

Weekly Summary

# Economics of Climate Change

February 9, 2024

## From National to Sectoral Perspective: A Comprehensive Analysis of Emissions in Spain

The upcoming BBVA research's Climate Change Economic Watch assesses the 2022 GHG emissions increase in Spain as well as the main factors behind: economic growth and a shift to carbon-intensive sources. It also carries out a sectoral analysis of Scope 1, 2, and 3 emissions, concluding the need for more effective strategies to accelerate the current downward trend of emission intensities and to keep net-zero in 2050 in the attainable range.

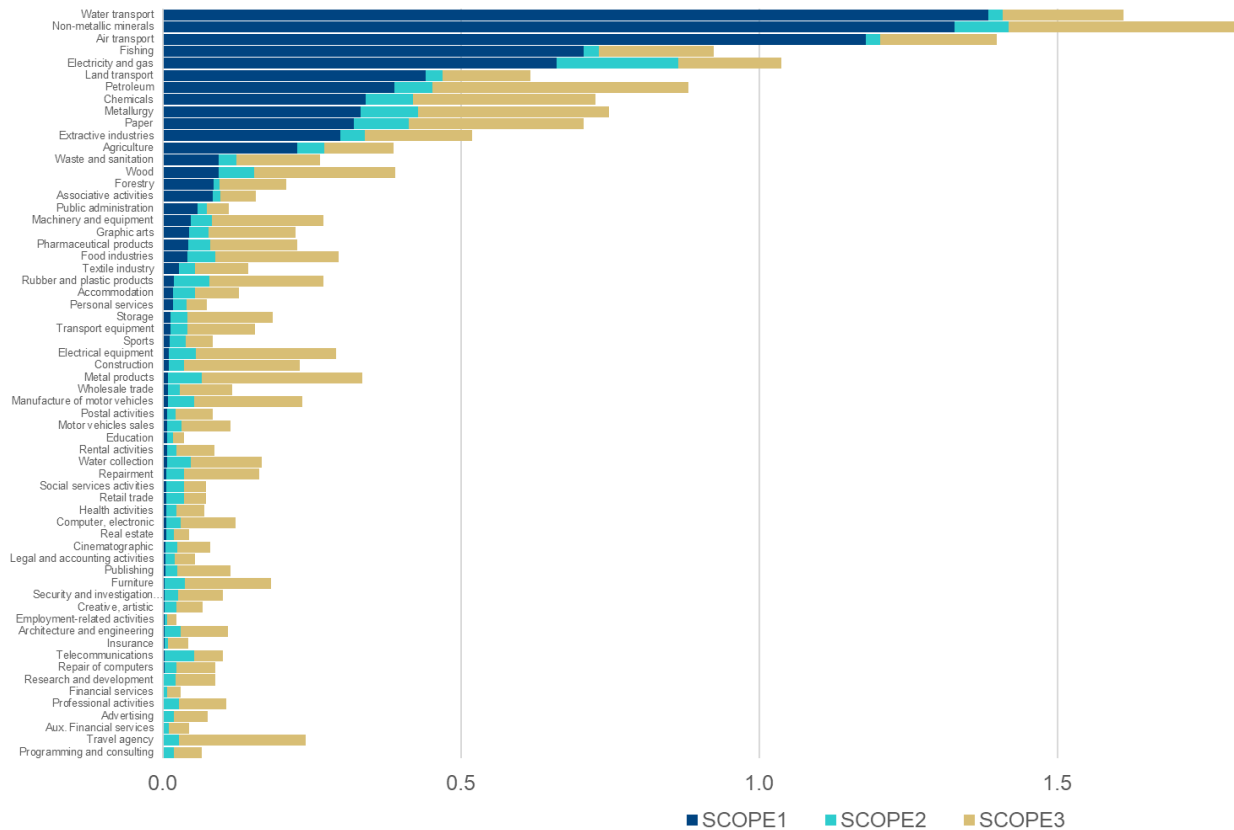
**Greenhouse gasses (GHG) and CO<sub>2</sub> emissions increased in Spain by 3.1% and 4.5% in 2022<sup>1</sup>**, mainly due to a shift towards a more carbon-intensive energy mix influenced by geopolitical factors, coupled with the post-pandemic economic recovery. This rebound was **partially offset by a lower energy intensity** -energy used per unit of GDP- driven by high energy prices. Non-CO<sub>2</sub> carbon intensities also declined, extending the well-established downward trend of emission intensities. **Air transport came up with the highest emission increase in 2022**, with a rise of over 60% compared to 2021, followed by energy supply -electricity and gas- and refining -oil. **Several sectors have not fully reverted to pre-COVID emission levels**, with overall GHG emissions remaining 5.4% lower than 2019 levels, **but a recovery trend is evident, indicating a gradual return to prior emission patterns.**

Understanding sector vulnerabilities to climate transition requires analyzing not only direct emissions (Scope 1) but also indirect ones (Scope 2 and 3). The upcoming BBVA Research's report delves into the complexities of sectoral emissions in Spain, in a context of ambitious climate goals. This analysis is highly relevant in sectors with low direct and high indirect emissions related to their upstream and downstream activities, as is the case of the travel agency sector (see Figure 1).

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<sup>1</sup>: According to the latest Spanish Air Emission Accounts published by the Spanish National Statistics Institute (INE).

Figure 1. **SPAIN. INTENSITY OF EMISSIONS PER BUSINESS ACTIVITY. (CO<sub>2</sub> KG PER € OF PRODUCTION. 2019)**

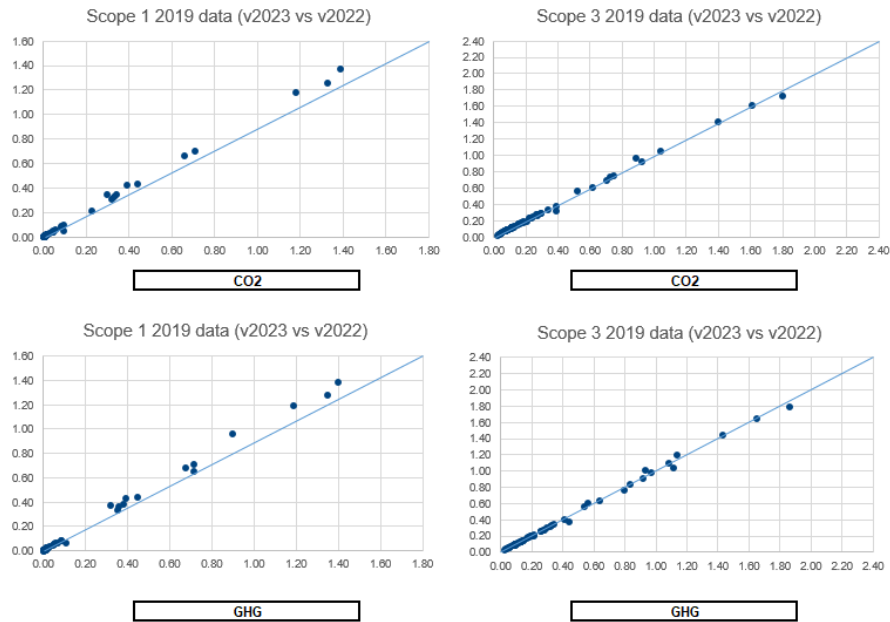


Source: BBVA Research.

**Methodological updates and INE’s data revisions impact on sectoral emission distribution.** The report progresses to an exhaustive assessment of the updated Input Output (I-O) tables and Environmental Accounts data revisions provided by the National Institute of Statistics (INE), focusing on their impact on sectoral emissions. These changes, though minor on a broad scale, uncover substantial sectoral shifts that fundamentally reconfigure the distribution of emissions.

**Scope 3 intensity ratios are more robust to backward revisions than Scope 1 ratios.** The report shows that Scope 3 emission intensity ratios, as calculated by BBVA Research, have been impacted by data revisions, albeit to a lesser extent than Scope 1 ratios. The most common data revisions, involving reallocations within the same production chain (e.g., from cement to construction), result in relatively minor changes in Scope 3 ratios, as evidenced by the stability in sectoral intensity rankings. This is due to the fact that the calculation of **Scope 3 intensity ratios already take into account sectoral interdependencies**. Thus, as long as the backward data revisions take place into the same value chains, Scope 3 ratios are more stable than Scope 1 ratios (see **Figure 2**).

Figure 2. **SPAIN. SECTORAL INTENSITY RATIOS. CO<sub>2</sub> AND GHG, 2019. CHANGE IN RATIO (UPDATED, 2023 DATA; OLD, 2022 DATA). SCOPE 1, 2 AND 3. CO2E KG / OUTPUT €**



Source: BBVA Research.

**Improvements are observed in the emission intensities of the top ten polluting sectors.** Another contribution of the report is the analysis of real (inflation-adjusted) changes in emission intensity ratios for the period 2016-2019<sup>2</sup>. Using sector-specific price production indices, the study points to the improvements in emission intensities of the top ten most polluting sectors in Spain. **Scope 3 ratios decreased in these sectors, with an accumulated drop in CO<sub>2</sub> emitted for each additional unit of product of 8.5% in four years (2016-2019), which represents an annual decrease of 2.2%.** GHG emissions display a similar pattern (see **Figure 3, 4 and 5**).

<sup>2</sup>: Sector-specific Price Production Indices (PRI) and Consumption Price Indices (CPI), provided by INE, have been used as deflators. PRI reflects prices paid by producers and measures the evolution of prices received by the productive sector, while CPI measures the change over time in prices paid by consumers, differing from those paid by producers.

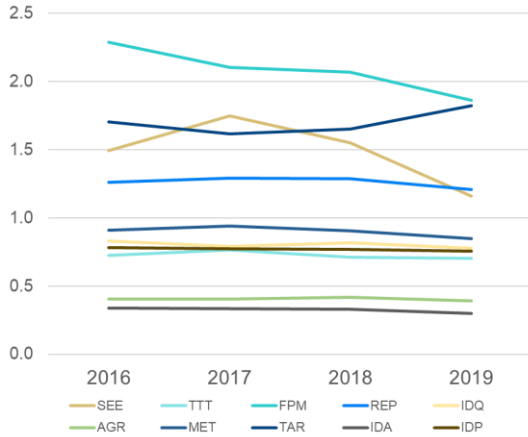
Figure 3. **SCOPE 3 SECTORAL CO<sub>2</sub> INTENSITY RATIOS EVOLUTION. 2019 VS 2016. 2016 PRICES**

	CO2				GHG			
	PRI NACE		CPI ALL		PRI NACE		CPI ALL	
	% period	% annual	% period	% annual	% period	% annual	% period	% annual
<b>SEE</b>	-22.4%	-6.1%	-27.6%	-7.7%	-22.1%	-6.1%	-27.3%	-7.7%
<b>TTT</b>	-2.4%	-0.6%	-10.8%	-2.8%	-2.6%	-0.7%	-10.9%	-2.9%
<b>FPM</b>	-18.7%	-5.0%	-18.0%	-4.8%	-19.2%	-5.2%	-18.5%	-5.0%
<b>REP</b>	-4.2%	-1.1%	-27.0%	-7.6%	-5.2%	-1.3%	-27.8%	-7.8%
<b>IDQ</b>	-6.4%	-1.6%	-8.8%	-2.3%	-7.4%	-1.9%	-9.8%	-2.5%
<b>AGR</b>	-3.5%	-0.9%	-0.4%	-0.1%	-5.0%	-1.3%	-1.8%	-0.5%
<b>MET</b>	-7.0%	-1.8%	-14.1%	-3.7%	-10.1%	-2.6%	-16.9%	-4.5%
<b>TAR</b>	6.9%	1.7%	-14.3%	-3.8%	6.7%	1.6%	-14.5%	-3.8%
<b>IDA</b>	-11.5%	-3.0%	-9.1%	-2.4%	-11.7%	-3.1%	-9.4%	-2.4%
<b>IDP</b>	-3.1%	-0.8%	-5.5%	-1.4%	-5.2%	-1.3%	-7.6%	-1.9%
<b>SGD</b>	-15.7%	-4.2%	-12.2%	-3.2%	-18.2%	-4.9%	-14.7%	-3.9%
<b>TOP10 MEAN</b>	-8.5%	-2.2%	-16.4%	-4.4%	-10.2%	-2.7%	-16.4%	-4.4%
<b>TOP10 W.MEAN</b>	-22.4%	-6.1%	-27.6%	-7.7%	-5.0%	-1.3%	-1.8%	-0.5%
<b>TOTAL MEAN</b>	-5.2%	-1.3%	-11.9%	-3.1%	-6.4%	-1.6%	-12.2%	-3.2%
<b>TOTAL W.MEAN</b>	-3.5%	-0.9%	-0.4%	-0.1%	-5.0%	-1.3%	-1.8%	-0.5%

These sectors are: (1) Electricity, Gas, Steam, and Air Conditioning Supply (SEE); (2) Land and Pipeline Transport (TTT); (3) Manufacture of Other Non-Metallic Mineral Products (FPM); (4) Manufacture of Coke and Refined Petroleum Products (REP); (5) Chemical Industry (IDQ); (6) Agriculture, Forestry, Hunting, and Related Services (AGR); (7) Metallurgy; Manufacture of Iron, Steel, and Ferro-Alloy Products (MET); (8) Air Transport (TAR); (9) Food Industries, Beverage Manufacturing, and Tobacco Industry (IDA); (10) Paper Industry (IDP); (11) Waste Management, Sanitation, and Remediation Activities (SGD).  
Source: BBVA Research.

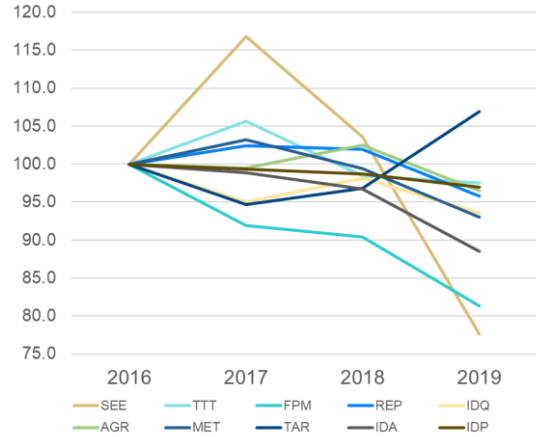
**However, the overall progress has been modest.** The average inflation-adjusted ratio across all sectors reveals a less favorable evolution, **with approximately a 5% decrease (1.3% annually)** (see **Figure 6**). This analysis brings to light the **disparity in emission intensity improvements between the most and least polluting sectors of the economy**, with the former showing more substantial gains. This difference is attributed to several key factors. More polluting sectors start with higher baseline emission levels, offering a broader margin for improvement. These sectors also face stricter regulatory and societal pressures, driving them towards more aggressive emission reduction measures. Additionally, the principle of economies of scale in emission reduction suggests that larger, more polluting industries may find it economically viable to adopt emission reduction technologies, leveraging their scale of operations. However, it is also noteworthy that these economies of scale come into play based on the availability of technologies that are not only proven but, above all, cost-competitive.

Figure 4. **PRI (NACE) ADJUSTED SECTORAL INTENSITY RATIOS. CO<sub>2</sub>, KG/ OUTPUT, €. 2016-2019. SCOPE 3. 2016 PRICES**



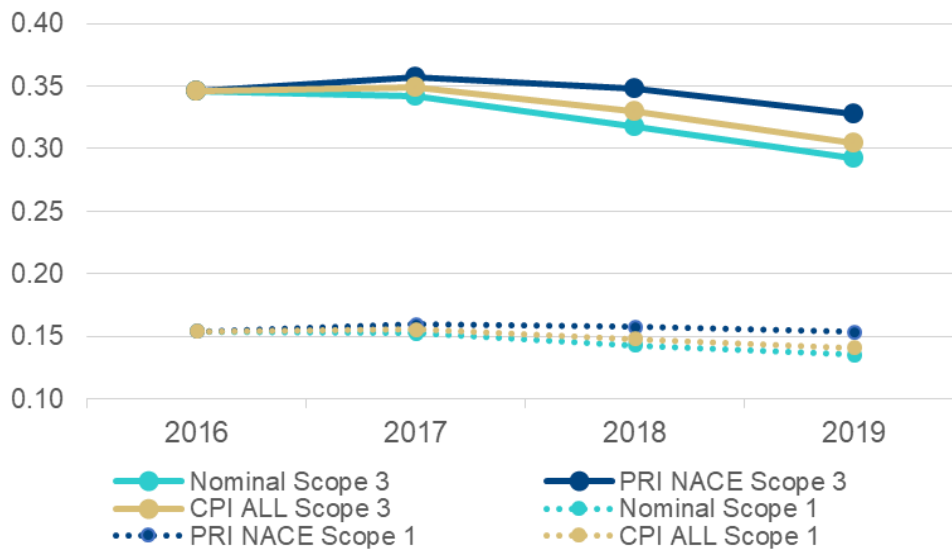
Source: BBVA Research.

Figure 5. **PRI (NACE) ADJUSTED SECTORAL INTENSITY RATIOS. INDEX 2016=100. CO<sub>2</sub>. 2016-2019. SCOPE 3. 2016 PRICES**



Source: BBVA Research.

Figure 6. **AVERAGE SECTORAL CO<sub>2</sub> INTENSITY RATIOS. 2016-2019. SCOPE 1 AND 3. CO<sub>2</sub>, KG/ OUTPUT, €. 2016 PRICES**



Source: BBVA Research.

In short, despite notable improvements, Spain remains considerably distant from its objectives, necessitating a more efficacious approach. The observed declines in intensity fall short of meeting the benchmarks outlined in the Spanish National Energy and Climate Plan (PNIEC), which strives for an annual CO<sub>2</sub> reduction rate of 4-5%. Presently, most sectors are only achieving a meager annual reduction of close to 1.5%. Hence, there's an urgent need for more effective strategies, particularly in critical sectors like transportation, agriculture or oil refining.

## Highlights of the Week

- **Spain | Spain has warmest January on record.** Spain is grappling with the consequences of climate change, marked by historic drought conditions and record-breaking temperatures. Catalonia has declared a drought emergency due to reservoirs in the region falling below 16% capacity.
- **EU | European Commission calls for 90% cut in EU emissions by 2040.** The European Commission has called for a significant reduction in the EU's greenhouse gas emissions, advocating for a cut to 90% below 1990 levels by 2040. However, the proposal faced criticism for backing away from specifying how agriculture should contribute to this goal, amidst concerns over the impact of farming on climate change.
- **China | China to crack down on emissions data fraud as CO2 market expansion nears.** China is set to enhance its national carbon emissions trading market with new regulations effective May 1, aiming to strengthen carbon trading oversight. These measures are part of China's broader climate change initiatives, intending to expand its emissions trading scheme to include more industrial sectors. Currently, the scheme covers around 2,000 power plants, with plans to extend it to over 3,500 companies in sectors like cement and aluminum by the end of 2025.
- **World | New UN weather agency chief says rate of global warming is speeding up.** The new chief of the World Meteorological Organization, Celeste Saulo, indicated that the rate of human-caused climate change seems to be accelerating, with last year's temperatures being 1.48 degrees Celsius above pre-industrial levels.

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