C). LULUCF (land use, land-use change and forestry) emissions include those from deforestation, fires, forest land, organic soils and other sources.

Figure 16: a) Climate performance indicators and b) percentile rank of the country for each indicator

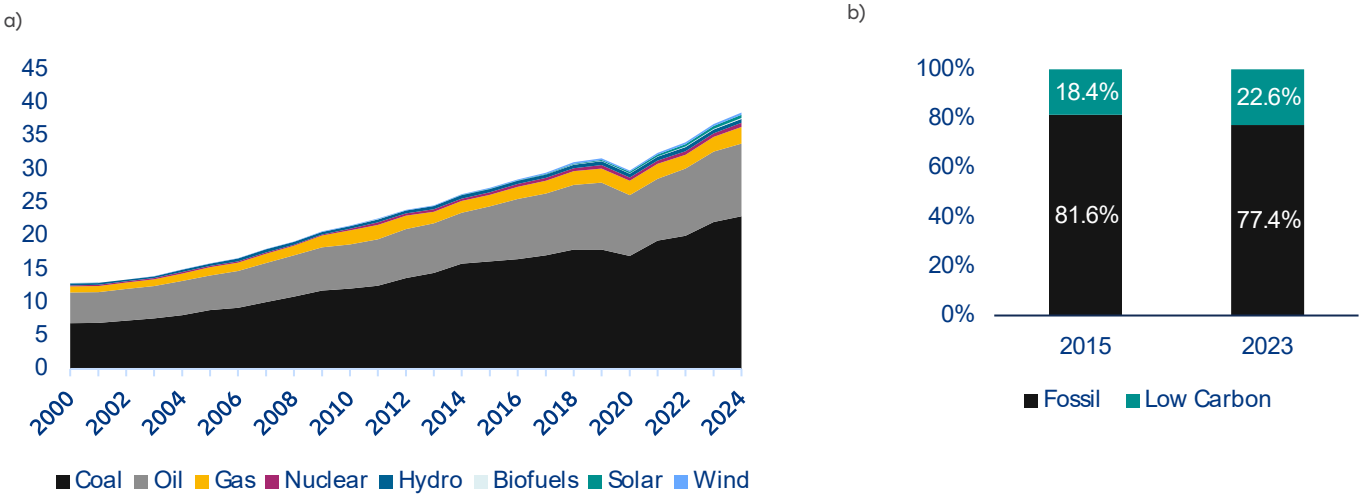


Indicator	Unit	2015	latest
Carbon intensity	tCO2/USD mn	384.20	306.95
Energy intensity	PJ/USD bn	12.94	9.85

Sources: Allianz Research based on JRC EDGAR, Energy Institute, Global Carbon Budget, World Bank, IRENA, NGFS

India's energy supply mix indicates that the country's economic growth remains closely tied to fossil-fuel consumption. Similarly to China, India has expanded its renewable power-generation capacity, yet fossil energy use has continued to rise in parallel (Figure 17a). Over the past five years, renewable capacity has increased by 128.3 GW, raising the share of low-carbon energy to more than 22% in 2023 (Figure 17b). However, this progress does not yet represent a fundamental shift in the country's energy paradigm. Fossil fuel use has seen a rapid expansion over the last 25 years and still accounts for more than 93% of the country's total energy supply. On the positive side, India stands to benefit from the declining costs of renewable technologies and battery storage, as well as its vast potential particularly for solar power generation. Nevertheless, several risks persist, including rapidly growing electricity demand driven by the expanding IT sector, broader access to power and rising use of air conditioning.

Figure 17: a) Total energy supply (EJ) and b) low carbon share in power mix (%,)



Sources: Allianz Research, Energy Institute, IRENA

Target setting and strategic focus will be crucial for India's decarbonization pathway in the years ahead. The country has made substantial progress toward its initial climate goals, having already achieved or nearly achieved several of them. The target of deriving 50% of installed power capacity from non-fossil sources has been met this year, while the goal of reducing carbon intensity by -45% from 2005 levels by 2030 appears attainable given India has already achieved a -35% reduction, with a -20% decline over the past decade. Sustaining momentum, however, will depend on the government's ability to maintain ambition and policy consistency. Looking beyond 2030, India should consider setting a 2035 milestone to cap absolute emissions at or below current levels. Such a target – allowing for a short-term overshoot followed by gradual decline – would align India's trajectory with a global warming pathway well below 2°C.

To achieve this, India's focus should extend beyond expanding low-carbon generation to strengthening the enabling conditions for a resilient, competitive clean economy. Key priorities include improving the reliability and flexibility of the power system through greater investment in transmission networks and energy storage; implementing and expanding carbon pricing mechanisms to incentivize efficiency and low-carbon innovation and capitalizing on India's strategic potential in the global solar and green hydrogen supply chains. In parallel, deeper decarbonization will also depend on advancing industrial efficiency, accelerating transport electrification and enhancing energy efficiency in rapidly growing urban areas.

Table 3: Key challenges and policy recommendations

Key Challences	Policy Recommendations
Sustainable economic growth while limiting emissions increase	Strengthen national climate targets with a 2035 emission cap and expand investment in low-carbon infrastructure to decouple growth from fossil fuel use
Ensuring grid reliability amid rapid renewable expansion	Invest in grid modernization, expansion, cross-regional transmission and large-scale energy storage to integrate variable renewables efficiently
Managing industrial and transport emissions	Support industrial electrification, promote green hydrogen and accelerate electric vehicule deployment with supporting infrastructure
Securing financing for the clean energy transition	Expand carbon pricing and green finance instruments to attract private capital and incentivize efficiency and innovation

Source: Allianz Research

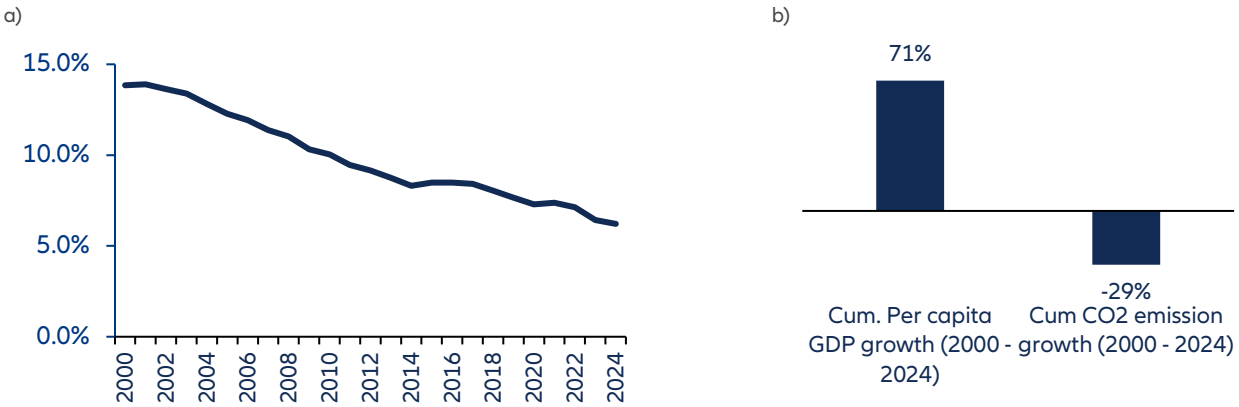
Europe – Leading, but not there yet

The EU's commitment to decarbonizing its economy has been both long-standing and measurable. Since the early 2000s, the EU-27 has steadily reduced its contribution to global CO_2 emissions, demonstrating global leadership in climate action. As shown in Figure 18a, the EU-27's share of global CO_2 emissions has declined by 7.7pps, falling from 13.9% in 2000 to just 6.2% in 2024. This represents one of the most substantial relative reductions among major economies, underscoring the effectiveness of EU-wide climate policies, carbon pricing mechanisms (see Box 2 discussing carbon market) and the progressive shift toward renewable energy sources.

Importantly, this decline in emissions has taken place alongside sustained economic growth, demonstrating a clear decoupling between economic performance and carbon output. As illustrated in Figure 18b, per capita GDP in the EU-27 has risen by about +71% since 2000, while CO_2 emissions have decreased by -29% over the same period. This structural transformation reflects significant gains in energy efficiency, industrial modernization and the greening of power generation. As shown in Figure 20a, both carbon intensity and energy intensity improved markedly, by 43% and 38% between 2015 and 2023, respectively, underscoring the effectiveness of technological and policy interventions in reducing emissions per unit of output.

However, as also depicted in Figure 20a, the observed decoupling between growth and emissions may partly stem from the rapid decline in territorial emissions within Europe, while consumption-based emissions per capita have stabilized. This divergence suggests that part of Europe's emission reductions is linked to decline of industrial activities and the relocation of energy-intensive industries to other emerging countries, raising important questions about the global distribution of production and the real carbon footprint of European consumption.

Figure 18: Recent emissions development in the EU-27: a) EU-27 share of global CO2 emissions; b) Growth and emissions decoupling in the EU-27



Sources: Allianz Research based on JRC EDGAR

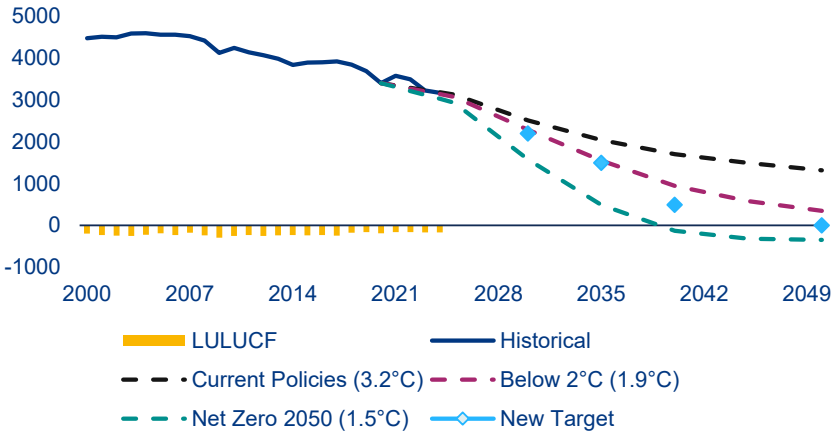
Europe is progressing toward its climate-neutrality objective, even if further efforts are needed to close remaining gaps (Figure 19). Present emission trends align broadly with the EU's NDC commitments and a +2 °C-consistent trajectory. To meet the 2030 climate target, the EU would need to reduce emissions by roughly -% within the next four years, a task made increasingly difficult by the region's sluggish economic performance, with GDP growth at only +0.7% in 2024 and persistent disparities across member states, including a two-year recession in Germany (2023–2024). These economic headwinds, coupled with ongoing geopolitical tensions and energy-security challenges, risk slowing the pace of industrial decarbonization and the rollout of green technologies. Yet, achieving the EU's 2040 objective of a -85% reduction in domestic emissions relative to 1990 levels is essential for staying on course toward carbon neutrality by mid-century.

In terms of its peer performance, the EU – considered here as a single entity – would rank 26th out of 69 countries, while in transition progress, it performs somewhat better, 15th out of 69 (Figure 19). The EU's overall ranking is bolstered by strong improvements in carbon and energy intensity as well as a growing share of low-carbon energy in its mix. However, it continues to lag behind on indicators related to territorial and consumption-based emissions, as well as the remaining emissions gap toward its climate targets.

Performance across the EU-27 remains highly uneven. Some member states, such as Sweden, Denmark and Portugal, rank among the top ten globally in both overall peer score and progress score (see Appendix A1). In contrast, countries like Italy and Greece perform significantly below the EU average, reflecting persistent challenges in reducing emissions and accelerating their clean energy transition. Globally, the EU-27 continues to provide substantial subsidies to fossil fuels, including coal, gas and oil, with total support more than doubling between 2015 and 2023 (+139%, Figure 20a). This increase was largely driven by the energy crisis following the war in Ukraine, which prompted governments to implement extensive measures to shield households and industries from soaring energy prices.

Figure 19: a) Historical emission & decarbonization pathways (MtCo2eq) and b) climate performance indicators

a)

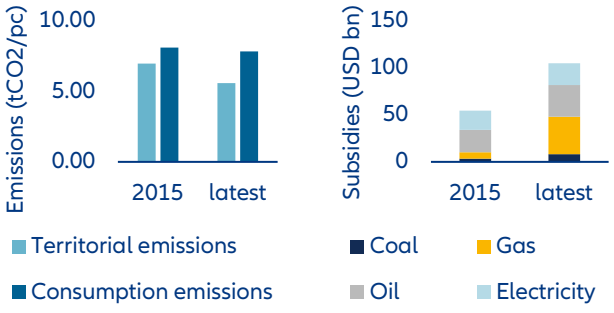


b)

Sources: Allianz Research based on JRC EDGAR, NGFS and UNEP; NGFS climate scenarios represent a 67% probability of not exceeding the following global warming thresholds by 2100: Current Policies (3.2°C), 2°C Scenario (1.9°C), and Net Zero 2050 (1.5°C). LULUCF (land use, land-use change and forestry) emissions include those from deforestation, fires, forest land, organic soils and other sources.

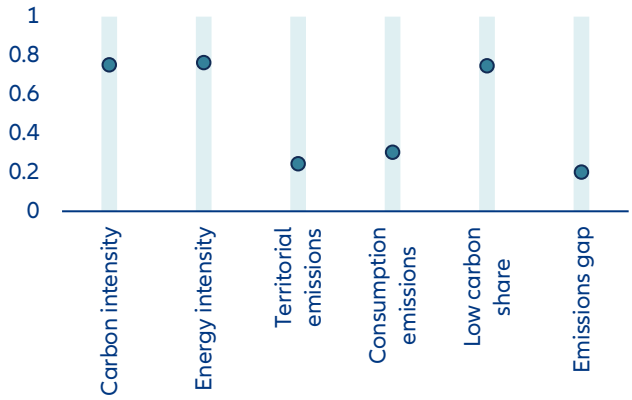
Figure 20: a) Climate performance indicators and b) percentile rank of the country for each indicator

a)



Indicator	Unit	2015	latest
Carbon intensity	tCO2/USD mn	284.58	162.93
Energy intensity	PJ/USD bn	4.15	2.58

b)



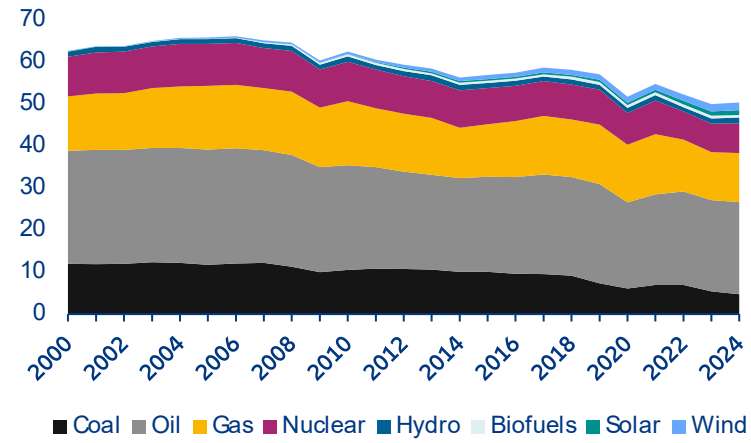
Sources: Allianz Research based on JRC EDGAR, Energy Institute, Global Carbon Budget, World Bank, IRENA, NGFS

From the perspective of energy supply, Europe has made notable progress toward a more sustainable and diversified energy system. This transition is particularly visible in the decline of the most carbon-intensive fuels: coal supply has fallen by nearly -60% between 2000 and 2024. However, this progress has not been uniform across all fossil sources. Natural gas consumption has remained broadly unchanged since 2000, reflecting its continued role as both a transition fuel and a source of energy security. Overall, the share of fossil fuels in the EU's total energy supply declined by 6.6pps, from 82.7% in 2000 to 76.1% in 2024 (Figure 21a).

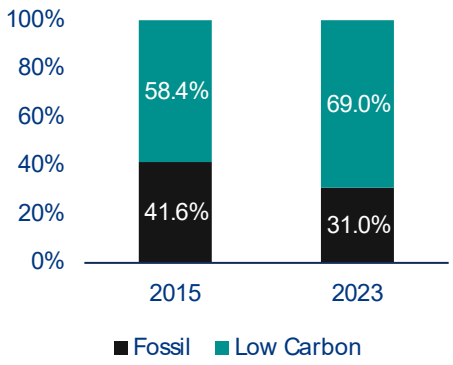
In the electricity mix, the shift is more pronounced. The share of low-carbon electricity – including renewables and nuclear – rose by roughly +11pps between 2015 and 2023 (Figure 21a). Among the five largest EU economies, the share of coal-based power dropped sharply over the same period: -29 pps in the Netherlands, -17pps in Germany and Spain and -11pps in Italy (Figures 21c and 21d). Yet, this progress was partly offset by a rise in gas-fired generation, especially in Italy and Germany, both recording +6pps increases. Italy now generates 45% of its electricity from natural gas, which helps explain its weaker climate performance relative to its peers.

Figure 21: Energy development in Europe: a) Total energy supply (EJ) and b) low carbon share in power mix (%) in the EU-27; c) and d) Electricity generation sources for the EU top five economies in 2015 and 2023, respectively

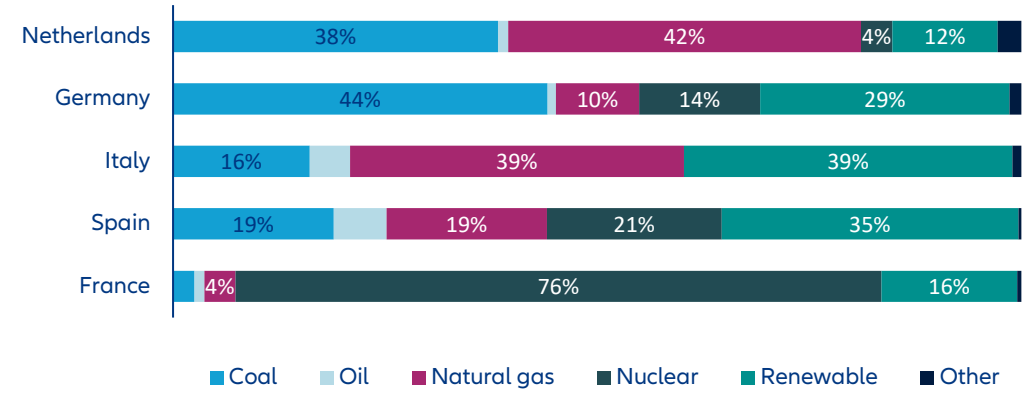
a)



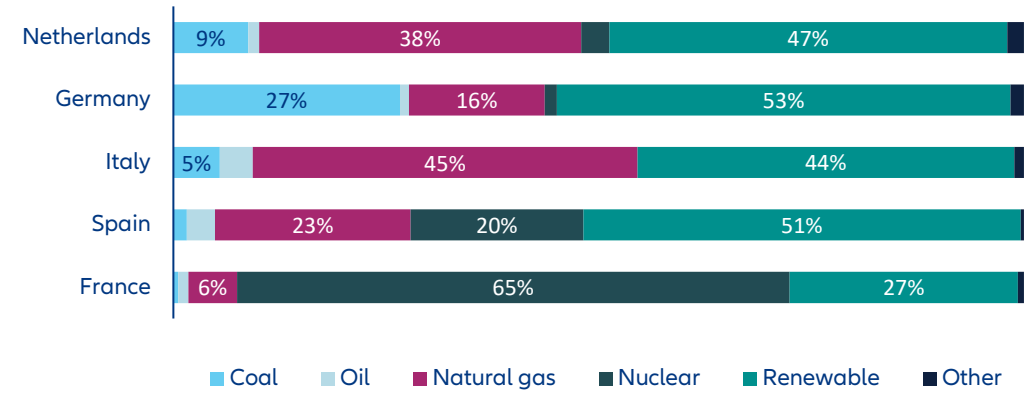
b)



c)



d)



Sources: Allianz Research, Energy Institute, IRENA

Table 4: Key challenges and policy recommendations

Key Challences	Policy Recommendations
Ensuring sustainable and inclusive economic growth through the green transition	1. Implement targeted green industrial policies (e.g., Green Deal Industrial Plan) to scale up clean manufacturing and innovation. 2. Promote circular economy models and digitalization to raise productivity while reducing resource use. 3. Strengthen labour reskilling and social protection programs to ensure a just transition across regions and sectors. 4. Encourage regional cohesion through green investment incentives for lagging areas (e.g., cohesion funds, Just Transition Mechanism).
Accelerating the phase-out of fossil fuels while ensuring energy security and affordability	1. Establish clear, binding timelines for fossil fuel phase-out aligned with the 2030 and 2040 targets. 2. Expand renewable capacity through faster permitting, stronger grid infrastructure, and regional energy integration. 3. Support large-scale electrification of transport, heating, and industry through incentives and infrastructure investment. 4. Ensure social protection mechanisms (e.g., targeted subsidies, energy efficiency programs) to shield vulnerable households from energy cost shocks.
Reducing the material and carbon footprint of consumption and trade	1. Introduce carbon and material footprint reporting for imported goods and strengthen the Carbon Border Adjustment Mechanism (CBAM). 2. Promote sustainable consumption patterns through eco-design standards, repairability regulations, and green labelling. 3. Foster circular value chains across sectors, particularly in construction, textiles, and electronics. 4. Integrate consumption-based emissions into EU climate accounting to reflect Europe's global environmental footprint.
Mobilizing and aligning finance for climate action and a just transition	1. Expand green public investment via the European Investment Bank and national promotional banks. 2. Strengthen the EU Taxonomy and Green Bond Standards to channel private finance toward sustainable projects. 3. Redirect fossil fuel subsidies and ETS revenues to climate innovation, adaptation, and social transition funds. 4. Enhance international climate finance to support developing partners and global mitigation efforts, reinforcing the EU's climate diplomacy.

Source: Allianz Research

Box 2: EU carbon pricing and competitiveness

Carbon pricing has emerged as a cornerstone of global climate policy, expanding its reach from less than 6% of global emissions in 2005 to nearly 30% by 2025, and generating over USD100bn in annual revenues. This rapid growth has been driven primarily by the proliferation of Emissions Trading Systems (ETSs), which have proven effective in delivering verifiable emission reductions across multiple sectors. At the forefront of this evolution stands the EU Emissions Trading System (EU ETS I) – the world's largest and most established carbon market. It has played a decisive role in driving deep decarbonization of power generation and energy-intensive industries, while simultaneously stimulating investment in low-carbon technologies, renewable energy and innovation. The EU ETS has thus become a benchmark for other regions, demonstrating how market-based instruments can align economic incentives with long-term climate objectives.

The EU carbon market is set for a major expansion with the introduction of ETS II, which will extend carbon pricing to additional sectors such as buildings, road transport and smaller emitters currently outside the scope of ETS I. This reform aims to overcome one of the key limitations of the existing system – its narrow sectoral coverage – by broadening the carbon price signal to end-use sectors where emissions have so far proven more resistant to decline. The integration of ETS I and ETS II is expected to transform the EU carbon market into a more comprehensive and influential instrument for decarbonization. The combined market value is projected to increase from around EUR85bn in 2024 to nearly EUR300bn by 2030, driven by both the inclusion of new sectors and a rising carbon price, which could exceed EUR140 per ton by the end of the decade.

To safeguard Europe's climate ambition while preserving industrial competitiveness, the EU Carbon Border Adjustment Mechanism (CBAM) will become fully operational in 2026. Under this system, importers of carbon-intensive goods, including steel, cement, fertilizers, aluminum, electricity and hydrogen, will be required to purchase CBAM certificates corresponding to the embedded CO_2 emissions of their products. By assigning a carbon cost to imports from countries with less stringent climate policies, the CBAM aims to prevent carbon leakage, protect EU industries and ensure a level playing field with domestic producers covered by the EU Emissions Trading System (EU ETS). The mechanism is closely aligned with the gradual phase-out of free ETS allowances between 2026 and 2034, ensuring that both importers and EU producers are exposed to comparable carbon prices. This transitional approach provides industries with the necessary time to adapt, innovate and decarbonize, while reinforcing the EU's leadership in establishing a fair and globally coherent carbon pricing framework.

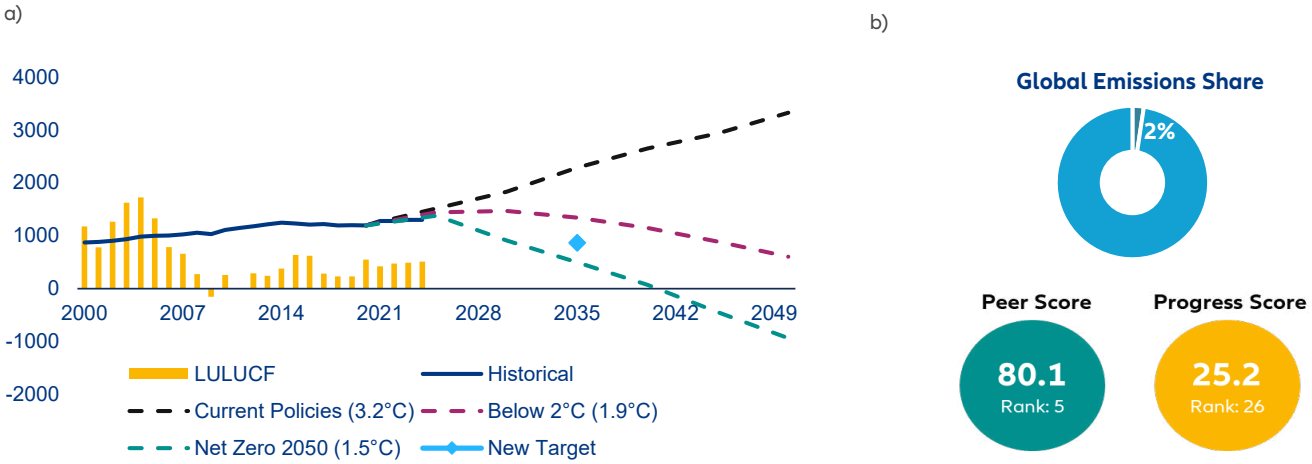
Beyond creating a level playing field, the CBAM serves as a powerful incentive for foreign producers to adopt carbon pricing mechanisms and cleaner production technologies, thereby reinforcing global climate ambition. To mitigate potential competitiveness concerns, the EU may introduce transitional measures, such as phased free allowances for importers that meet specific emissions benchmarks or export rebates for EU firms operating in markets without equivalent carbon pricing. By combining the CBAM with such adaptive policies, the EU seeks to establish a predictable and equitable framework that both accelerates global decarbonization and stimulates investment in low-carbon innovation. This balanced approach is designed to maintain industrial competitiveness, investor confidence and public support for the EU's broader climate transition agenda.

Brazil – Energy and forests at the heart of climate action

As the host of this year's COP30, Brazil, the world's sixth-largest emitter and home to one of the planet's largest carbon sinks, plays a central role in global climate-change mitigation. Among G20 economies, the country stands out for its comparatively clean energy supply, with around one-third of total energy coming from renewable sources. Its electricity mix, dominated by hydropower and complemented by a growing share of wind and solar, ensures that over 91% of power generation comes from low-carbon sources, while its potential as a biofuel producer positions Brazil to contribute to decarbonizing hard-to-abate sectors such as aviation and shipping. At the same time, significant challenges remain. Despite recent progress in forest protection, including a -32% reduction in deforestation across its biomes in 2024 compared with the previous year, Brazil still loses more than 1.2mn hectares of forest annually. This highlights that the success of the country's green transition will depend heavily on sustaining forest conservation and further reducing land-use emissions. Balancing these opportunities and constraints will be crucial to aligning Brazil's economic development with its climate ambitions.

Brazil's recent emission trends indicate the potential for a structural shift in its decarbonization trajectory, though sustained climate leadership beyond COP30 will be essential to remain on course. In recent years, the country's non-land-use emissions have largely stagnated, placing Brazil broadly in line with the five-year net-zero pathway projection (Figure 22a). This trend reflects a mix of factors, most notably slower economic growth over the past decade, but also steady progress in expanding renewable energy and lowering the carbon intensity of the energy system. Over the last ten years, Brazil has increased its combined wind and solar capacity from 7.6 GW to more than 85 GW, driving much of the 15pps rise in low-carbon power generation (Figure 24). These developments have helped to slow emissions growth relative to economic output and gradually shift the country's emissions profile. Unlike most of the world's top emitters, where the power sector dominates, in Brazil agriculture now represents the largest source of greenhouse gases (53%). This highlights that the next phase of the country's transition will depend as much on sustainable land use and agricultural innovation as on continued advances in clean energy.

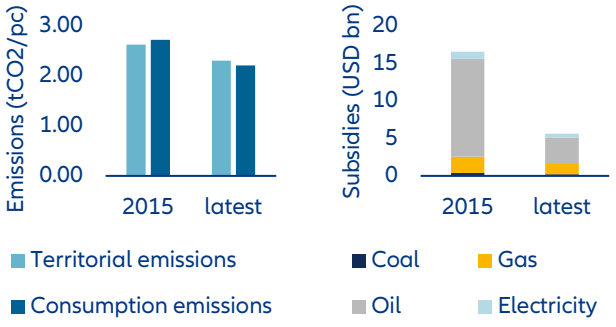
Figure 22: a) Historical emission & decarbonization pathways (MtCo2eq,) and b) climate performance indicators



Sources: Allianz Research based on JRC EDGAR, NGFS and UNEP; NGFS climate scenarios represent a 67% probability of not exceeding the following global warming thresholds by 2100: Current Policies (3.2°C), 2°C Scenario (1.9°C), and Net Zero 2050 (1.5°C). LULUCF (land use, land-use change and forestry) emissions include those from deforestation, fires, forest land, organic soils and other sources. Depicted Climate pathways exclude LULUCF developments while Brazil's target includes them. A direct comparison would is assume climate neutral LULUCF emissions by 2035.

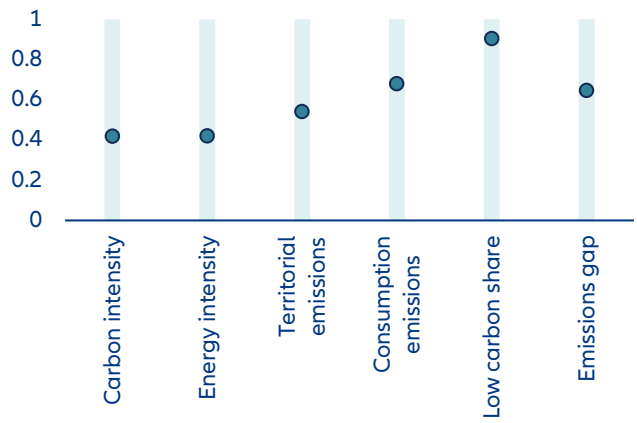
Figure 23: a) Climate performance indicators and b) percentile rank of the country for each indicator

a)



Indicator	Unit	2015	latest
Carbon intensity	tCO2/USD mn	333.11	311.90
Energy intensity	PJ/USD bn	5.47	4.62

b)



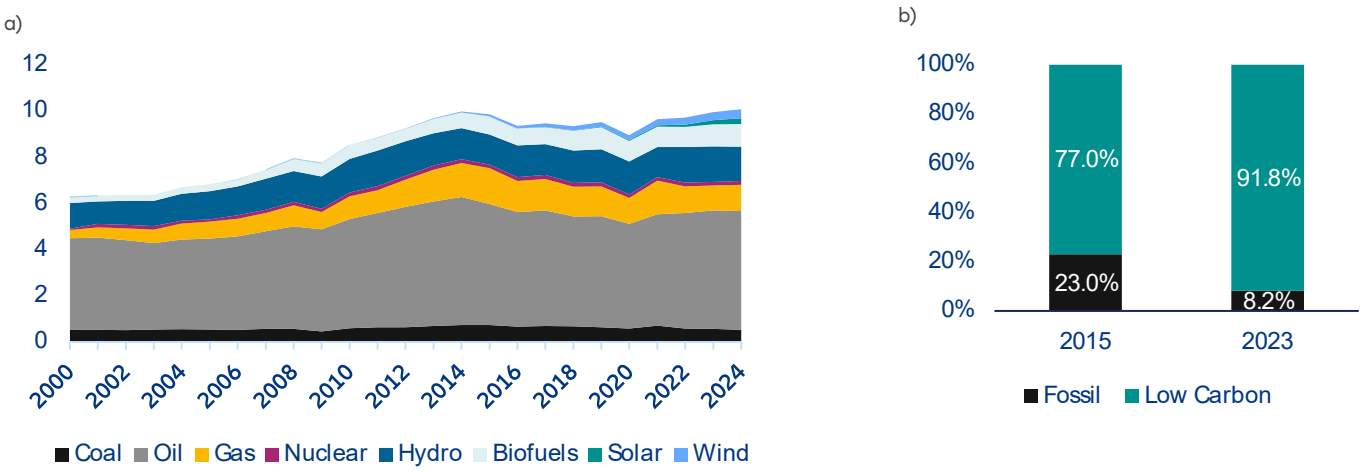
Sources: Allianz Research based on JRC EDGAR, Energy Institute, Global Carbon Budget, World Bank, IRENA, NGFS

In our climate score analysis, Brazil ranks 5th in the peer score, reflecting its strong relative position, while its progress score ranking of 26th highlights a more moderate pace in the energy transition. The country has achieved notable gains in decarbonizing electricity generation, but the next phase will need to focus on improving energy efficiency and shifting more energy demand toward electricity to reduce reliance on fossil fuels (Figure 23a). Territorial and consumption emissions per capita remain relatively low at 2.3 and 2.2 tCO2/pc, respectively, but could rise as Brazil returns to a higher growth trajectory. This underscores that mid- to long-term decarbonization will require attention to demand-side factors, including the rollout of energy-efficient technologies, expanded electrification in transport and industry and measures to optimize industrial and residential energy use, in order to sustain low-carbon growth while supporting economic development.

The key challenge for Brazil in meeting its climate targets lies in reducing land-use emissions, primarily by curbing deforestation. Successfully achieving its zero-deforestation goal would unlock the vast carbon sequestration potential of Brazil's tropical forests, making a major contribution to reaching climate neutrality by 2050. Even if Brazil attains a net-neutral balance in its land-use, land-use change and forestry (LULUCF) emissions – where the carbon absorbed by forests offsets the emissions from deforestation and wildfires – it could reduce the required emission cuts in other sectors to roughly one-third over the next decade, helping the country stay on a pathway consistent with limiting warming to well below 2°C. However, a growing risk is the increasing role of wildfires, which accounted for approximately 50% of tree cover loss in 2024, highlighting the need for effective forest management and fire prevention alongside deforestation control (Figure 25).

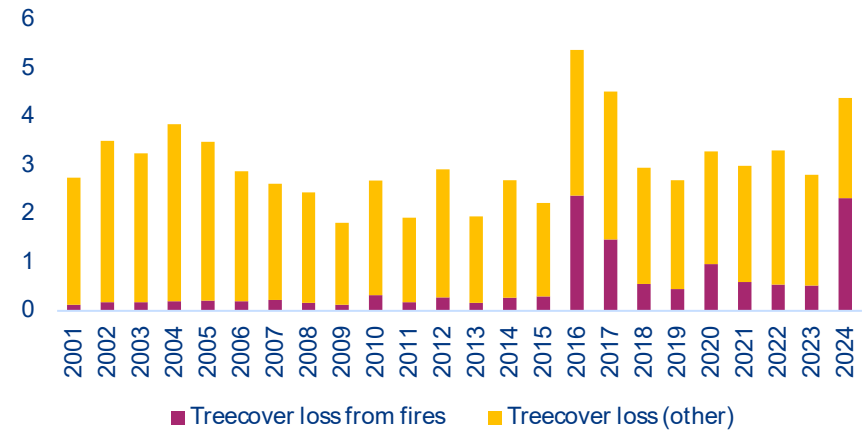
Looking ahead, Brazil's climate outlook will be shaped by its policy commitments and structural reforms. Brazil's ambitious GHG reduction targets (59–67% by 2035), the planned SBCE emissions trading system and the proposed Tropical Forests Forever Facility (TFFF) provide a strong policy framework to guide these efforts. If effectively implemented, these initiatives could position Brazil as both a regional and global climate leader, combining domestic mitigation with forest protection and international climate cooperation. However, Brazil faces multiple risks that could slow progress – including wildfires, economic pressures, governance challenges and the country's heavy reliance on hydropower, which is increasingly vulnerable to climate-driven droughts – underscoring the need to accelerate diversification toward wind, solar and other renewable sources.

Figure 24: a) Total energy supply (EJ), and b) low carbon share in power mix (%)



Sources: Allianz Research, Energy Institute, IRENA

Figure 25: Tree cover loss in Brazil (in million hectares)



Source: Global Forest Watch

Table 5: Key challenges and policy recommendations

Key Challenges	Policy Recommendations
Reducing land-use emissions and deforestation	Enforce zero-deforestation policies, expand sustainable land use, and strengthen wildfire management
Maintaining low-carbon growth amid rising energy demand	Improve energy efficiency, expand electrification in transport and industry, scale up renewables, and diversify the power mix to reduce reliance on climate-sensitive hydropower
Managing industrial and agricultural emissions	Promote energy-efficient technologies, sustainable farming, and clean biofuel deployment
Financing climate action	Implement SBCE emissions trading, expand green finance instruments, and mobilize private and public funding

Source: Allianz Research

Appendix

A1 – Climate Transition Scores

		Peer Score					
Rank	Region	Carbon Intensity	Energy Intensity	Consumption Emissions	Territorial Emissions	Low Carbon Share	Final Score
1	Sri Lanka	84.5	100.0	90.2	92.1	49.1	83.2
2	Sweden	91.0	85.1	62.0	69.4	100.0	81.5
3	Colombia	70.1	94.9	88.4	82.3	67.8	80.7
4	Portugal	85.2	98.6	72.6	69.0	76.9	80.5
5	Brazil	57.0	83.7	87.5	79.9	92.7	80.1
6	France	87.7	86.4	64.4	64.7	93.4	79.3
7	Romania	83.3	100.0	74.0	68.4	69.8	79.1
8	Peru	74.2	92.3	88.9	85.5	53.8	78.9
9	Denmark	89.8	100.0	53.6	59.4	89.4	78.5
10	Switzerland	94.0	100.0	20.4	67.5	100.0	76.4
11	Lithuania	79.4	99.4	54.0	61.5	87.0	76.3
12	Latvia	79.1	100.0	52.8	69.4	78.5	75.9
13	Pakistan	46.9	91.0	94.4	94.0	53.3	75.9
14	Ecuador	59.5	80.3	85.0	79.8	74.1	75.8
15	Spain	84.9	90.7	66.7	59.4	73.3	75.0
16	Bangladesh	80.6	100.0	95.2	94.6	2.1	74.5
17	Croatia	78.7	95.5	65.7	60.0	70.9	74.2
18	Norway	87.1	90.8	52.0	37.2	99.9	73.4
19	Hungary	79.8	88.1	60.4	62.9	72.7	72.8
20	Philippines	70.1	92.1	90.9	88.0	22.4	72.7
21	United Kingdom	87.0	97.7	55.4	60.5	62.7	72.7
22	Chile	73.6	83.4	71.9	64.0	63.8	71.3
23	Austria	84.7	94.9	42.7	42.9	87.0	70.4
24	Slovakia	76.5	76.9	56.0	49.7	86.1	69.0
25	Egypt	73.7	93.7	86.4	79.3	11.9	69.0
26	Finland	79.9	69.8	45.7	49.7	95.6	68.1
27	Italy	85.2	97.3	57.4	52.8	45.6	67.7
28	Slovenia	78.0	85.9	42.8	52.6	77.7	67.4
29	Greece	75.9	84.0	72.1	53.5	49.8	67.1
30	India	57.7	81.1	90.2	81.5	22.9	66.7
31	Türkiye	74.5	88.0	71.0	55.1	42.9	66.3
32	Ukraine	53.0	63.4	74.4	68.1	71.9	66.1
33	Morocco	57.2	81.5	88.3	83.9	19.1	66.0
34	Bulgaria	71.5	76.3	63.9	50.3	65.9	65.6
35	Argentina	57.5	81.5	77.5	62.8	46.9	65.2
36	Ireland	88.5	100.0	47.0	42.3	46.7	64.9
37	Indonesia	55.4	81.6	87.2	77.2	18.7	64.0
38	Viet Nam	43.9	73.6	86.9	67.2	45.3	63.4
39	New Zealand	58.2	66.1	53.5	49.3	88.5	63.1
40	Mexico	67.7	79.9	77.1	67.8	22.3	62.9
41	Germany	83.8	94.8	41.8	36.7	56.7	62.8
42	Luxembourg	89.0	100.0	20.0	6.2	97.5	62.5
43	Netherlands	85.9	87.2	45.5	40.9	51.6	62.2
44	Cyprus	75.3	89.6	70.0	52.6	20.7	61.6
45	Thailand	62.9	72.3	77.7	67.5	21.6	60.4
46	Israel	78.8	93.7	51.7	49.8	12.0	57.2
47	Azerbaijan	64.7	72.1	77.9	62.0	7.3	56.8
48	Czechia	74.4	81.2	39.5	29.7	56.1	56.2
49	Hong Kong	90.7	94.4	29.1	60.3	1.0	55.1
50	Belgium	81.5	76.1	0.0	37.0	75.9	54.1
51	Poland	71.7	88.3	50.0	29.7	28.7	53.7
52	Estonia	66.3	71.5	39.1	34.9	50.1	52.4
53	Japan	75.3	78.4	43.2	29.2	33.5	51.9
54	Belarus	54.3	52.5	61.6	45.3	34.3	49.6
55	Malaysia	62.5	60.9	55.9	26.0	20.4	45.1
56	Canada	54.6	40.1	23.4	0.0	81.1	39.8
57	China	35.0	46.1	57.5	24.4	35.8	39.8
58	United States of Amer	68.9	66.2	2.0	0.0	40.8	35.6
59	Australia	49.5	70.2	23.1	0.0	34.2	35.4
60	South Africa	6.9	32.0	72.0	44.4	14.9	34.0
61	Kazakhstan	37.2	57.8	51.7	0.0	12.9	31.9
62	Singapore	88.6	46.0	0.0	16.6	3.3	30.9
63	Iran	0.0	0.0	59.4	24.4	6.1	18.0
64	Saudi Arabia	46.9	35.6	0.0	0.0	1.5	16.8
65	United Arab Emirates	50.8	0.5	0.0	0.0	28.6	16.0
66	Qatar	27.3	0.0	0.0	0.0	3.6	6.2
67	Oman	2.8	0.0	9.8	0.0	5.0	3.5
68	Trinidad and Tobago	0.0	0.0	9.7	0.0	0.1	1.9
69	Kuwait	0.0	0.0	0.0	0.0	0.2	0.0

Rank	Region	Progress Score					Final Score
		Carbon Intensity	Energy Intensity	Consumption Emissions	Territorial Emissions	Low Carbon Share	
1	Luxembourg	37.99	100.00	29.13	36.19	91.75	59.0
2	Switzerland	32.83	100.00	20.76	21.52	100.00	55.0
3	Denmark	41.93	100.00	7.77	26.07	67.18	48.6
4	Portugal	39.81	90.61	5.58	30.65	54.27	44.2
5	Estonia	55.57	51.47	23.74	39.27	40.80	42.2
6	Lithuania	37.01	93.53	0.00	3.20	73.18	41.4
7	Ireland	50.86	100.00	7.82	21.39	24.58	40.9
8	United Kingdom	38.55	83.59	15.37	31.69	29.52	39.7
9	Sweden	26.75	39.75	10.12	22.03	100.00	39.7
10	Norway	28.76	40.31	15.22	19.77	85.71	38.0
11	Latvia	24.18	100.00	0.00	5.69	56.33	37.2
12	Netherlands	43.73	58.67	6.31	31.55	41.84	36.4
13	Romania	35.42	100.00	0.00	8.91	27.65	34.4
14	Finland	29.76	19.96	7.30	30.03	78.35	33.1
15	Germany	33.84	70.60	8.79	27.72	20.85	32.4
16	Israel	30.00	70.73	13.48	24.93	10.09	29.8
17	Bulgaria	43.97	52.99	0.00	19.09	31.11	29.4
18	Spain	33.06	45.57	5.51	21.63	38.20	28.8
19	New Zealand	28.10	35.16	4.71	26.77	38.61	26.7
20	Ukraine	29.44	46.26	0.00	26.38	30.11	26.4
21	Bangladesh	30.45	100.00	0.00	0.00	0.08	26.1
22	Austria	24.36	48.97	4.52	16.58	35.81	26.0
23	Czechia	38.29	50.67	0.00	20.98	19.72	25.9
24	Greece	34.58	34.03	6.83	24.59	29.27	25.9
25	Slovenia	31.50	47.21	0.00	19.41	28.54	25.3
26	Brazil	6.71	20.12	19.32	12.54	67.15	25.2
27	Belgium	29.15	31.17	6.79	21.36	36.92	25.1
28	Italy	24.97	72.98	2.85	11.55	9.59	24.4
29	Hong Kong	29.68	65.16	2.57	23.14	0.92	24.3
30	Cyprus	30.67	61.70	5.51	6.79	12.96	23.5
31	Poland	36.36	57.92	0.00	4.27	16.72	23.1
32	Hungary	29.93	48.77	0.00	11.95	24.48	23.0
33	Australia	20.58	33.22	17.90	14.83	24.03	22.1
34	Japan	24.25	28.69	8.96	17.58	21.18	20.1
35	Sri Lanka	0.00	100.00	0.00	0.00	0.00	20.0
36	France	29.63	45.73	3.49	20.17	0.00	19.8
37	Slovakia	28.23	31.58	0.00	11.14	27.35	19.7
38	Croatia	24.08	61.68	0.00	0.00	9.14	19.0
39	Pakistan	9.57	54.13	0.00	3.94	25.86	18.7
40	Egypt	21.87	61.00	3.73	0.00	3.84	18.1
41	United States of Amer	26.54	30.30	6.77	12.73	11.27	17.5
42	United Arab Emirates	17.50	0.55	12.82	17.38	28.40	15.3
43	Türkiye	18.27	31.68	5.18	0.00	15.58	14.1
44	Canada	15.88	23.05	13.48	13.56	3.78	14.0
45	South Africa	7.76	18.20	13.53	6.78	20.69	13.4
46	Chile	15.98	4.59	0.00	10.22	35.61	13.3
47	Ecuador	6.65	0.00	9.76	4.50	44.83	13.1
48	China	27.46	25.43	0.00	0.00	11.69	12.9
49	Saudi Arabia	12.21	20.96	13.90	13.42	1.48	12.4
50	India	21.05	29.74	0.00	0.00	5.20	11.2
51	Trinidad and Tobago	6.01	14.10	9.67	25.32	0.01	11.0
52	Thailand	10.99	23.27	0.00	6.21	11.87	10.5
53	Singapore	15.19	18.65	0.00	16.57	1.67	10.4
54	Malaysia	19.24	22.26	0.00	0.00	10.34	10.4
55	Argentina	0.00	5.84	15.24	4.06	25.17	10.1
56	Kazakhstan	5.22	0.00	23.44	18.63	2.70	10.0
57	Belarus	14.65	0.00	0.00	0.98	33.72	9.9
58	Mexico	10.16	17.84	11.13	6.00	3.79	9.8
59	Colombia	6.56	8.12	12.45	0.00	7.14	6.9
60	Philippines	6.21	25.65	0.00	0.00	0.00	6.4
61	Kuwait	0.00	0.00	5.12	15.58	0.19	4.2
62	Viet Nam	0.00	0.00	0.00	0.00	13.97	2.8
63	Morocco	4.95	0.00	0.00	0.00	3.30	1.7
64	Oman	0.00	0.00	0.78	1.33	4.97	1.4
65	Peru	1.25	0.00	3.68	0.00	1.53	1.3
66	Indonesia	0.00	0.00	0.00	0.00	5.53	1.1
67	Qatar	0.00	0.68	0.63	0.00	3.32	0.9
68	Azerbaijan	2.72	0.00	0.53	0.00	0.00	0.6
69	Iran	0.00	0.00	2.72	0.00	0.00	0.5

A2 – Transition score methodology

Transition Peer Score

Peer scores measure how far a country's current performance (C) is from its 2050 Net Zero target (NZ), benchmarked against the worst-performing peers for the same indicator. The score is normalized on a scale from 0 to 100, where:

- 0 represents the performance of the worst peers, and
- 100 represents achievement of the Net Zero target

Case 1: Lower values are better (LB)
Applies to: Carbon intensity, energy intensity, territorial emissions per capita and consumption emissions per capita.
For indicators where a lower value means better performance, the peer score is benchmarked against the 90th percentile of the worst performers (W_{90}) and calculated as

$$Peer\ Score\ (LB) = \begin{cases} 0, & if\ C \geq W_{90} \\ \left[1 - \frac{C - NZ}{W_{90} - NZ}\right] * 100, & if\ NZ < C < W_{90} \\ 100, & if\ \ C \leq NZ \end{cases}$$

Case 2: Higher values are better (HB)
Applies to: Low-carbon power share.
For indicators where a higher value means better performance, the peer score is benchmarked against the worst performer (W) and calculated as

$$Peer\ Score\ (HB) = \begin{cases} 0, & if\ C \leq W \\ \left[1 - \frac{NZ - C}{NZ - W}\right] * 100, & if\ W < C < NZ \\ 100, & if\ \ C \geq NZ \end{cases}$$

Transition Progress Score

Progress scores measure how much a country has advanced toward its 2050 Net Zero target (NZ) relative to its own 2015 baseline (C_{2015}). They assess in-country improvement over time, rather than performance compared to peers. Scores are expressed on a 0–100 scale, where:

- 0 means no improvement since 2015 (or regression), and
- 100 means the 2050 target has been achieved or surpassed.

Case 1: Lower values are better (LB)

$$Progress\ Score\ (LB) = \begin{cases} 0, & if\ C \geq C_{2015}\ and\ C > NZ \\ \left[1 - \dfrac{C - NZ}{C_{2015} - NZ}\right] * 100, & if\ NZ < C < C_{2015} \\ 100, & if\ \ C \leq NZ \end{cases}$$

Case 2: Higher values are better (HB)

$$Progress\ Score\ (HB) = \begin{cases} 0, & if\ C \leq C_{2015}\ and\ C < NZ \\ \left[1 - \dfrac{NZ - NZ}{NZ - C_{2015}}\right] * 100, & if\ C_{2015} < C < NZ \\ 100, & if\ \ C \geq NZ \end{cases}$$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Forward looking statements

The statements contained herein may include prospects, statements of future expectations and other forward-looking statements that are based on management's current views and assumptions and involve known and unknown risks and uncertainties. Actual results, performance or events may differ materially from those expressed or implied in such forward-looking statements.
Such deviations may arise due to, without limitation, (i) changes of the general economic conditions and competitive situation, particularly in the Allianz Group's core business and core markets, (ii) performance of financial markets (particularly market volatility, liquidity and credit events), (iii) frequency and severity of insured loss events, including from natural catastrophes, and the development of loss expenses, (iv) mortality and morbidity levels and trends, (v) persistency levels, (vi) particularly in the banking business, the extent of credit defaults, (vii) interest rate levels, (viii) currency exchange rates including the EUR/USD exchange rate, (ix) changes in laws and regulations, including tax regulations, (x) the impact of acquisitions, including related integration issues, and reorganization measures, and (xi) general competitive factors, in each case on a local, regional, national and/or global basis. Many of these factors may be more likely to occur, or more pronounced, as a result of terrorist activities and their consequences.

No duty to update

The company assumes no obligation to update any information or forward-looking statement contained herein, save for any information required to be disclosed by law.