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EUROSYSTEM

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GHG Emissions Analysis

Methodology

This GHG emissions analysis was conducted through an interactive dashboard developed using **R Shiny** (link to the repository). The dashboard offers a comprehensive platform for visualizing greenhouse gas (GHG) emissions data, structured into three distinct tabs: GHG Evolution, GHG per Capita, and GHG Contribution. Users can engage with the data through dynamic filtering options, enabling tailored analyses by year, country, and data type, thereby providing an insightful user experience.

Data Sources:

- Emissions Database for Global Atmospheric Research (EDGAR) report on the global greenhouse gas (GHG) emissions around the world (European Commission)
- Historical classification by income (World Bank)
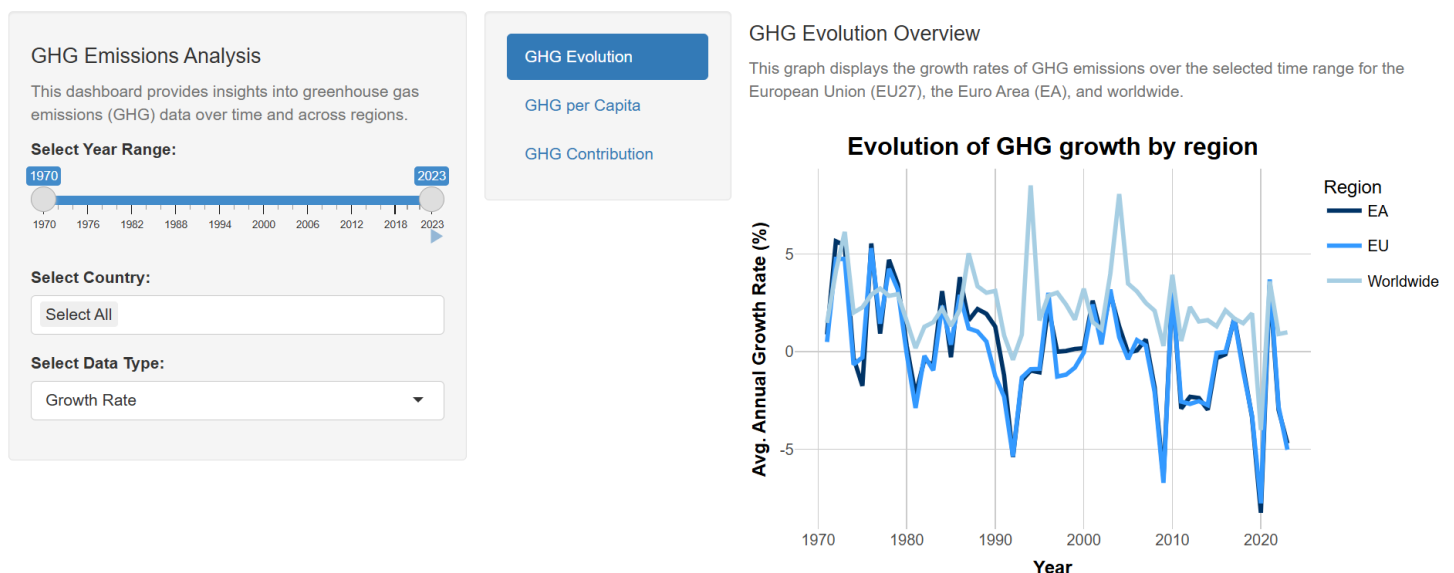- World regions according to Our World in Data

Data Manipulation:

International Aviation and International Shipping were excluded from this analysis, as they account for less than 1% of global total emissions, specifically 0.719% and 0.034%, respectively.

1. Chart 1 – Evolution of GHG growth in the euro area, European Union (EU27) and worldwide:

Years analysed: from 1970 to 2023, with a **fixed composition** based on the EU27.
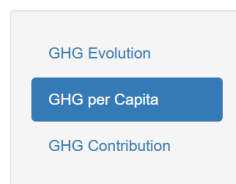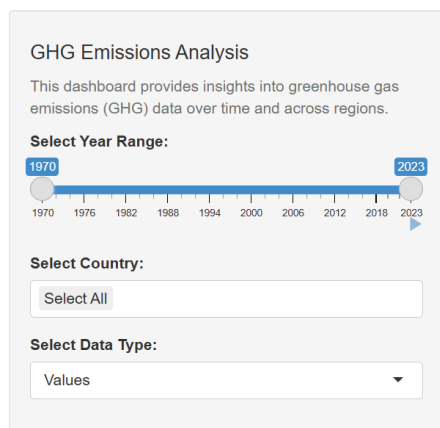
GHG Emissions Dashboard

GHG Emissions Analysis

This dashboard provides insights into greenhouse gas emissions (GHG) data over time and across regions.

Select Year Range:

1970 — 2023

1970 1976 1982 1988 1994 2000 2006 2012 2018 2023

Select Country:

Select All

Select Data Type:

Growth Rate

GHG Evolution

GHG per Capita

GHG Contribution

GHG Evolution Overview

This graph displays the growth rates of GHG emissions over the selected time range for the European Union (EU27), the Euro Area (EA), and worldwide.

Evolution of GHG growth by region

Region: EA, EU, Worldwide

- **Global vs. Regional Trends**: The worldwide GHG growth rates are consistently more volatile than those of the EU and EA, particularly in periods of economic crises, such as the early 1990s and 2008–2009, reflecting the broader economic and industrial diversity globally.

- **Long-Term Decline in EU and EA GHG Growth Rates**: While EU and EA follow the same trend, both regions show a gradual decrease in GHG growth rates over the decades, with frequent instances of negative growth (indicating reductions in emissions), especially post-2000, aligning with increased climate policies and emission reduction commitments.

- **Notable Negative Spikes**: Significant negative spikes in GHG growth rates are evident around global crises, such as the financial crisis in 2008 and the COVID-19 pandemic in 2020, indicating sharp reductions in emissions due to economic slowdowns or shutdowns.

2.   Chart 2 – Comparison of countries' GHG emissions per capita aggregated according to the World Bank income groups:
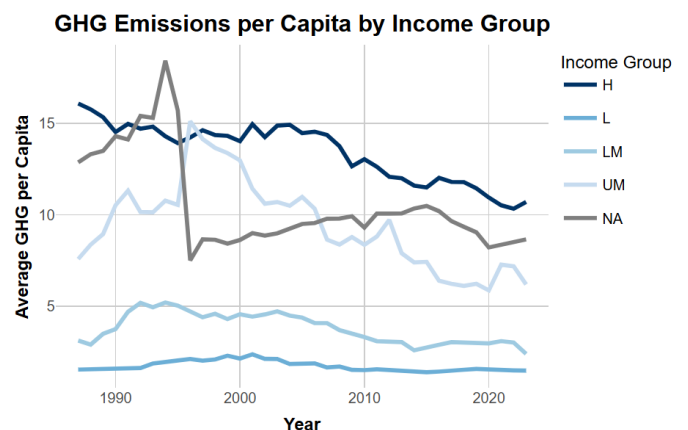
Years analysed: 1987 to 2023.

Note: the countries not being classified by the World Bank have been classified under the category "Not classified", considering their relevance on the overall emissions

- **High-Income Group (H) Leads Emissions**: The high-income (H) group consistently exhibits the highest GHG emissions per capita, although it shows a gradual and steady decline over the years.
- **Not classified group(NA)**:from 1970 to 1994 it showed a peak, becoming the biggest polluter per capita (on average), from which it followed a big drop in 1996. From then onwards, it followed a stable trend.

- **Similar Trends Across Income Groups:** High-income groups show a steady decline in emissions from 1970 to 2023. Low-income (L) and lower-middle-income (LM) groups consistently exhibit lower per capita emissions. The LM group experienced an increase in emissions from 1970 to 1996, after which it aligned with the downward trend observed in other income groups. Meanwhile, the L group remains relatively stable and consistently has the lowest per capita emissions. The upper-middle-income (UM) group, on the other hand, demonstrates a notable decline in per capita emissions beginning around 1996.

3.   Chart 3 – Contribution of individual country and continent GHG emissions to total world GHG emissions:

Years analysed: 1970 to 2023.

- **Asia's Dominance in Emissions**: Asia contributes the highest share of global GHG emissions (42.96%), with China alone responsible for 19% of global emissions and 44.1% of Asia's emissions. It is interesting to note that around the years of 1970's the United States were the biggest contributor, while from the year 2000's China takes the prime.

- **Regional Disparities in Emission Contributions**: North America, led by the United States (82% of its region's emissions), contributes 21.37% of global emissions, whereas Europe contributes 23.43%, with Russia and Germany being the largest emitters in that region.

- **Low Contributions from Africa and Oceania**: Africa and Oceania have significantly lower GHG emissions, collectively accounting for only about 7.37% of global emissions, highlighting their minimal contribution compared to other continents.

GHG Contribution Overview

This tab offers a detailed breakdown of GHG emissions by continent and country, featuring a tree map alongside a table highlighting each continent's contribution.

Share of GHG Emissions per Continent and Country with Gradient
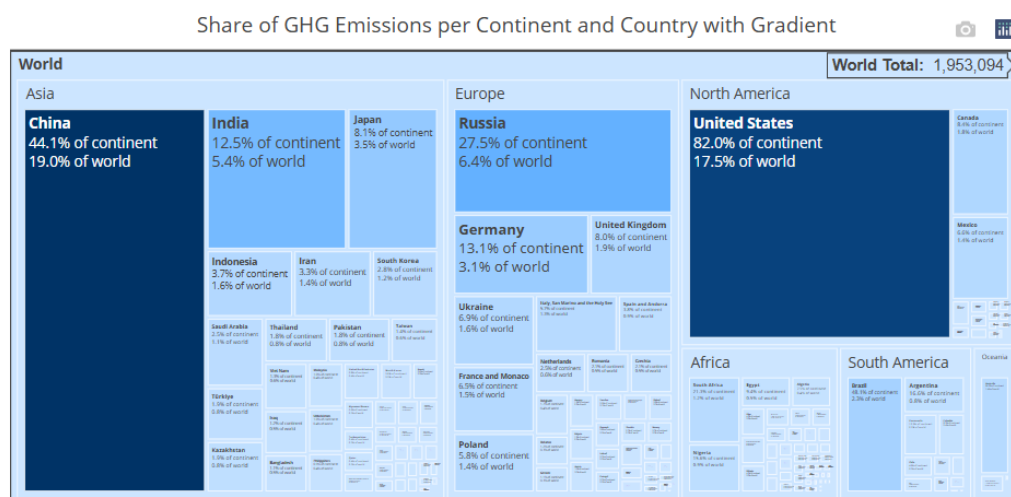
Gradient Legend: GHG Emissions Levels

Low Emissions	Medium Emissions	High Emissions
0 - 1,000,000 GHG	1,000,001 - 10,000,000 GHG	10,000,001+ GHG

Continent	GHG Emissions	% of World Total
Asia	839076.70	42.96
Europe	457591.64	23.43
North America	417461.60	21.37
Africa	112582.20	5.76
South America	94915.33	4.86
Oceania	31466.74	1.61