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Greenhouse Gas Emissions in Spain. A regional analysis

Main Takeaways (*)

Spain is making progress in decoupling economic growth from emissions, driven by renewable energy, energy efficiency, and productive modernization, although with sectoral and territorial heterogeneity.

Since the mid-1990s, greenhouse gas (GHG) emissions intensity in Spain has been halved, reflecting a less carbon-intensive economy. The increasing share of **renewables** in the energy mix, together with improvements in **energy efficiency,** has been key to reducing emissions.

Four sectors —industry, energy, transport, and agriculture— account for nearly 90% of GHG emissions in Spain (excluding households), while representing only a quarter of national gross value added (GVA).

Decarbonization is progressing across all regions, but unevenly, due to differences in productive structures, energy mixes, electrification, and technological advancement.

Catalonia and the Basque Country combine a strong industrial base with relatively lower emissions, thanks to gains in efficiency and innovation, while **Asturias is making progress in decarbonization but faces greater challenges** due to its specialization in carbon-intensive sectors.

Regions with a higher presence of carbon-intensive industrial or energy activities are progressing more gradually, while those with more diversified productive structures or a more advanced energy transition tend to perform better.

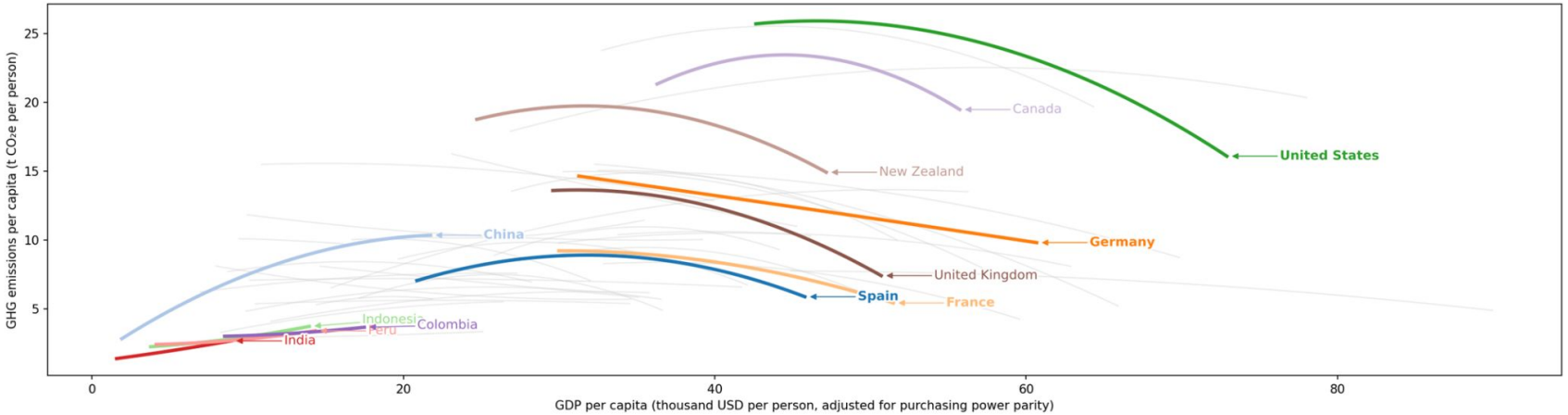
Achieving climate targets requires territorially tailored policies, complementing European and national frameworks with regional instruments and coordination across different levels of government to preserve competitiveness and territorial cohesion.

(*) Based on the article "Greenhouse Gas Emissions in Spain: A Regional Analysis" (PEE No. 187, Funcas), which uses information available up to end-2025. This presentation incorporates updated MITECO data on GHG emissions by Autonomous Community (1990–2024), so some figures may differ from those in the article.

Spain, among the countries that have combined economic growth with emissions reduction

COUNTRIES. TREND IN GHG EMISSIONS PER CAPITA AND GDP PER CAPITA. 1990–2023

TONNES OF CO2 EQUIVALENT PER CAPITA AND THOUSANDS OF DOLLARS PER CAPITA, ADJUSTED FOR PURCHASING POWER PARITY

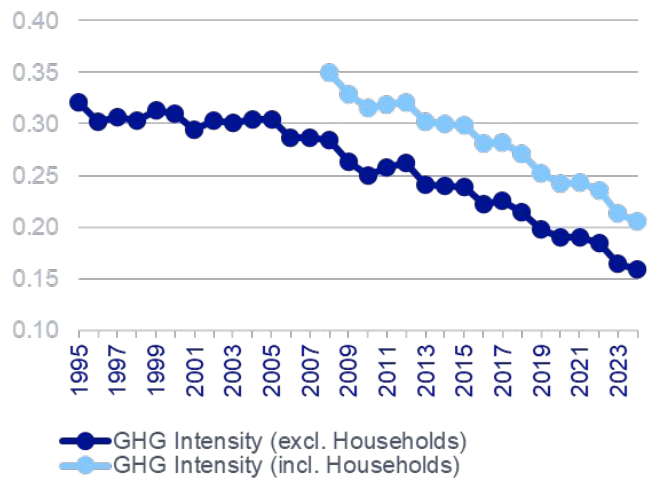


Source: BBVA Research with data from Penn World Tables and Potsdam Institute for Climate Impact Research (PIK)

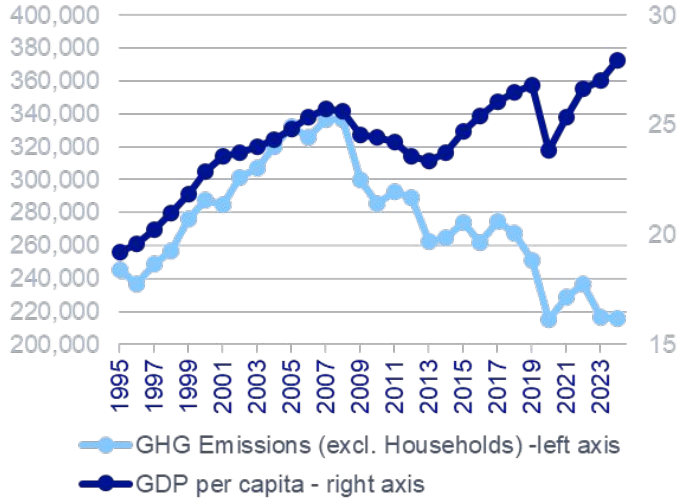
Spain's per capita emissions are lower than those of major economies such as Germany, Canada, and the USA, and broadly comparable to those of France and the UK. The decoupling of per capita income growth from emissions results from a combination of economic development, innovation, and policies

Spain has doubled its environmental efficiency: it now produces twice as much output with the same level of emissions

SPAIN. GHG EMISSION INTENSITY. 1995–2024
KG CO2eq PER EURO (2020 PRICES)



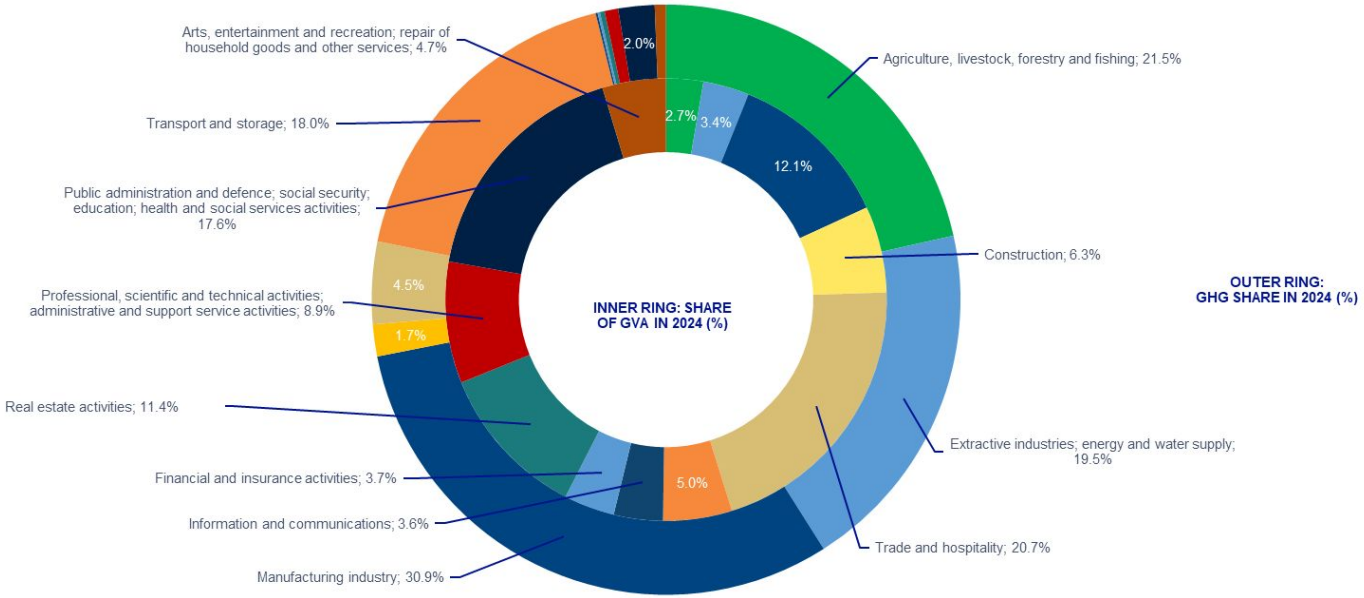
SPAIN. GHG EMISSIONS AND REAL GDP PER CAPITA. 1995–2024
KT CO2eq AND THOUSANDS OF EUROS (2020 PRICES)



Source: BBVA Research with data from INE (Environmental accounts and National Accounts) and MITECO (Emissions)

The most emissions-intensive sectors are not, in general, the ones that contribute the most to the economy

SPAIN. SHARE OF SECTORS IN GVA AND NATIONAL GHG EMISSIONS. 2024 (%)

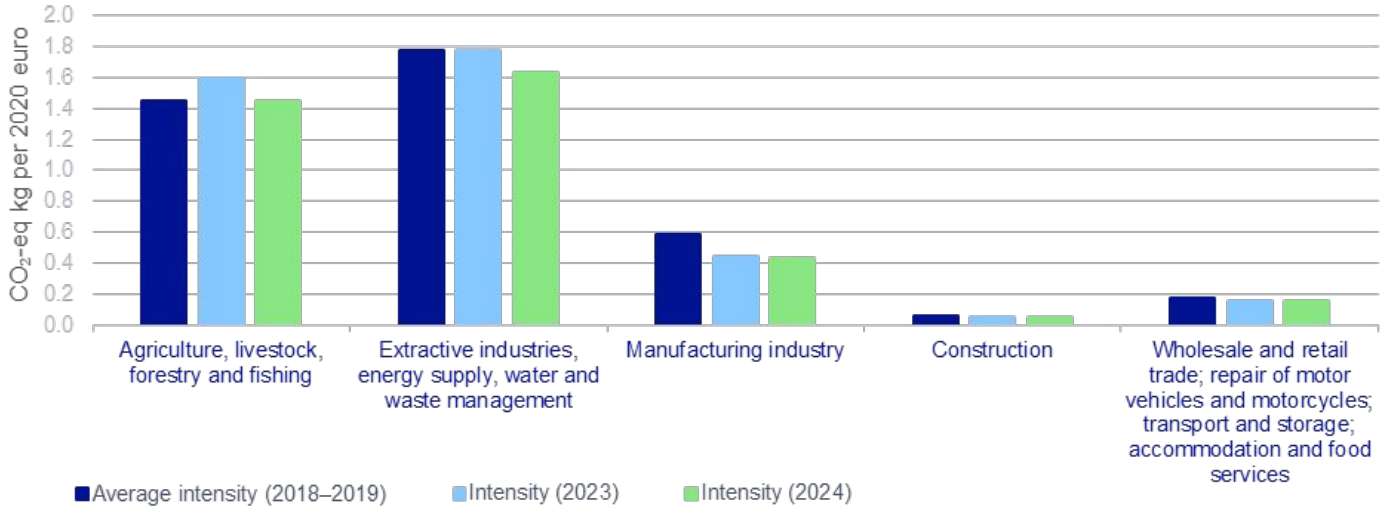


Source: BBVA Research with data from Environmental accounts provided by INE

Strong sectoral asymmetry: industry, agriculture, transport and energy account for 90% of GHG emissions (excl. households) while contributing less than 25% of national GVA, whereas sectors with greater economic weight (trade and hospitality, government) have a relatively low carbon footprint

The productive structure largely determines aggregate emissions intensity

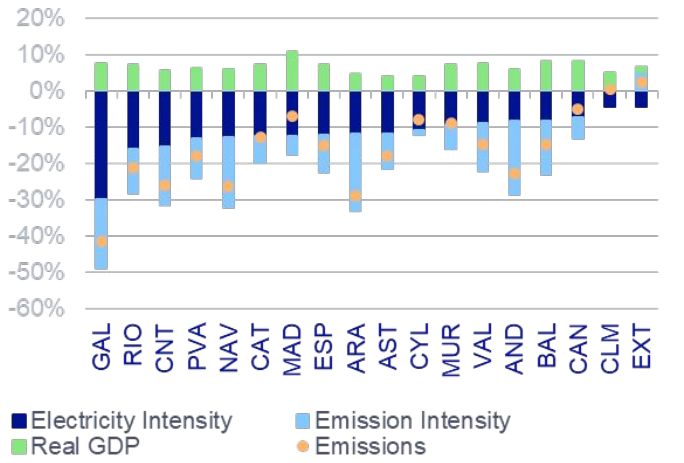
SPAIN. GHG EMISSIONS INTENSITY BY SECTOR OF ACTIVITY. 2018–2019, 2023 AND 2024
KG OF CO2eq PER EURO (2020 PRICES)



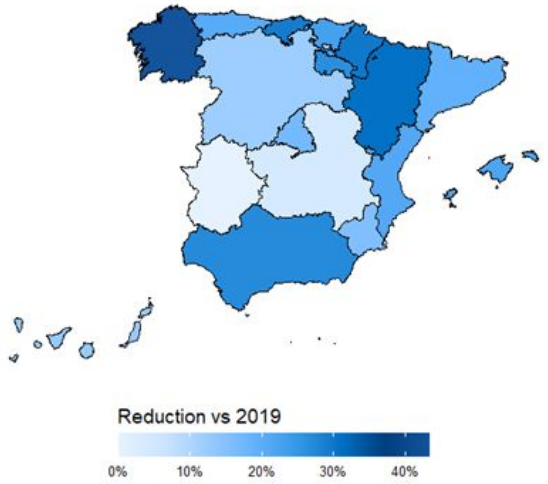
Source: BBVA Research with data from Environmental accounts and National accounts provided by INE

Across regions, the reduction in emissions has been widespread, but with differing intensities and drivers

REGIONS. GHG EMISSIONS GROWTH RATE 2019–2024 AND COMPONENTS (%)*



REGIONS. GHG EMISSIONS INTENSITY REDUCTIONS. 2019–2024 (%)



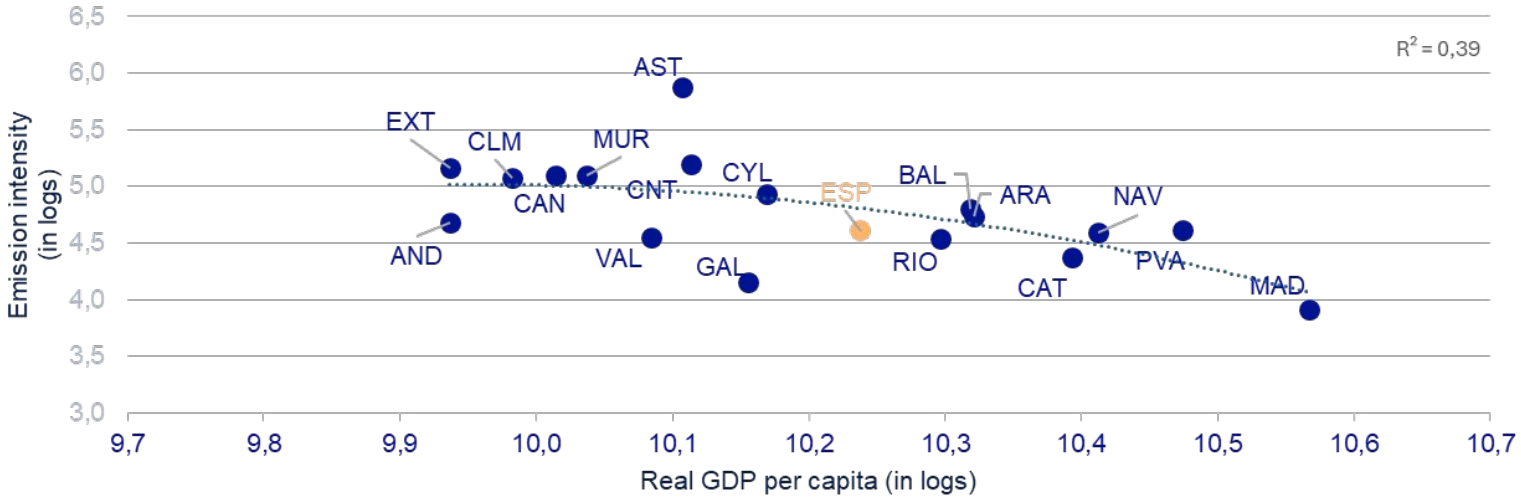
Source: BBVA Research with data from MITECO, INE and Red Eléctrica.*GHG Emissions= (GHG Emissions / Electricity Consumption) * (Electricity Consumption / Real GDP) * Real GDP

source: BBVA Research with data from MITECO and INE

Regions with higher income per capita generally emit less CO_2 per unit of output

REGIONS. GHG EMISSIONS INTENSITY AND GDP PER CAPITA. 2024

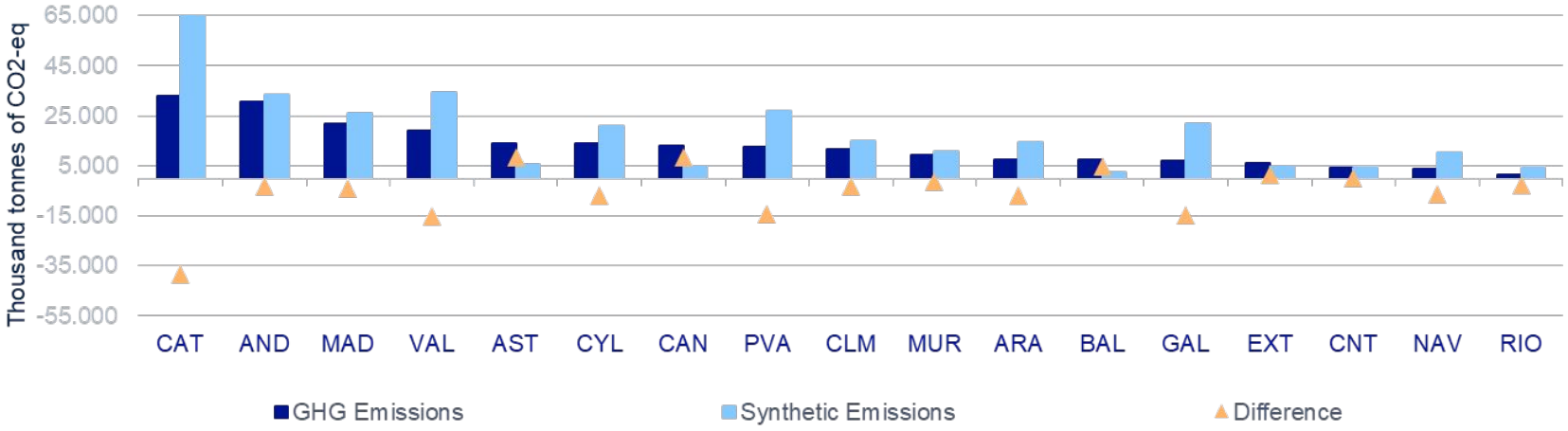
KG OF CO2eq PER EURO (2020 PRICES); THOUSAND 2020 EUROS PER CAPITA, IN LOGS



Source: BBVA Research with data from MITECO and INE

The productive structure is a key determinant of regional emissions intensity

REGIONS. GHG EMISSIONS PUBLISHED BY MITECO VS "SYNTHETIC" ESTIMATES (*). 2024
KT OF CO2eq

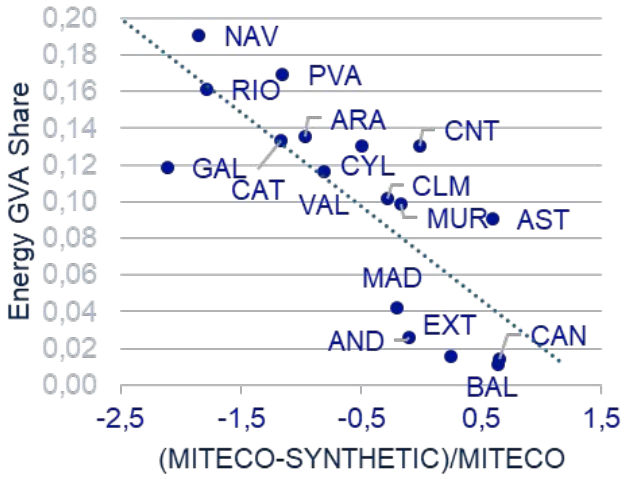


Source: BBVA Research with data from MITECO, National accounts and Regional accounts (INE). (*) Synthetic emissions are estimated by assuming, for the region's sectoral structure, the emission intensity of each sector at the national level

Differences between published and "synthetic" emissions across regions are shaped by factors such as productive specialization, energy mix, degree of electrification, and adoption of more efficient technologies

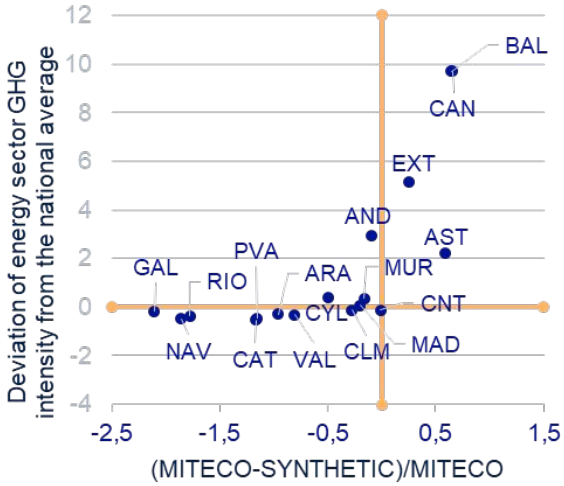
The weight of the energy sector reinforces this effect on emissions intensity

REGIONS. SHARE OF THE ENERGY SECTOR IN REGIONAL GVA. 2024



Source: BBVA Research with data from MITECO and INE

REGIONS. RELATIVE DEVIATION BETWEEN REGIONAL AND NATIONAL ENERGY SECTOR EMISSIONS INTENSITY. 2024



Source: BBVA Research with data from regional inventories provided by MITECO and INE

Regional emissions intensity differences are mainly structural and strongly linked to the energy sector due to both composition effect (left-hand chart) and relative carbon intensity (right-hand chart)

Regional policies also play a key role

Differentiated regional strategies: (renewables, electrification, and efficiency) enable some regions to reduce emissions below what would be expected based on their productive structure.

Decarbonization is structured within a multilevel framework: EU (Green Deal, Fit for 55), Spain (NECP, Climate Law), and region-specific strategies.

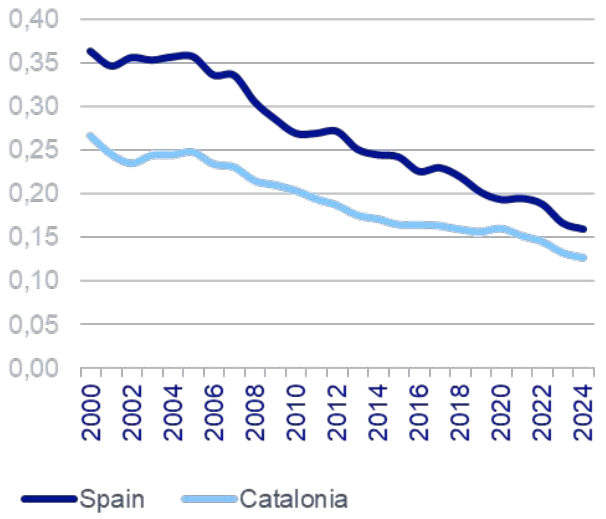
Uneven progress across regions: explained by natural resources, productive specialization, fiscal capacity, and governance.

Regions with more space, sun, and wind lead in renewables: others prioritize industrial decarbonization, innovation, and sustainable mobility.

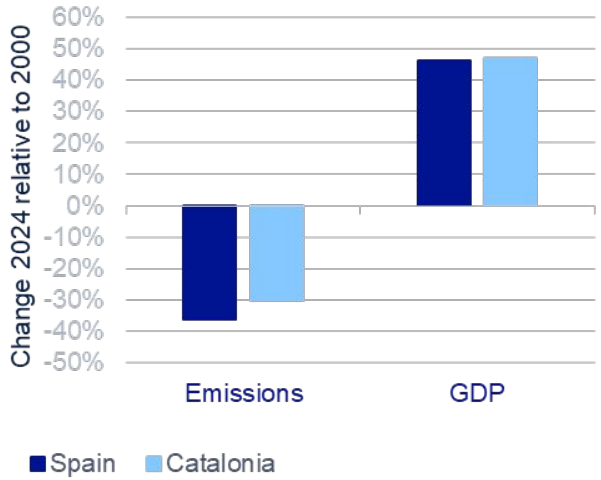
Heterogeneity in regional policies creates a risk of fragmentation, but also opportunities for complementary specialization if there is interregional coordination

Catalonia is making progress in decarbonization, with challenges in electrification and clean technologies

CATALONIA–SPAIN. GHG EMISSION INTENSITY. 2000–2024*
KG OF CO2eq PER EURO (2020 PRICES)



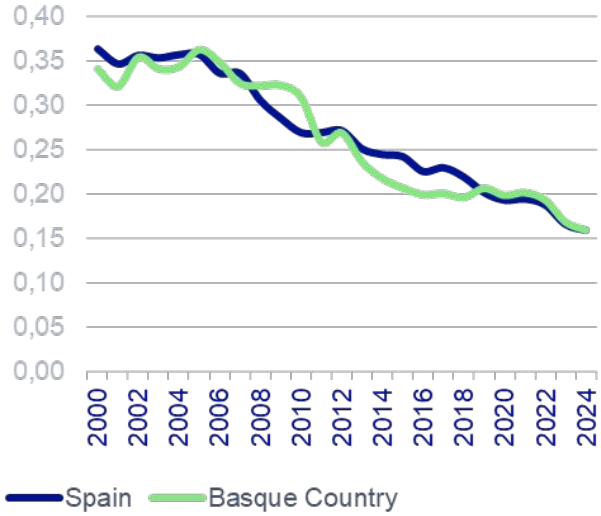
CATALONIA–SPAIN. RELATIVE CHANGE IN GHG EMISSIONS AND REAL GDP. 2000–2024*
PERCENTAGE CHANGE (%)



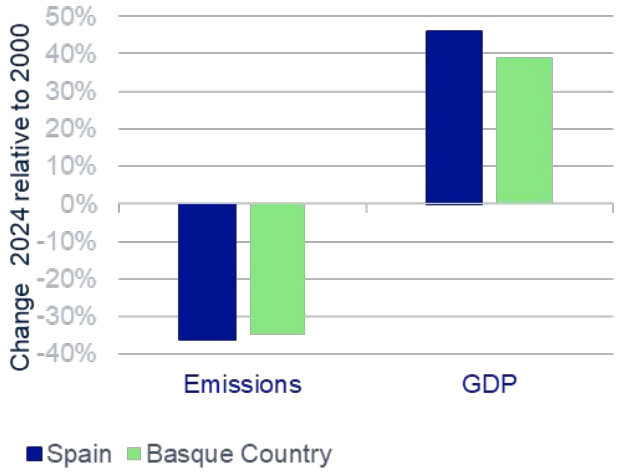
Source: BBVA Research with data from MITECO and INE (Regional accounts and Environmental accounts). *Excluding household emissions

The Basque Country is advancing in decarbonization through innovation and efficiency

BASQUE COUNTRY–SPAIN. GHG EMISSION INTENSITY. 2000–2024*
KG OF CO2eq PER EURO (2020 PRICES)



BASQUE COUNTRY–SPAIN. RELATIVE CHANGE IN GHG EMISSIONS AND REAL GDP. 2000–2024*
PERCENTAGE CHANGE (%)

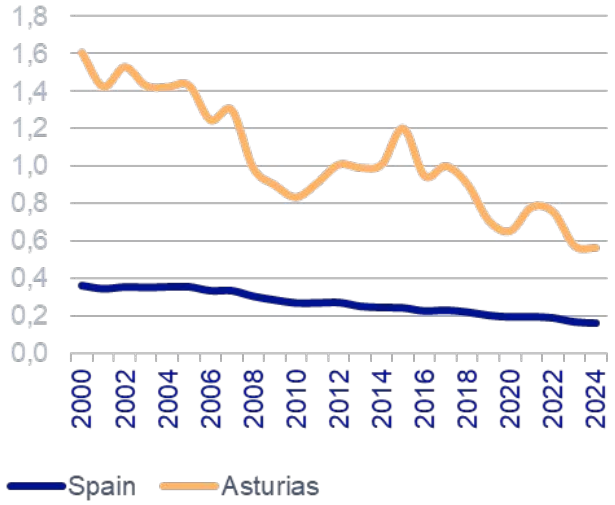


Source: BBVA Research with data from MITECO and INE (Regional accounts and Environmental accounts). *Excluding household emissions

Asturias is advancing in the transition, but remains more carbon-intensive than the national average

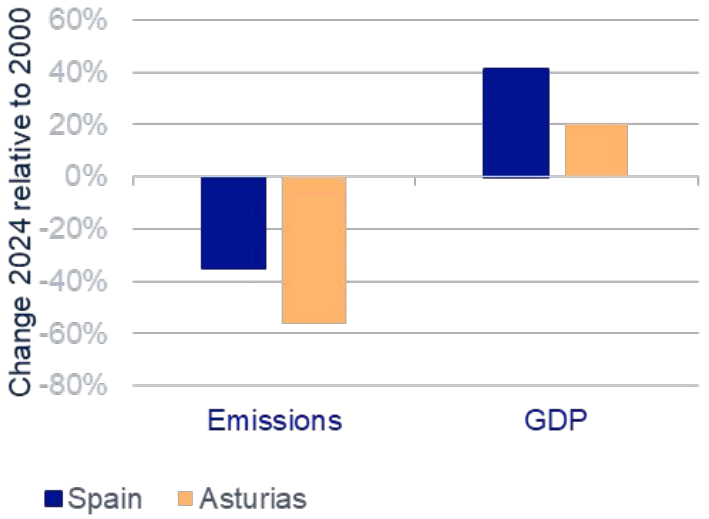
ASTURIAS–SPAIN. GHG EMISSION INTENSITY. 2000–2024*

KG OF CO2eq PER EURO (2020 PRICES)



ASTURIAS–SPAIN. RELATIVE CHANGE IN GHG EMISSIONS AND REAL GDP. 2000–2024*

PERCENTAGE CHANGE (%)



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Main Takeaways (*)

Spain is making progress in decoupling economic growth from emissions, driven by renewable energy, energy efficiency, and productive modernization, although with sectoral and territorial heterogeneity.

Since the mid-1990s, greenhouse gas (GHG) emissions intensity in Spain has been halved, reflecting a less carbon-intensive economy. The increasing share of **renewables** in the energy mix, together with improvements in **energy efficiency,** has been key to reducing emissions.

Four sectors —industry, energy, transport, and agriculture— account for nearly 90% of GHG emissions in Spain (excluding households), while representing only a quarter of national gross value added (GVA).

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Annex

Calculation of “synthetic” emissions by sector and region

MITECO does not provide data on sectoral emissions intensity by region, only at the national level. Given sectoral intensities at the national level (denoting sectors by s), the following holds:

National intensity of sector s = (GHG emissions of sector s in Spain) / (GVA of sector s in Spain)

“Synthetic” emissions have been estimated for each region, assuming a sectoral intensity identical to the national one for each sector across all 17 regions. Emissions are thus calibrated according to each region’s sectoral specialization, as reflected in national gross value added by sector s. Accordingly, for each region r, the following is defined:

“Synthetic” emissions of region r = Σ (National intensity × Share of sector s in region r’s GVA)

The result estimates the total level of emissions each region would have if all its sectors were as emissions-intensive as the national sectoral average. Differences across regions depend exclusively on their economic structure.

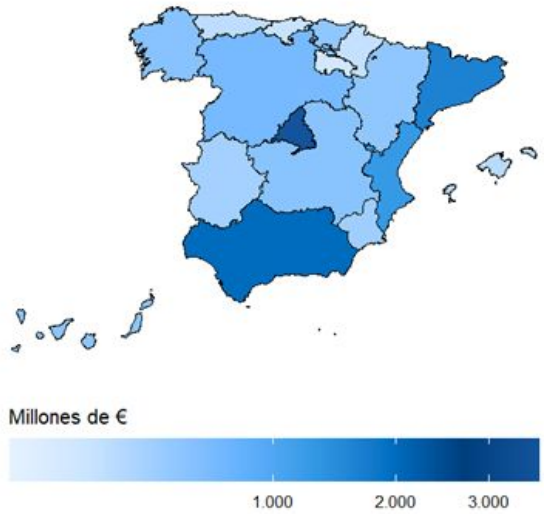
Comparing “synthetic” emissions with those published by MITECO allows for an assessment of each region’s relative efficiency:

- MITECO emissions < “synthetic” emissions: the region operates more efficiently or uses less emissions-intensive technologies than would be expected given its productive structure.
- MITECO emissions > “synthetic” emissions: suggests lower relative efficiency or a greater reliance on carbon-intensive technologies.

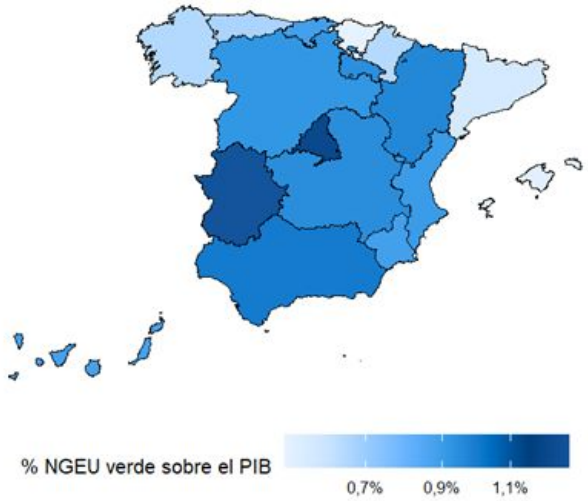
This methodology makes it possible to distinguish which part of regional differences in emissions is explained by economic composition and which part is due to other factors, such as technology or efficiency.

NGEU climate financing has been distributed unevenly

REGIONS. NGEU CLIMATE FINANCING EXPENDITURE. CUMULATIVE 2020–2025
MILLION EUROS



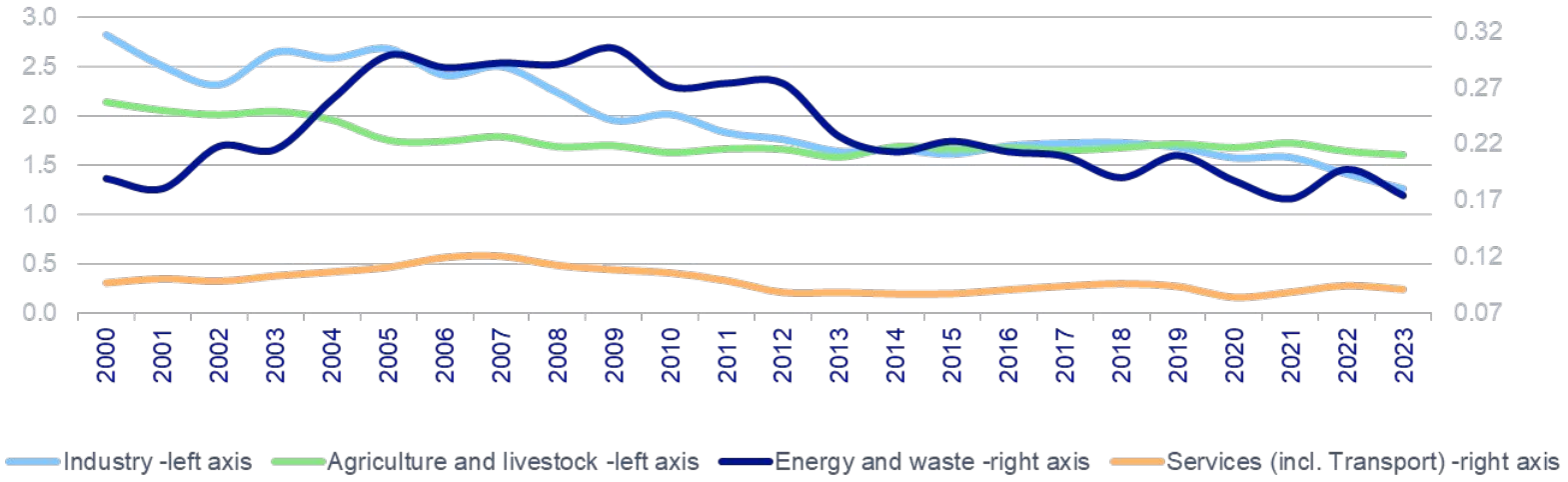
REGIONS. NGEU CLIMATE FINANCING EXPENDITURE. CUMULATIVE 2020–2025
% OF REGIONAL GDP. 2023



*Source: BBVA Research based on the Public Sector Procurement Platform and the National Subsidies Database. Own estimates based on the EU Taxonomy for sustainable activities and internal expertise. Up to October 2025

Catalonia provides an example of broad-based decarbonization

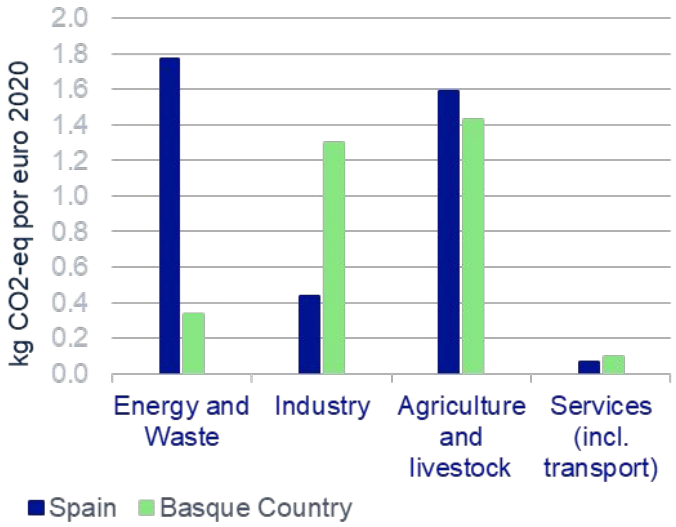
CATALONIA. GHG EMISSION INTENSITY BY SECTOR. 2000–2023
KG OF CO2eq PER EURO (2020 PRICES)



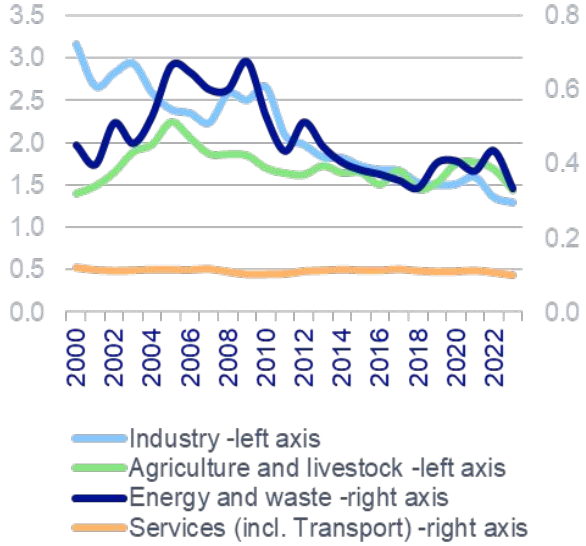
Source: BBVA Research with data from the Catalonia Regional Inventory and Regional accounts from INE

The industry and energy sectors drive decarbonization in the Basque Country

BASQUE COUNTRY–SPAIN. GHG EMISSION INTENSITY BY SECTOR. 2023
KG OF CO2eq PER EURO (2020 PRICES)



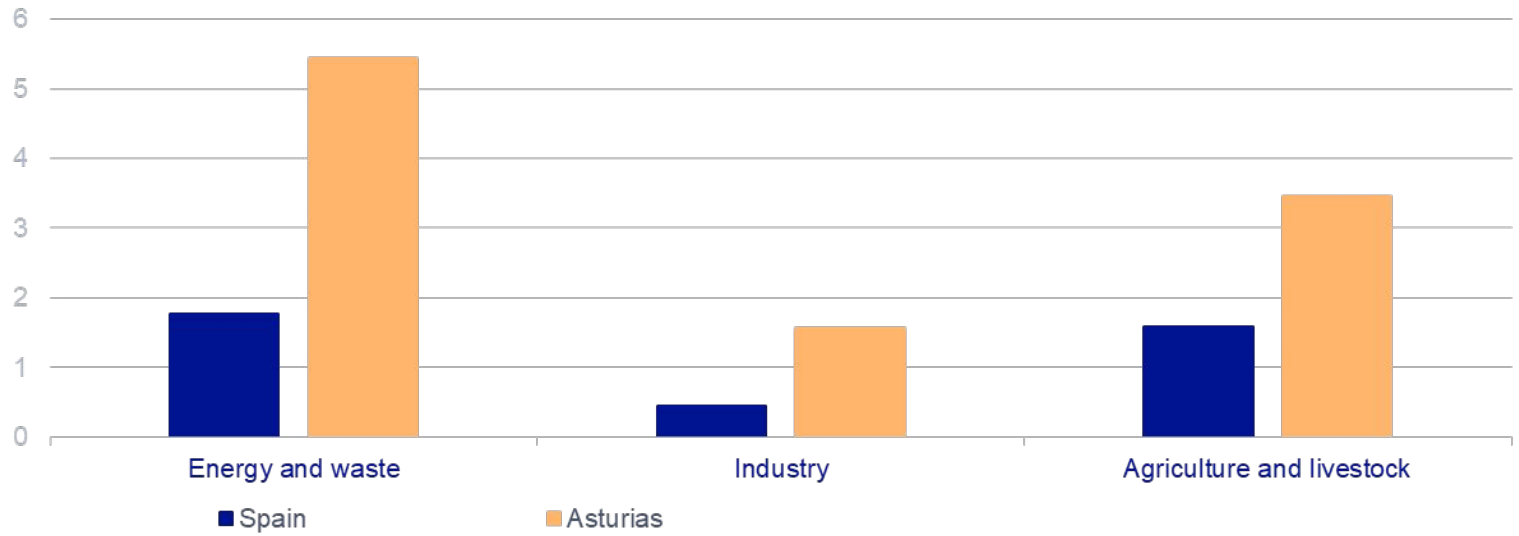
BASQUE COUNTRY. GHG EMISSION INTENSITY BY SECTOR. 2000–2023
KG OF CO2eq PER EURO (2020 PRICES)



Source: BBVA Research with data from the Basque Country Regional Inventory and Contabilidad Regional from INE

Energy and waste explain most of Asturias' higher carbon intensity

ASTURIAS-SPAIN. GHG EMISSION INTENSITY BY SECTOR. 2023. KG OF CO2eq PER EURO (2020 PRICES)



Source: BBVA Research with data from MITECO and INE (Regional accounts and Environmental accounts). *Excluding household emissions

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