

Weekly Summary

Economics of Climate Change

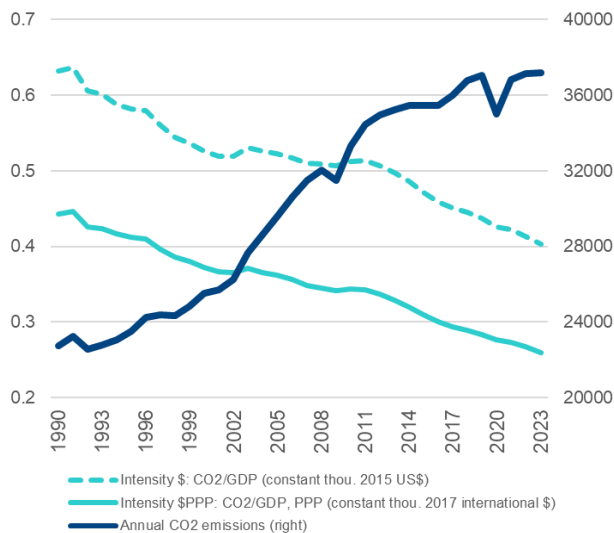
February 2, 2024

A new record in 2023: slight rise in CO₂ emissions despite near-stabilization

Despite high interest rates and geopolitics curbing economic activity, the reduction in coal consumption and the increasing penetration of renewables, 2023 CO₂ emissions slightly increased, pushing the World closer to surpassing the 1.5°C warming threshold before 2030.

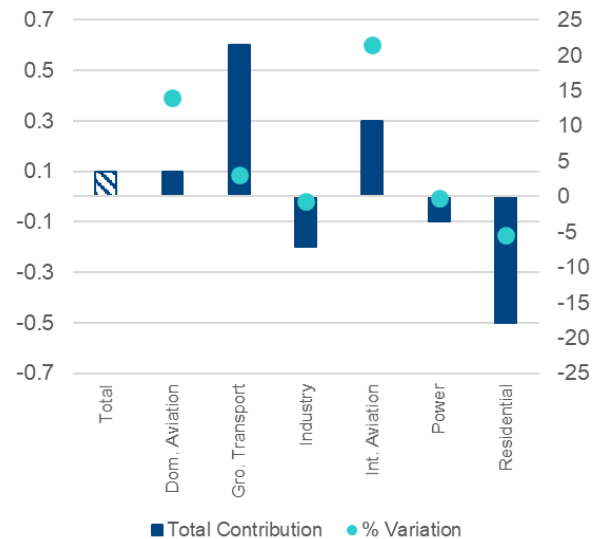
Real time estimations by Carbon Monitor¹ for 2023 reveal that worldwide carbon dioxide (CO₂) emissions have exhibited a marked stability, registering a slight increment of 0.1% (vs. 1% in 2022). This global overview masks profound disparities among nations and sets a new record high for CO₂ emissions. China and India have increases in emissions of 3% and 4.5% respectively, in stark contrast to the European Union and the United States, which have reported reductions in emissions of 5.1% and 2.2% respectively.

Figure 1. **WORLD. CO₂ EMISSIONS (RIGHT) AND EMISSION INTENSITY.** (MILLION OF TONS OF CO₂; THOUSAND TONS OF CO₂ PER REAL (OR PPP) DOLLARS)



Source: BBVA Research from Global Carbon Budget, Carbon Monitor and World Bank.

Figure 2. **WORLD, CO₂. CONTRIBUTION TO TOTAL CHANGE AND PERCENTAGE VARIATION IN 2023 WITH RESPECT TO 2022 (RIGHT).** (PP)



Source: BBVA Research from Global Carbon Budget, Carbon Monitor and World Bank.

1: See Box 1 at the end of the document with further details on Carbon Monitor.

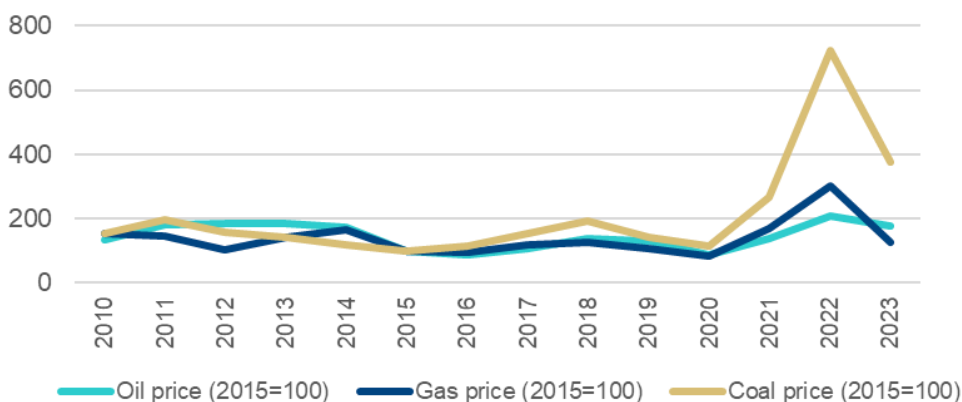
This diminished rate of growth can be attributed to several key factors. Elevated interest rates and geopolitical uncertainties have exerted a significant dampening effect on economic activities, thereby influencing emission levels. Concurrently, the expedited integration of renewable energy sources into the energy mix and a discernible decrease in coal consumption have played pivotal roles in mitigating the extent of emission growth. Despite these developments, the trajectory of emission increases remains considerably divergent from the reductions necessary to align with established transition scenarios towards a net-zero future.

According to Carbon Monitor's projections, the trend towards reduced emission intensity would have persisted into 2023, albeit with the transport sector continuing to exert upward pressure on emission levels. Figure 1 illustrates the trajectory of global CO₂ emissions alongside emission intensity, the quotient of total emissions over the Gross Domestic Product (GDP)². Being concrete, the emission intensity ratio has adhered to its well established trend, registering an enhancement of approximately 2.7% in 2023. This figure slightly surpasses the average annual improvement rate of 2.2% observed over the preceding 11-year period. Notwithstanding this progress, the expansion of global GDP (recorded at approximately 2.6% in constant dollars and 3% when adjusted for PPP) has led to a resurgence in emissions, propelling them to a zenith surpassing pre-pandemic benchmarks by a margin of approximately half a percentage point. It merits attention that, within the framework of a net-zero scenario akin to that posited by the NGFS, annual CO₂ emissions would necessitate an annual reduction of approximately 6%, a target markedly distant from the levels presently recorded.

Figure 2 shows that the rise in emissions is predominantly attributable to a marked increase in the transport sector, encompassing both aviation and terrestrial transport. **Conversely, industrial emissions have seen a decline, facilitated by reduced coal usage and the dampening effect of high interest rates and geopolitics that have decelerated economic activities.** Similarly, emissions associated with the energy sector and residential domain have also diminished, concurrently benefitting from a shift towards a greener energy mix.

Despite the numerous geopolitical challenges that impacted the global economy in 2023, including the ongoing wars in Ukraine and Gaza and the tensions in the Red Sea, prices of major fossil fuels have decreased. This reduction can be attributed to lower supply pressures as compared to those experienced in 2022 and a stagnated demand. Factors contributing to this stagnation include higher than anticipated temperatures, elevated interest rates, and the progression of renewable energy sources in electricity generation. As illustrated in **Figure 3**, the prices for gas, coal, and oil have all declined in 2023.

Figure 3. **USA. OIL, GAS AND COAL REAL PRICES. INDEX, 2015=100**



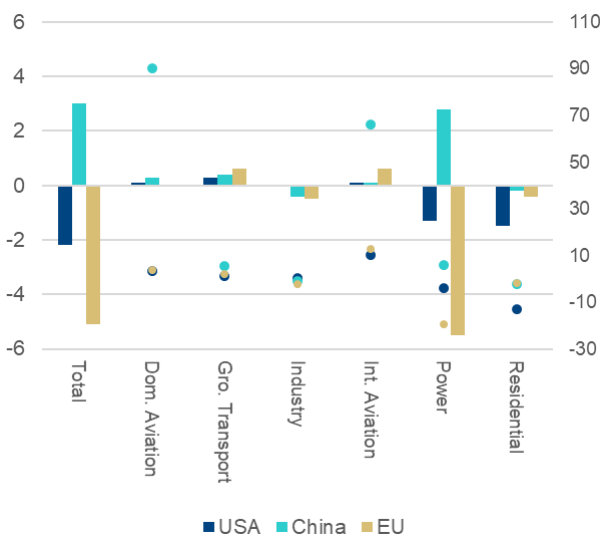
Source: BBVA Research.

2: Measured in thousands of dollars and in terms of international dollars (Purchasing Power Parity adjusted, PPP).

Focusing on China, the USA, and the EU, it becomes evident that the situation regarding emissions varies significantly across these geographies. As shown in Figure 4, CO₂ emissions in the USA have declined by 2.2%, while the EU saw a more substantial reduction of 5.1%. Conversely, China's emissions escalated by 3%, alongside real GDP annual growth rates of approximately 2.5%, 0.5%, and 5.2% for the USA, EU, and China, respectively. In the United States, the power and residential sectors were the primary contributors to this decline, contributing reductions of 1.3% and 1.5% respectively to the overall decrease. In the European Union, significant reductions were noted in the power sector (5.5%) and industry (0.5%), the latter clearly impacted by lower activity. An illustrative example of this dynamic is observed in the EU Emissions Trading System (ETS), where prices peaked at 93 euros per ton in March 2023, only to close the year at 66 euros, indicating a reduced demand for emission allowances from the first quarter onwards.

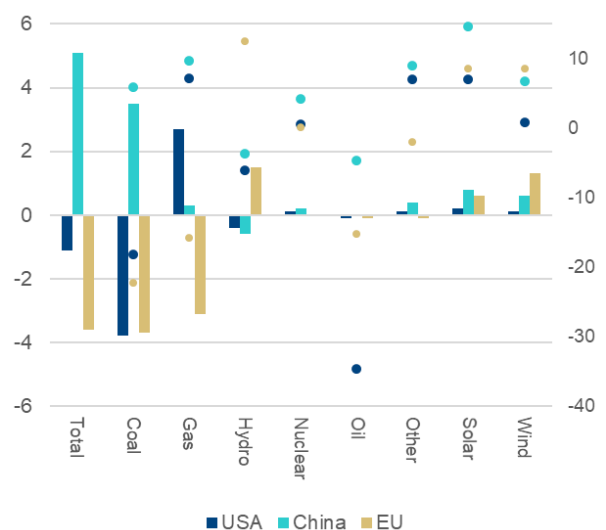
Figure 5 highlights a marked decrease in coal usage for electricity generation in both the USA and the EU, by approximately 20%. This, coupled with a 15% reduction in gas usage in the EU, has facilitated a cleaner electricity mix. Additionally, both countries have witnessed positive trends in solar energy development (around 8%) and a decrease in total electricity demand. China has been also investing heavily in green energy, being a key driver to its economic growth in 2023, including solar power and electric vehicles³. Despite these efforts, China reported an increase in emissions, attributed to a significant rise in transport-related emissions (returning to pre-COVID patterns) and power due to increased electricity demand and higher coal usage. In summary, emission intensity saw a reduction of 4.5% in the USA, 5.5% in the EU, and 2.1% in China. It is pertinent to note that, for example, achieving a 3% GDP growth while reducing emissions by 6% annually, requires improvements in emission intensity close to 9%, surpassing even the achievements of the world's most advanced and committed economies, such as the EU and the USA.

Figure 4. USA, CHINA AND EU, CO₂. CONTRIBUTION TO TOTAL CHANGE AND PERCENTAGE VARIATION WITH RESPECT TO 2022 (RIGHT) (PP)



Source: BBVA Research from Carbon Monitor data.

Figure 5. USA, CHINA AND EU, ELECTRICITY GENERATION. CONTRIBUTION TO TOTAL CHANGE AND PERCENTAGE VARIATION IN 2023 WITH RESPECT TO 2022 (RIGHT). (PP)

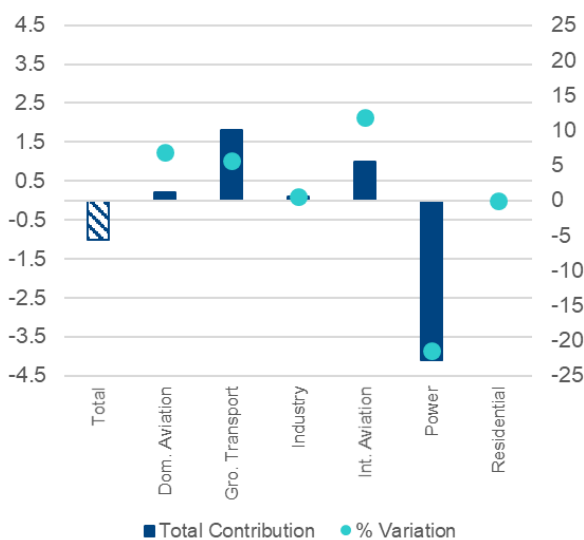


Source: BBVA Research from Carbon Monitor data.

3: Clean energy was top driver of China's economic growth in 2023 - Carbon Brief.

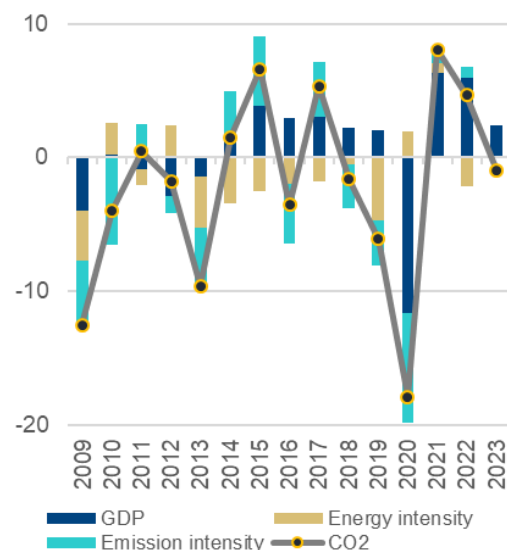
Focusing on **Spain**, Carbon Monitor's estimations reveal a **1% reduction in emissions for 2023, thereby halting the upward trend in CO₂ emissions observed over the past two years**. With a GDP growth of 2.4% in 2023, Spain has enhanced its emission intensity by 3.3%, which is half a percentage point above its average of the last decade at 2.7%. **This improvement is largely attributable to the reduction of emissions within the power sector**, which has significantly contributed to the overall CO₂ decrease with a 4.1% reduction and a 21.4% decrease relative to 2022, thereby offsetting the rise in emissions from the transport sector. **The decline in emissions is partly driven by a nearly 50% reduction in coal usage for electricity, a 15% decrease in gas, and a substantial increase in hydro and solar power (28% and 12% respectively, according to Carbon Monitor data).**

Figure 6. **SPAIN. CONTRIBUTION TO TOTAL CHANGE AND PERCENTAGE VARIATION IN 2023 WITH RESPECT TO 2022 (RIGHT). (PP)**



Source: BBVA Research from Carbon Monitor and Energy Institute data.

Figure 7. **KAYA IDENTITY, SPAIN. CO₂ EMISSIONS GROWTH (2009-2023). (PP)**



Source: BBVA Research from Carbon Monitor and Energy Institute data.

In essence, when we delve into the data we find that while a mix of cyclical factors (such as economic slowdown) and structural changes (like the growing adoption of renewable energy sources) are contributing to the containment of CO₂ emissions, a significant reduction is yet to be achieved. This situation underscores the critical need for reinforcing decarbonization narratives with increasingly effective strategies. It is becoming increasingly clear that the willful narratives put forth by nations (story-telling) are not fully aligned with their practical actions (story-doing). This gap highlights the urgency for impactful measures in the journey towards genuine decarbonization.⁴

4: For further details: "Climate Policies: Widening Range and Enhanced Stringency, but More is Needed, also in the BBVA Footprint". BBVA Research, 19 January 2024

Box 1. Carbon Monitor: Real time estimation of CO₂ emissions

The [Carbon Monitor](#) initiative marks a significant advancement in environmental research, offering a methodology that dramatically shortens the delay in emissions reporting compared to traditional approaches⁵. This web-based platform provides almost instantaneous global CO₂ emissions estimates, a feat made possible by its daily updated dataset. Since its launch on January 1, 2019, Carbon Monitor has specialized in tracking CO₂ emissions stemming from the combustion of fossil fuels and cement production⁶, facilitating a more dynamic and responsive approach to monitoring environmental impacts. This initiative stands out for its ability to provide near-real-time insights into emissions trends, enabling more timely and informed responses to global climate challenges.

Highlights of the Week

- **Spain | Challenging climate-related developments.** The recent climate-related developments in Spain paint a picture of significant environmental challenges, primarily driven by extreme weather patterns and their socioeconomic impacts. The [drought situation](#) and [record temperatures](#) highlight the urgency of addressing climate change and its implications for water resources, agriculture, and overall environmental sustainability. The [farmers' protests further](#) emphasize the need for balanced and equitable climate policies that consider the diverse needs of all stakeholders.
- **Europe | ECB deepens climate analysis.** [ECB steps up climate work with focus on green transition, climate and nature-related risks.](#)
- **Europe | The EU needs trillions of investment for 2050 climate target.**
- **US | Joe Biden appoints John Podesta as US's top climate diplomat.**
- **China | China, green growth.** [Analysis: Clean energy was top driver of China's economic growth in 2023 - Carbon Brief.](#)

5: This initiative was launched by a group of international researchers from various institutions with the goal of offering a more timely and precise understanding of carbon emissions, enhancing the ability to monitor and respond to climate change effectively.

6: CO₂ emissions from fossil fuel combustion and cement production represent a significant portion of total global CO₂ emissions, often accounting for over 90% of the total. This includes emissions from the burning of coal, oil, and gas for energy and transportation, as well as CO₂ released during the production of cement, which involves calcination of limestone.

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