Energy&Climate
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and climate change

ANALYSIS REPORT

10 Years Post-Paris:

How emissions decoupling has progressed globally

December 2025

Executive summary

Global CO_2 emissions are still rising, but this masks a striking shift beneath the surface: an increasing share of the world economy is now managing to grow while cutting CO_2. Decoupling — breaking the link between economic growth and emissions — is no longer theoretical. It is happening at scale.

Using the latest 2025 Global Carbon Budget data, and a more detailed classification system than previous studies, we assess decoupling across **113 countries representing over 97% of global GDP and 93% of global emissions**. Our approach evaluates not just the number of countries decoupling, but their share of global economic output and emissions, and tracks progress across multiple time periods.

In the decade before the Paris Agreement, 32 countries absolutely decoupled emissions from GDP, with 35 more achieving relative decoupling. In the post-Paris decade (2015–2023), these numbers grew to 43 and 40 countries respectively.

Today, countries responsible for 46.3% of global GDP and 36.1% of global emissions have absolutely decoupled. Overall, 92% of global GDP and 89% of global emissions are in economies that have decoupled, either relatively or absolutely, up from 77% for both in the decade before the Paris Agreement (2006–2015).

Countries once increasing emissions faster than GDP have made especially strong progress. A large share of '**Improvers**' moved from expansive recoupling to **absolute decoupling,** a turnaround visible in advanced economies and in major emitters across Latin America, Africa and the Middle East. At the same time, a small number of countries have slipped backwards, either due to rapid industrialisation or stagnating growth.

Our sensitivity analysis shows that these results are robust to shifts in the time window. While year-to-year fluctuations — particularly during the COVID pandemic — drive temporary movements between states, the longer-term trend is consistent: **more countries are decoupling, and they represent a rising share of the world economy**.

The global totals still matter most because climate change is a global problem. But at the country level, the momentum is clear: **decoupling is growing more widespread**.

Achieving global net zero CO_2 requires bending the global curve into a sustained, structural decline. These results show that many economies are already bending their own curves — and that the foundations for accelerated absolute emission reductions, not just decoupling, are in place.

Introduction

Emissions decoupling describes the extent to which an economy can grow without increasing its carbon emissions. It matters because, in a world where global emissions are still rising, breaking the link between GDP and CO2 is essential for achieving climate goals without suppressing economic development.

Over the past two decades, global emissions have risen steadily, but this aggregate trend masks important differences between countries. Many individual economies — especially in the global North — have shown that it is possible to reduce emissions while continuing to grow. Previous studies, including work by the Breakthrough Institute and Our World in Data, have demonstrated clear evidence of both absolute and relative decoupling in multiple advanced economies.[1]

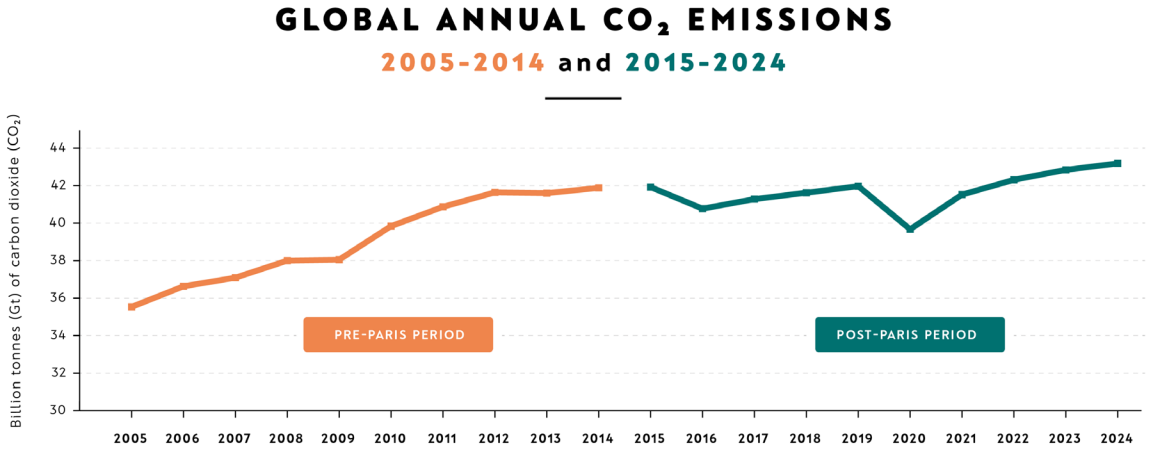


Figure 1: Global CO_2 emissions for the pre- and post-Paris periods, including emissions from land use change

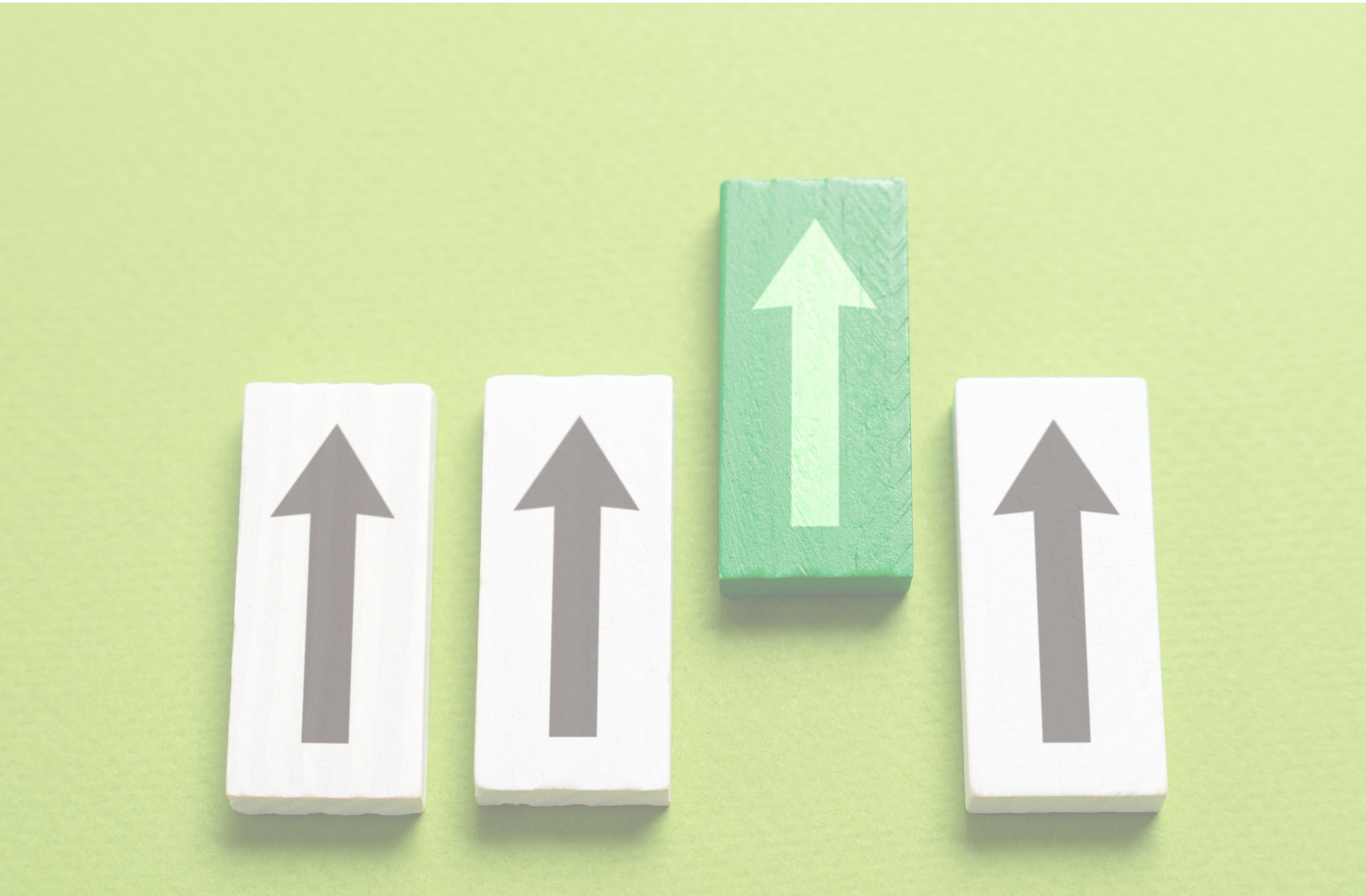
Our analysis builds on this literature in five ways. First, we update earlier studies with the latest Global Carbon Budget data. Second, we introduce a more detailed classification system that goes beyond the binary distinction between absolute and relative decoupling, allowing a more nuanced interpretation of country trajectories. Third, we describe decoupling not only in terms of the number of countries involved but also as shares of global GDP and emissions, providing a clearer sense of the scale of progress. Fourth, we enable like-for-like comparisons across different time periods. Finally, we examine every country individually across these timeframes, allowing progress towards — or away from — decoupling to be tracked at the national level.

Decoupling as a metric of progress on climate action is not without critics. Some analyses highlight that observed cases can be geographically limited, temporary or sensitive to whether emissions are measured on a territorial or consumption basis, and may be influenced by rebound effects or the shifting of impacts through trade *(Parrique et al., 2019)*.

1 For example, by The Breakthrough Institute's 'Absolute decoupling of economic growth and emissions in 32 countries' (2021) and Our World in Data's 'Many countries have decoupled economic growth from CO_2 emissions, even if we take offshored production into account' (2021).

The Intergovernmental Panel on Climate Change (IPCC) notes that 'there has been a long-standing discussion on whether environmental impacts such as carbon emissions and use of natural resources can be decoupled from economic growth', and emphasises that 'it is controversial whether absolute decoupling can be achieved at a global scale'. It also finds that while some countries have sustained emission reductions, 'the total reduction in annual GHG emissions of these countries is small… compared to global emissions growth observed over the last decades', underscoring the challenge of aligning decoupling trends with 'well below 2°C' Paris-aligned pathways (*Dhakal, 2022*).

Nevertheless, the IPCC recognises that decoupling can signal meaningful structural change, noting that a growing number of countries have achieved sustained emission reductions for more than a decade, and that a few have done so at rates broadly consistent with pathways that limit heating to well below 2°C.



Methodology

This analysis uses national emissions data from the Global Carbon Budget (GCB), which reports annual emissions from fossil fuel combustion and cement production for 214 countries. The latest dataset, released in November 2025, reports emissions in megatonnes of carbon; we convert these values to carbon dioxide (CO_2) using a factor of 3.664.

GCB provides both **territorial emissions (TE)** and **consumption-based emissions (CBE)** data. TE covers all emissions released within a country's borders. CBE adjusts this by adding the carbon embodied in imported goods and subtracting the carbon embodied in exports, giving a clearer view of emissions that have been offshored. For example, emissions from goods produced in China but consumed in the UK are attributed to the UK under the CBE approach. This measure, therefore, gives a fuller picture of the emissions associated with domestic economic activity.

GCB's TE data runs to 2024 and cover all 214 countries; its CBE data runs to 2023 and covers 120 countries, accounting for **94.3%** of global emissions.[2] [3]

We supplement this emissions data the World Bank's *World Development Indicators* dataset. GDP is expressed in Purchasing Power Parity (PPP)[4] terms (so normalised for differences in purchasing power between countries), in 2017 constant international dollars to allow for comparisons across time and countries. Latest national population figures come from the World Bank.[5]

Countries with a population size of less than one million are excluded from the analysis because these smaller economies may not be representative of the larger, more complex economies which drive the vast majority of global emissions — 67 small countries are therefore removed from the data for calculating decoupling statistics. Despite this exclusion, the territorial-based emissions dataset still covers 99.4% of global GDP and 95.5% of 2024 global emissions. The consumption-based emissions dataset covers 97.1% of global GDP and 93.1% of 2023 global emissions.

Previous decoupling studies use various methods to classify country trajectories. Some,

2 Throughout this report we use 'global emissions' to mean total CO_2 emissions as reported by GCB 2025, including bunker fuels from international shipping and aviation. This gives the fullest possible picture of global emissions. Because there is no internationally agreed method for assigning bunker fuel emissions to 'responsible' countries, we do not allocate them to any of the six decoupling states. In 2024, bunker fuels made up 3.1% of global CO_2 emissions. This share varies slightly year to year but has remained between 2.4% and 3.4% since 2000. As a result, when we report results 'as a share of total global emissions' in year n, the maximum possible value sits between 96.6% and 97.6%, depending on the bunker fuels share in that year.

3 Panama is also excluded due to inconsistencies in emissions data. In 2023 it accounted for 0.05% of global emissions.

4 The World Bank GDP series identifier (WDI) is NY.GDP.MKTP.PP.KD.

5 The World Bank population identifier is SP.POP.TOTL.

including from the Breakthrough Institute[6] use a variant of the OECD's 'decoupling factor model', which enables the identification of countries which have relatively or absolutely decoupled, based on emissions and GDP growth over a defined period. This method is intuitive but sensitive to data bias as the selection of start and end years can have a significant impact on the results. Others follow the Tapio decoupling index approach[7], which looks at the ratio between the annual growth *rates* of each variable to arrive at a 'decoupling index' value, which enables the classification of countries into a taxonomy of decoupling 'states'.[8] For this analysis, we take a hybrid approach combining elements of both, enabling the presentation of clear long-term trend identification, while accounting for the sensitivity of the results to period selection.

Our calculation and classification taxonomy follows the work of Hong Wang,[9] whereby a decoupling index (DI) value is calculated as the ratio between a calculated emissions index (EI) and growth index (GI). The emissions and growth indices respectively are values reflecting the growth rate of emissions or GDP growth over a given period (Emissions or GDP in year n / Emissions or GDP in year 0).

The calculated decoupling index (DI) value allows a straightforward result; DI values below 1 indicate that emissions have grown more slowly than GDP — i.e. decoupling has occurred —while DI values above 1 indicate 'recoupling'. The combination of EI and GI values allows each country to be assigned to one of six states, shown in **Figure 2**.

Taxonomy of decoupling states

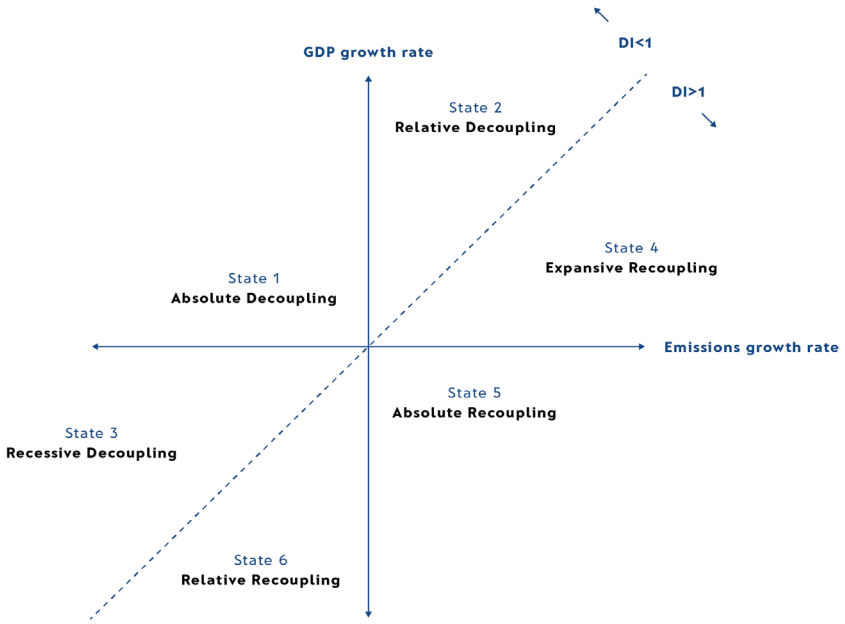


Figure 2: *Taxonomy of six decoupling states, showing how combinations of GDP and emissions growth rates map to absolute or relative decoupling, recessive decoupling, and expansive or absolute recoupling via the decoupling index (DI).*

6 The Breakthrough Institute, 'Absolute decoupling of economic growth and emissions in 32 countries' (2021)

7 Petrii Tapio, 'Towards a theory of decoupling' (2005)

8 Yan Song et al., 'Study on the decoupling relationship between CO2 emissions and economic development based on two-dimensional decoupling theory' (2019)

9 Hong Wang, 'Decoupling Measure between Economic Growth and Energy Consumption of China' (2011)

From an emissions and development perspective, **absolute decoupling** — falling emissions alongside positive economic growth — is the optimum outcome. **Relative decoupling** occurs when emissions rise but more slowly than GDP. At the opposite end of the spectrum is **absolute recoupling**, where emissions rise while GDP falls. This state is rare but can appear during periods of acute economic stress, such as during the 2020 COVID pandemic economic downturn.

Results

Our analysis shows that a significant and growing number of countries — representing an increasing share of both global GDP and CO_2 emissions — have successfully decoupled their emissions from economic growth. Over the full decade prior to the Paris Agreement, using the consumption-based emissions measure, 32 countries achieved absolute decoupling and a further 35 achieved relative decoupling.

In 2015-2023, these numbers rose: **43 countries achieved absolute decoupling** and a further **40 achieved relative decoupling.** In the post-Paris decade, countries responsible for **46.3%** of global economic output and **36.1%** of global emissions have absolutely decoupled their emissions from GDP. Overall, 92.3% of global GDP and 89% of CO_2 emissions are generated in countries that have decoupled in either relative or absolute terms, up from 77.1% and 77.2% respectively in the pre-Paris period (2006-2015).

Table 1 summarises these results for the pre- and post-Paris periods.

Table 1: Decoupling of emissions pre- and post-Paris

Consumption-based emissions	Country count		Percentage of global GDP (PPP)		Percentage of global CO_2 emissions	
	2006 - 2015	*2015 - 2023*	*2006 - 2015*	*2015 - 2023*	*2006 - 2015*	*2015 - 2023*
Absolute decoupling	32	43	38.5%	**46.3%**	32.1%	**36.1%**
Relative decoupling	35	40	38.6%	**46.0%**	45.1%	**52.9%**
Recessive decoupling	6	1	3.4%	0.7%	2.2%	0.5%
Expansive recoupling	40	27	16.4%	3.8%	13.3%	3.1%
Absolute recoupling	0	0	0.0%	0.0%	0.0%	0.0%
Relative recoupling	0	2	0.0%	0.4%	0.0%	0.5%
Totals	113	113	96.8%	**97.1%**	92.7%	**93.1%**

Table 1: *Decoupling outcomes for consumption-based emissions before and after the Paris Agreement (2006–2015 and 2015–2023).*

The movement of countries between decoupling states is shown in **Table 2**. The first column, **Consistent decouplers**, lists countries that have remained in **State 1 (absolute**

decoupling) across both periods. The second column, **Improvers**, lists countries that have newly achieved **absolute decoupling** in 2015-2023, with their previous state shown in brackets. The final column, **Reversals**, list those countries that were absolutely decoupled in 2006-2015 but moved into another state in 2015–2023, again with the new state shown in brackets.

Table 2: Consistent decouplers, improvers and reversals

CONSISTENT DECOUPLERS Absolutely decoupled in both 2006-2015 and 2015-2023	IMPROVERS Did not absolutely decouple in 2006-2015 but did in 2015-2023 (Previous state in brackets)	REVERSALS Absolutely decoupled in 2006-2015 but no longer in 2015-2023 (New state in brackets)
Austria	Albania (State 2)	Azerbaijan (State 4)
Belgium	United Arab Emirates (4)	Dominican Republic (2)
Bulgaria	Australia (2)	Lithuania (2)
Canada	Bahrain (4)	Latvia (2)
Czechia	Belarus (2)	Malawi (4)
Germany	Brazil (4)	New Zealand (2)
Denmark	Switzerland (4)	El Salvador (4)
Spain	Chile (2)	Slovenia (2)
Estonia	Cameroon (4)	Togo (4)
Finland	Colombia (4)	
France	Egypt (4)	
United Kingdom	Greece (3)	
Hungary	Italy (3)	
Ireland	Jordan (4)	
Japan	Kazakhstan (2)	
Netherlands	Mexico (2)	
Norway	Mozambique (4)	
Poland	Namibia (4)	
Romania	Nicaragua (2)	
Slovakia	Portugal (3)	
Sweden	South Africa (2)	
United States		

Table 2: *Countries that maintained, improved or lost absolute decoupling status between 2006-2015 and 2015-2023. Data is based on consumption-based emissions.*

The **Consistent decouplers** include many of the world's largest developed economies; those with the greatest capacity to decarbonise and the highest historic responsibility for emissions. Importantly, these results use consumption-based emissions. This addresses the concern that some Global North countries have 'offshored' their emissions; even when emissions embodied in imports are included, many still show absolute decoupling.

The second column shows that while many **Improvers** previously exhibited relative decoupling (State 2), the largest share moved from expansive recoupling (State 4). This represents a substantial turnaround: emissions that were growing faster than GDP are now falling in absolute terms. This group includes advanced economies in the global north as well as several large economies in Latin America, Africa and the Middle East.

The final column shows the countries that moved out of absolute decoupling (State 1). They fell into either relative decoupling (State 2) or expansive recoupling (State 4). There are potentially two different reasons for these results: rapidly industrialising emerging economies with emissions rising faster than GDP, or lower growth developed economies where emissions, having previously fallen, are now increasing again.

Figure 3 maps the decoupling states for consumption-based emissions in 2015–2023. No countries fell into **recessive decoupling (State 5)** during this period.

Consumption-based emissions decoupling state, 2015-2023

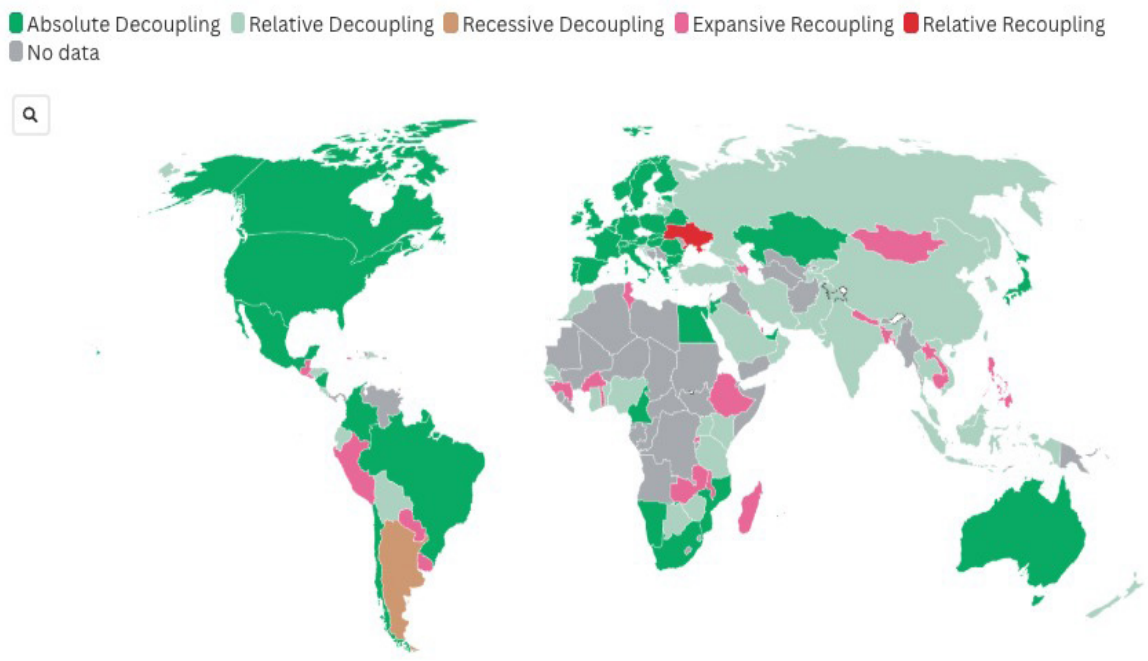


Figure 3: *Global distribution of consumption-based emissions decoupling states, 2015–2023*

Figure 3 illustrates the nature and extent of emissions decoupling in the period since 2015; countries which have reduced their consumption-based emissions while simultaneously growing their economies include much of Europe and North America, Japan, Australia and several major South American and Southern African economies.

The widespread observation of absolute decoupling in advanced economies is consistent with previous analyses, with some of the largest proportional emissions reductions over the period occurring in Western European countries (Norway, Switzerland, and the UK).

Of the world's largest emitting economies, the **US and the EU as a whole fall into Absolute Decoupling (State 1)**, while both **India and China are in Relative Decoupling (State 2)**. China's consumption-based emissions rose 24% between 2015 and 2023, while GDP grew over 50% during the same period. It's worth noting that while the latest Global Carbon Budget data indicates that overall China's emissions continue to rise,[10] the pace of growth is significantly lower, and there are growing indications that emissions from the power generation and transport sectors have already peaked.[11]

Sensitivity analysis: period selection

Calculating decoupling states over a period longer than one-year conclusions to be drawn over longer timespans, but it also risks skewed results if either the start or end year departs from longer-term trends. To account for this, we reproduced the results using several alternative timespans for the core pre-Paris and post-Paris periods, shifting the sample window 1–2 years in either direction to assess the impact of our sampling choices on the overall results.

Table 3 summarises the results. The upper part of the table shows the share of global emissions (on a consumption basis) falling into each decoupling state for the central pre-Paris window (2006–2015) and for windows of the same length shifted one or two years earlier or later. The lower part repeats the exercise for the post-Paris period (2015–2023). Since this period already includes the most recent available data, the t+1 and t+2 windows shift the start year forward while the end year remains unchanged.

10 Global Carbon Project (2025) 'Fossil-fuel CO_2 emissions hit record high in 2025'. Global Carbon Budget

11 Carbon Brief (2025) 'China's CO_2 emissions have now been flat or falling for 18 months'.

Table 3: Period sensitivity of decoupling-state shares of CBE emissions

DECOUPLING STATE	t-2	t-1	2006 - 2015	t+1	t+2
State 1 (Absolute Decoupling)	30.3%	31.5%	32.1%	34.9%	35.4%
State 2 (Relative Decoupling)	46.4%	48.6%	45.1%	44.5%	46.4%
State 3 (Recessive Decoupling)	1.8%	2.3%	2.2%	2.5%	2.3%
State 4 (Expansive Recoupling)	14.0%	10.2%	13.3%	10.3%	8.0%
State 5 (Absolute Recoupling)	0.0%	0.0%	0.0%	0.0%	0.1%
State 6 (Relative Recoupling)	0.0%	0.0%	0.0%	0.0%	0.0%
	t-2	t-1	2015-2023	t+1	t+2
State 1 (Absolute Decoupling)	38.7%	38.8%	36.1%	36.6%	34.3%
State 2 (Relative Decoupling)	46.0%	46.1%	52.9%	49.7%	51.3%
State 3 (Recessive Decoupling)	2.3%	0.0%	0.5%	0.1%	0.5%
State 4 (Expansive Recoupling)	6.4%	7.8%	3.1%	6.2%	6.5%
State 5 (Absolute Recoupling)	0.1%	0.2%	0.0%	0.0%	0.0%
State 6 (Relative Recoupling)	0.0%	0.5%	0.5%	0.4%	0.4%

Table 3: *Sensitivity of decoupling-state shares of global consumption-based emissions to different period boundaries (t−2, t−1, core period, t+1, t+2) for 2006–2015 and 2015–2023.*

The results show that outcomes are relatively robust to selection bias: the share of global emissions in State 1 varies by no more than +3.3% across all scenarios. This maximum absolute variance occurs in the t+2 pre-Paris window, while the largest negative variances (-1.8%) are found in the t-2 Pre-Paris and t+2 post-Paris windows. Across the pre-Paris scenarios, the State 1 share is lower in the earlier windows and higher in the later ones, consistent with the gradual shift toward the higher proportion observed in the central 2015–2023 scenario.

For the 2015–2023 windows, the variances are similar in magnitude but less systematic. The share of emissions in State 1 countries is higher than the central scenario in t-2, t-1 and t+1, and lower in t+2. This pattern may partly reflect the impact of COVID: in the earlier windows, the end years fall closer to the post-COVID rebound, when emissions rose sharply to resume pre-pandemic trajectories. By contrast, the t+1 and t+2 windows are necessarily shorter due to data availability, meaning the COVID downturn and recovery make up a larger portion of the sample period.

Sensitivity analysis: decoupling in individual years

The movement of countries into and out of decoupling states shown in **Table 2** reflects a

noisier underlying pattern when the data are examined in finer detail. When decoupling index values are calculated year by year, countries shift regularly between states due to short-term economic changes. COVID provides the clearest recent example: in 2019, 52 countries demonstrated falling CO_2 emissions while simultaneously growing GDP - the highest for any year in the dataset. In 2020, this number dropped to just 10 as the pandemic-driven recession pushed a record 58 countries into Recessive Decoupling (State 3) – i.e. both emissions and GDP fell, but emissions at a faster rate than GDP. Across the full 19-year period examined (2005–2023), only five countries (France, the United Kingdom, Norway, the US and Albania) achieved Absolute Decoupling (State 1) in more than 10 individual years. While some movement between states is expected, examining annual patterns provides a useful check on the country-level findings.

For the post-Paris period (2015–2023), six countries listed in column one of **Table 2** — those classified as absolutely decoupled over the period — spent 50% or more of those years in a state of recoupling, with emissions growing faster than GDP despite the overall trend. This suggests that Bahrain, Belarus, Colombia, Greece, Namibia and South Africa have not sustainably decoupled emissions, and their results should be interpreted with caution. In 2023, these countries accounted for just under 1.6% of global emissions; excluding them would reduce the overall percentage of global CO_2 emissions associated with consumption in absolutely decoupled countries from 36.1% to 34.5%.

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