



JRC SCIENCE FOR POLICY REPORT

GHG EMISSIONS OF ALL WORLD COUNTRIES

2023



Crippa, M., Guizzardi, D., Pagani, F., Banja, M., Muntean, M., Schaaf, E., Becker, W., Monforti-Ferrario, F., Quadrelli, R., Risquez Martin, A., Taghavi-Moharamli, P., Köykkä, J., Grassi, G., Rossi, S., Brandao De Melo, J., Oom, D., Branco, A., San-Miguel, J., Vignati, E.

JRC/IEA REPORT

EUR 31658 EN

This publication is a Science for Policy report by the Joint Research Centre (JRC), the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The contents of this publication do not necessarily reflect the position or opinion of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication. For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source. The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Contact information

Email: JRC-EDGAR@ec.europa.eu

Address: European Commission, Joint Research Centre, Via Enrico Fermi, 2749, 21027, Ispra (VA), Italy

EU Science Hub

<https://joint-research-centre.ec.europa.eu>

JRC134504

EUR 31658 EN

| | | | | |
|-------|------------------------|----------------|---|-------------------|
| Print | ISBN 978-92-68-07551-7 | ISSN 1018-5593 | doi:10.2760/235266 | KJ-NA-31-658-EN-C |
| PDF | ISBN 978-92-68-07550-0 | ISSN 1831-9424 | doi:10.2760/953322 | KJ-NA-31-658-EN-N |

Luxembourg: Publications Office of the European Union, 2023

© European Union, 2023



The reuse policy of the European Commission documents is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Unless otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated.

For any use or reproduction of photos or other material that is not owned by the European Union permission must be sought directly from the copyright holders.

How to cite this report: Crippa, M., Guizzardi, D., Pagani, F., Banja, M., Muntean, M., Schaaf E., Becker, W., Monforti-Ferrario, F., Quadrelli, R., Risquez Martin, A., Taghavi-Moharamli, P., Köykkä, J., Grassi, G., Rossi, S., Brandao De Melo, J., Oom, D., Branco, A., San-Miguel, J., Vignati, E., *GHG emissions of all world countries*, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/953322, JRC134504.

Contents

| | |
|---|-----|
| Abstract..... | 1 |
| Acknowledgement | 2 |
| Executive summary | 3 |
| 1 Introduction..... | 7 |
| 2 Global GHG emissions from 1970 until 2022 | 9 |
| 3 Global GHG emissions from LULUCF from 1990 until 2022 | 17 |
| 4 Conclusions..... | 20 |
| References | 21 |
| List of abbreviations and definitions..... | 24 |
| List of boxes | 25 |
| List of figures..... | 26 |
| List of tables | 27 |
| Annexes..... | 28 |
| Annex 1. Bottom-up methodology for global GHG emissions compilation | 28 |
| Annex 2. Methodology for the estimation of emissions from Land Use, Land-Use Change and Forestry (LULUCF) | 33 |
| Annex 3. Methodology for the estimation of emissions from large scale biomass burning..... | 35 |
| Annex 4. Content of country fact-sheets | 37 |
| Annex 5. GHG emissions for the world, international transport and the EU27 | 38 |
| Annex 6: GHG emissions by country | 43 |
| Annex 7. GHG emissions and removals from LULUCF sector by macro-regions..... | 252 |
| Disclaimer..... | 263 |

Abstract

The Emissions Database for Global Atmospheric Research (EDGAR) provides greenhouse gas (GHG) emissions time series for all countries and for all anthropogenic sectors from 1970 until 2022, with the exception of emissions and removals from land use and forestry, which are provided for the years 1990-2022. The report contributes to the Paris Agreement process with an independent quantitative overview of global GHG emissions, based on the IEA-EDGAR CO₂, EDGAR CH₄, EDGAR N₂O and EDGAR F-gases version 8.0 datasets (2023).

Acknowledgement

This booklet was produced with input from many colleagues, gathered over several years. The International Energy Agency (IEA) energy use statistics and the corresponding CO₂ emissions are fundamental to the EDGAR database and the authors would like to thank IEA for the long-standing collaboration. The authors are grateful to the European Commission's Directorate-General for Climate Action (DG CLIMA) (V. Pollard, B. Goni-Ros, R. Lake, J. Genet, O. Juvyns, S. Santacroce, J. Salay, S. Kay) for their reviews and guidance and M. Rivas Rabago (DG ENER) and M. Tognoni (DG ENER) for their review. The authors would also like to thank the Food and Agriculture Organisation (FAO) (F. Tubiello), United States Geological Survey (USGS) (R. Schulte, L. Apodaca, A. Hatfield), the International Fertiliser Association (IFA) (L. Cross), the World Steel Association, the Energy Institute (EI), and the Global Gas Flaring Reduction Partnership (GGFR), the Payne Institute at the Colorado School of Mines and the U.S. National Oceanic and Atmospheric Administration (NOAA), for the provision of data. An extra thank to F. Pekar (JRC, Unit C.5), Matthias Weitzel (JRC, Unit C.6) and Sabine Darras (JRC, Unit C.5) for their thorough reviews and proofreading and to Bagdagul Tan (JRC.C) for the design of the cover page.

Authors

Crippa, M., Unisystems, S. A. Milan, Italy
Guizzardi, D., EC, Joint Research Centre (JRC), Unit C.5., Ispra, Italy
Pagani, F., Unisystems, S. A. Milan, Italy
Banja, M., EC, Joint Research Centre (JRC), Unit C.5., Ispra, Italy
Muntean, M., EC, Joint Research Centre (JRC), Unit C.5., Ispra, Italy
Schaaf, E., EC, Joint Research Centre (JRC), Unit C.5., Ispra, Italy
Becker, W., Unisystems, S. A. Milan, Italy
Monforti-Ferrario, F., EC, Joint Research Centre (JRC), Unit C.5., Ispra, Italy
Quadrelli, R., International Energy Agency, Paris, France
Risquez Martin, A., International Energy Agency, Paris, France
Taghavi-Moharamli, P., International Energy Agency, Paris, France
Köykkä, J., International Energy Agency, Paris, France
Grassi, G., EC, Joint Research Centre (JRC), Unit D.1., Ispra, Italy
Rossi, S., ARCADIA SIT s.r.l, Vigevano (PV), Italy
Brandao De Melo, J., Joint Research Centre (JRC), Unit D.1., Ispra, Italy
Oom, D., EC, Joint Research Centre (JRC), Unit E.1., Ispra, Italy
Branco, A., ARCADIA SIT s.r.l, Vigevano (PV), Italy
San-Miguel, J., EC, Joint Research Centre (JRC), Unit E.1., Ispra, Italy
Vignati, E., EC, Joint Research Centre (JRC), Unit C.5., Ispra, Italy

Executive summary

Policy context

Most countries around the world are preparing plans and implementing actions to tackle climate change. The European Union has ambitious objectives in this regard, and in the context of the European Green Deal¹ and European Climate Law², has set a target to reduce its net domestic greenhouse gas (GHG) emissions by at least 55% by 2030 compared to 1990 levels and to become climate neutral (net zero greenhouse gas emissions) by 2050.

On the 14th of July 2021, the European Commission proposed a package of legislative proposals (known as the “Fit for 55” package³) covering climate, energy, land use, transport and taxation, that will lead the EU to achieve its 2030 GHG emissions reduction target. At the time of writing, several major initiatives of the “Fit for 55” package have been adopted and are being implemented⁴ and its full deployment is expected before the end of 2024.

At the global level, all G20 countries, covering in total about 75% of current global GHG emissions, have decided to fix a target date in which they will become net-zero emitters⁵. Among them, USA, Canada, Brazil, Australia and the European Union have pledged to reach climate neutrality by 2050, China and Saudi Arabia by 2060 (while India targets net zero emissions by 2070).

All Parties to the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) are required to prepare emission reduction pledges, known as Nationally Determined Contributions (NDCs). Under the transparency framework of the Paris Agreement, all Parties must report bottom-up inventories of national greenhouse gas emissions and track progress towards the implementation and achievement of their NDCs. This reporting is to be contained in Biennial Transparency Reports (BTRs), which are first due by the end of 2024. Parties may submit their inventory reports as part of the BTR or separately, and Annex-I⁶ countries must continue submitting inventories annually.

Bottom-up national emission inventories are therefore an essential component of reporting and tracking progress towards the goals of the Paris Agreement. However, national inventory reports are not yet available for all countries and years. In addition, they are dependent on individual national reporting processes and methodological choices, they can present data gaps for specific sectors and currently, except for Annex I parties, there is no obligation to include long-term series of emissions up to the most recent year.

The European Commission’s in-house Emissions Database for Global Atmospheric Research (EDGAR)⁷ offers an alternative to overcome these limitations and to complement national inventories and has the advantage of producing timely emission estimates that are comparable across countries.

EDGAR relies on several sources of international statistics for the underpinning data. Foremost among these is the International Energy Agency (IEA). To harmonise global GHG emission estimates, this booklet incorporates IEA CO₂ emissions from fossil fuel combustion sources named IEA-EDGAR CO₂ emission dataset (v2), which are complemented with in-house EDGAR estimates for CH₄, N₂O and F-gas emissions.

EDGAR completes the global picture with emissions time-series for each country, contributing to enhanced transparency and providing an additional source with which national and global estimates can be compared.

This report focuses on the update to the most recent years of the GHG emission time series, including emissions from anthropogenic sectors and Land Use, Land Use Change and Forestry (LULUCF) up to 2022. For all countries,

(¹) See the Communication from the European Commission on the European Green Deal: COM(2019) 640 final.

(²) Regulation (EU) 2021/1119, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R1119>

(³) https://ec.europa.eu/clima/eu-action/european-green-deal/delivering-european-green-deal_en

(⁴) https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal/fit-55-delivering-proposals_en

(⁵) <https://www.un.org/en/climatechange/net-zero-coalition>

(⁶) Annex I Parties comprise the industrialized countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.

(⁷) EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database, a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO₂, EDGAR CH₄, EDGAR N₂O, EDGAR F-GASES version v8.0 (2023), European Commission, https://edgar.jrc.ec.europa.eu/report_2023.

including the EU and its 27 Member States⁸, EDGAR emissions may differ from official national inventories due to differences in data sources, methodologies, and approaches, although both are, in principle, based on the Intergovernmental Panel on Climate Change (IPCC) guidelines for GHG reporting. However, the overall EU GHG emissions trend is similar to that reported to the UNFCCC even though the figures do not match completely.

Key conclusions

According to the latest data, global GHG emissions in 2022 reached 53.8 Gt CO₂eq (without LULUCF)⁹. The 2022 data represent the highest level recorded and experienced an increase of 1.4% or 730 Mt CO₂eq compared to the levels in 2021. This upward trend indicates a continuation of the post-COVID rebound. In fact, global GHG emissions in 2022 rose by 6.2% compared to the levels in 2020, and by 2.3% compared to the levels in 2019.

Taking a longer-term perspective and considering the top five emitters in 2022, the European Union's GHG emissions demonstrated the most significant relative decrease among the top emitting economies, being 27.0% lower in 2022 than in 1990 and showing GHG emission decoupling from economic growth.

Over the same period, Russia's GHG emissions also saw a considerable decrease of 15.5%, while the United States' emissions decreased only by 2.4%. On the contrary, emerging economies such as China and India have experienced considerable increases in their GHG emissions. In fact, emerging countries even within the top emitting economies, still have to reach a peak in their GHG emissions, decouple them from their economic growth, and then move forward to the achievement of their climate neutrality commitments. China's GHG emissions have increased by 285%, while India's GHG emissions have increased by 170% from 1990 to 2022.

Globally, LULUCF has acted as a fairly stable net sink for CO₂ emissions since 2000, if the contribution of wildfire related GHG emissions is excluded. In 2022, we estimate that this sector was a net sink of about 0.18 Gt CO₂eq (or 1.35 Gt CO₂ excluding wildfires) equivalent to 0.33% of global GHG emissions of that year.

Global deforestation was responsible for net CO₂ emissions of about 4.0 Gt CO₂ in 2022, equivalent to 10.4% (or 7.5%) of the total anthropogenic CO₂ (or GHG) emissions. In the EU27, LULUCF in 2022 was a net sink of 0.21 Gt CO₂eq (or 0.22 Gt CO₂eq when excluding wildfires), which is approximately 40% less than in 1990.

Main findings

Since the beginning of the 21st century, global GHG emissions have grown steadily in comparison to the two previous decades, mainly due to the increase in fossil CO₂ emissions by China, India, and other emerging economies. However, the global economy experienced a slowdown in 2020 due to the COVID-19 crisis. As a result, there was a temporary halt in the growth of global greenhouse gas (GHG) emissions, followed by a rebound in 2021¹⁰. Based on the emission estimates for 2022 provided by EDGAR, global GHG emissions increased by 1.4% compared to 2021, reaching 53.8 Gt CO₂eq. These figures are 2.3% higher than the 52.6 Gt CO₂eq emissions recorded in 2019.

In 2022, the majority of GHG emissions consisted of fossil CO₂ accounting for 71.6% of total emissions, while CH₄ contributed by 21% to the total, N₂O by 4.8% and F-gases by 2.6%. Global fossil CO₂ emissions increased by more than 70% since 1990. The increases in CH₄ and N₂O emissions have followed a somewhat slower pace: CH₄ increased by 32.4% and N₂O by 36.5% between 1990 and 2022, while F-gases have seen a four-fold increase in the same period.

China, the United States, India, the EU27, Russia and Brazil were the six world largest GHG emitters in 2022 (see Figure 1). Together they account for 50.1% of global population, 61.2% of global Gross Domestic Product (WB, 2023), 63.4% of global fossil fuel consumption (EI, 2023¹¹) and 61.6% of global GHG emissions.

Among these top emitters, in 2022 China, the United States and India increased their emissions compared to 2021, with India having the largest increase in relative terms (5%). In 2022, the EU27's GHG emissions were 27.0% lower than in 1990 at 3.59 Gt CO₂eq and 0.8% lower than in 2021, representing 6.7% of global emissions. Out of the countries that contribute more than 1% to the total global greenhouse gas emissions (see Table 1), only Australia

⁽⁸⁾ Hereafter EU27

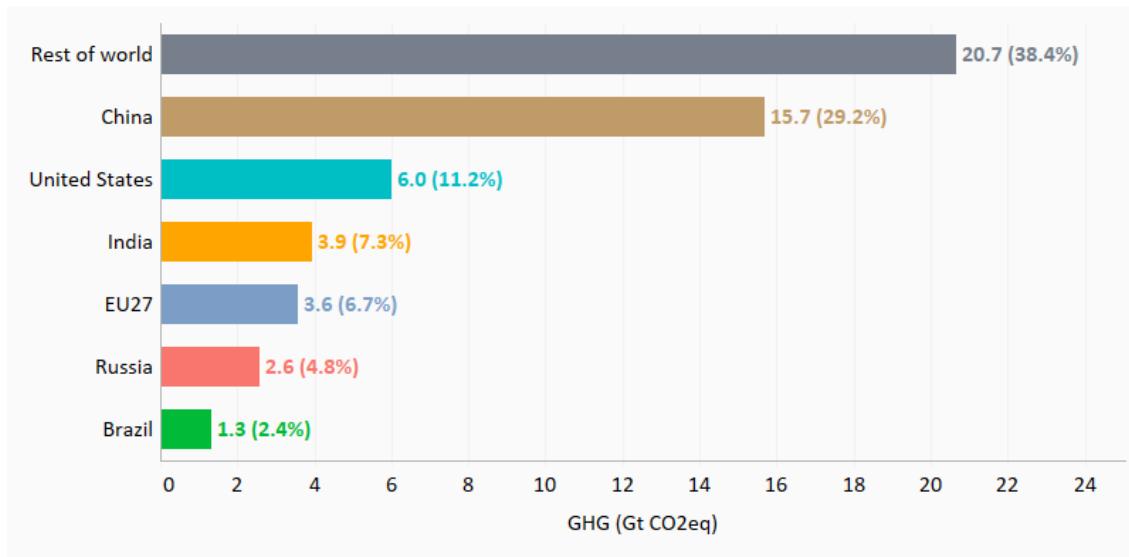
⁽⁹⁾ The analysis on GHG emissions trends presented does not include the emissions from LULUCF. Hereafter, these emissions will be defined as GHG emissions.

⁽¹⁰⁾ The comparison between the 2022 emission levels with the years 2019, 2020 and 2021 is presented across the text to evaluate how current emissions (2022) have changed compared to the pre COVID-19 pandemic (2019), the year of the pandemic (2020) and the previous year (2021) which is also characterised by the emission rebound from the COVID-19 reduction.

⁽¹¹⁾ Defined as the sum of all coal, liquid fossil fuels and natural gas primary energy consumption.

managed to reduce its emissions in 2021 (by 1.9%) and 2022 (by 0.3%) compared to 2020. Additionally, Australia's emission intensity (emissions per unit of economic output) has consistently decreased over the past decade, although its per capita emissions are even higher than the US or Russian ones. Conversely, Indonesia displayed the largest increase of 10% in GHG emissions in 2022 compared to 2021.

Figure 1. GHG emissions (in Gt CO₂eq) and contribution of the major emitting economies and the rest of the world in 2022, (in Gt CO₂eq)



Source: JRC, 2023

Table 1. Shares in 2022 global emissions¹², yearly GHG emission relative changes¹³ over the period 2019-2022 and the CAGR¹⁴ in 1990-2022 (%)

| | Share in global | Change 2019-2020 | Change 2020-2021 | Change 2021-2022 | Change 2019-2022 | Change 2020-2022 | CAGR (1990-2022) |
|------------------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| China | 29.2% | 1.9% | 5.1% | 0.3% | 7.4% | 5.4% | 4.3% |
| United States | 11.2% | -8.7% | 5.5% | 1.6% | -2.2% | 7.2% | -0.1% |
| India | 7.3% | -5.7% | 6.7% | 5.0% | 5.7% | 12.1% | 3.2% |
| EU27 | 6.7% | -7.7% | 5.6% | -0.8% | -3.4% | 4.7% | -1.0% |
| Russia | 4.8% | -3.9% | 7.2% | -1.0% | 2.0% | 6.1% | -0.5% |
| Brazil | 2.4% | -0.3% | 5.1% | -2.4% | 2.3% | 2.6% | 2.0% |
| Indonesia | 2.3% | -4.9% | 2.1% | 10.0% | 6.8% | 12.3% | 3.4% |
| Japan | 2.2% | -5.3% | 1.2% | 0.6% | -3.6% | 1.8% | -0.3% |
| Iran | 1.8% | -1.6% | 3.9% | 1.6% | 3.9% | 5.6% | 3.3% |
| Mexico | 1.5% | -6.5% | 3.5% | 7.1% | 3.7% | 10.9% | 1.8% |
| Saudi Arabia | 1.5% | -0.8% | 3.3% | 3.9% | 6.4% | 7.3% | 3.9% |
| Canada | 1.4% | -8.2% | 3.0% | 3.2% | -2.4% | 6.4% | 0.8% |
| South Korea | 1.3% | -4.3% | 4.5% | -0.7% | -0.8% | 3.7% | 2.5% |
| Türkiye | 1.3% | 3.5% | 8.5% | 3.1% | 15.8% | 11.9% | 3.5% |
| Australia | 1.1% | -3.9% | -2.0% | 1.7% | -4.1% | -0.3% | 0.7% |
| South Africa | 0.99% | -9.8% | -0.5% | -2.5% | -12.5% | -3.1% | 0.8% |
| Global | | -3.7% | 4.8% | 1.4% | 2.3% | 6.2% | 1.5% |
| International Aviation | 0.8% | -52.3% | 15.4% | 23.3% | -32.1% | 42.3% | 1.5% |
| International Shipping | 1.4% | -8.5% | 5.7% | 5.7% | 2.2% | 11.7% | 2.0% |

Source: JRC, 2023

⁽¹²⁾ In Table 1, countries are ranked by their GHG emission share in the global total (countries with share of more than 1% are shown, together with international shipping and aviation).

⁽¹³⁾ It is important to acknowledge that year-to-year variations in emissions are estimated with an accuracy level of approximately $\pm 0.5\%$ (Olivier et al., 2016) when relying on robust statistical activity data (such as IEA energy balance data or CO₂ emissions from fossil fuel combustion for the period 1970-2020). For the data spanning 2021-2022, the accuracy can range up to $\pm 2\%$ (based on a Fast-Track approach), contingent upon regional, sectoral, and fuel-specific contributions. Emission magnitudes, on the other hand, have a range of accuracy that depends on the level of aggregation (for example global or country level, total emission, or specific sector, as detailed by Solazzo et al., 2021), as well as the substance, with N₂O in particular having higher levels of uncertainty, and CO₂ the least. Global total GHG emissions are estimated with around $\pm 10\%$ accuracy, while the range of accuracy for country level total CO₂ emissions is between $\pm 4\%$ and $\pm 35\%$ (95% confidence interval). Policy makers and the scientific community should consider these uncertainties when using these data for further analysis.

⁽¹⁴⁾ Compound annual growth rate (CAGR) calculates annual changes over a specified number of years as if this change had happened steadily each year over that time period.

Emissions from international aviation and shipping, which represented 0.8% and 1.4% of global GHG emissions in 2022, increased by 23.3% and 5.7%, respectively. Emissions from international aviation decreased by almost half in 2020, partially rebounding in 2021 when they accounted for 55% of the 2019 value.

Concerning international shipping, the increase in GHG emissions was more than twice their 2020 reduction (in relative terms), with emissions in 2022 being 2.2% higher than in 2019.

Quick guide

The main sections of this booklet present an overview of the global and regional trends of GHG emissions. A brief and representative analysis shows the role of top emitters (by country and sector) in the evolution of emissions over a 52-year period. Section 3 is devoted to preliminary estimation of LULUCF CO₂ emissions and removals, and GHG emissions from wildfires. Then, for each country, a fact sheet is provided with time series of GHG emissions from all anthropogenic activities except land use, land-use change, forestry, and large-scale biomass burning which are provided in Annex 7 for world macro-regions.

1 Introduction

Scope

In December 2015, the Paris Agreement brought together 195 nations to undertake ambitious efforts to combat climate change and required all parties to the agreement to put forward their best efforts through “nationally determined contributions” (NDC). Acknowledging the need to ensure environmental integrity, an enhanced transparency framework was created and 5-yearly Global Stocktakes were planned from 2023 onwards. It is nevertheless worth noticing that current NDCs commitments by world countries for 2030 have been judged “highly insufficient” by the latest UNEP emission Gap report (UNEP, 2022).

The Emissions Database for Global Atmospheric Research (EDGAR) contributes to global climate action with an independent and quantitative view of global GHG emissions. EDGAR is a global database that provides estimates of country and sector-specific GHG emissions (CO₂, CH₄, N₂O and F-gases) implementing a transparent state-of-the-art methodology (Janssens-Maenhout et al., 2019; IPCC, 2006a; IPCC 2019b). As such, it supports efforts to provide consistent and transparent emission estimates that are global in scope and can inform climate action under the Paris Agreement, although the conception and early versions of EDGAR precede by far the Paris Agreement.

EDGAR estimates of greenhouse gas emissions use global statistics and state-of-the-art scientific knowledge of emission mechanisms for a wide range of anthropogenic activities. The methodology used is transparent and in line with the most recent scientific literature and Intergovernmental Panel on Climate Change (IPCC) guidelines (IPCC, 2006a; IPCC, 2019b). The EDGAR Community GHG emission database used in this report comprises IEA-EDGAR CO₂¹⁵, EDGAR CH₄, EDGAR N₂O and EDGAR F-gases version 8.0. This edition of the booklet also includes annual macro-regional estimates of CO₂ emissions from Land Use, Land Use Change and Forestry (LULUCF) sector from 1990 to 2022, including GHG emissions from wildfires from the Global Wildfire Information System (GWIS)¹⁶, as part of the continuous improvement and expanding outreach of the EDGAR database.

A combination of reliability, independence, transparency and completeness makes EDGAR a valuable quantitative tool to support the complex international scientific and political discussions on climate mitigation. EDGAR data can contribute to providing the comprehensive picture needed for the UNFCCC’s Global Stocktakes envisaged from 2023 onwards. Previous editions of this booklet have been regularly presented to the annual Conference of Parties (COP) under UNFCCC.

Overview

This booklet presents the trends of global GHG emissions from 1990 to 2022 together with emissions and removals from LULUCF and wildfires. EDGAR applies a bottom-up methodology a summary of which is available in the Annex 1 of this booklet, together with data sources and references. For each country as well as for the world and EU27 emissions, a fact-sheet with time series of GHG reveals sector-specific trends and trends in emissions per capita and per GDP. The upper panel of the fact sheet includes emissions from 1990 until 2022 by aggregated sectors, together with a pie chart indicating the relative share of each GHG to the country total in 2022. An overview table with total emissions by country for the years 1990, 2005 (Kyoto protocol), 2015 (Paris Agreement) and 2022 is also reported, together with per capita and per GDP emissions and population data. Finally, the bottom panel of each fact-sheet shows the changes of emissions by sector for the last available year (2022) compared to 1990, 2005 and 2021. All data presented in this booklet are available for download and further analysis from the EDGAR website https://edgar.jrc.ec.europa.eu/report_2023.

Related and future JRC work

The reliability, independence and completeness of the EDGAR GHG emission estimates make them a valuable quantitative information source in support of the complex international scientific and political discussions on climate mitigation. The EDGAR database compiles global GHG emissions, making use of international statistics and

⁽¹⁵⁾ IEA-EDGAR CO₂ dataset incorporates IEA CO₂ emissions from fossil fuel combustion (1970-2020), extended up to 2022 with a Fast-Track (FT) methodology and JRC computed CO₂ process emissions (1970-2022), as described in Annex 1.

⁽¹⁶⁾ <https://gwis.jrc.ec.europa.eu/>

a globally consistent methodology across countries, complementing official national inventories reported by the EU Member States to the European Environmental Agency and by Parties to the UNFCCC¹⁷.

The EDGAR database aims to inform policy makers and the scientific community involved in the field of GHG emissions and budgets. It complements and supports the upcoming UNFCCC Global Stocktakes foreseen under the Paris Agreement. It also underpins analyses of the co-benefits of air pollution and GHG emission mitigation strategies, supports the development of an independent verification system and helps the understanding of emission uncertainties.

EDGAR depends on a number of sources of international statistics for the underlying data. Foremost among these is the International Energy Agency (IEA). The IEA and the JRC are committed to the yearly co-production of consistent fossil CO₂ emissions estimates up to the year *t-1*, directly using IEA CO₂ emissions from fossil fuel combustion (up to *t-2* extended by the JRC with a Fast-Track approach) and JRC computations of CO₂ process emissions.

This booklet incorporates emissions from IEA-EDGAR CO₂ (v2), EDGAR CH₄, EDGAR N₂O and EDGAR F-gases version 8.0 (2023). Land Use, Land Use Change and Forestry (LULUCF) emissions are based on an updated version of the EDGAR-LULUCF database and the Global Wildfire Information System (GWIS).

In addition, the EDGAR framework and the JRC experience in compiling emissions inventories are shared and compared within the international emissions community of the Global Emissions Initiative (GEIA) where EDGAR is represented in the Scientific Steering Committee.

EDGAR GHG emissions presented in the yearly EDGAR booklets also contributed to the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC) Working Group III on climate mitigation (Dhakal et al., 2022), and are regularly used in the yearly UNEP Emission Gap Reports.

EDGAR supports the IPCC Task Force on National Greenhouse Gas Inventories, compiling and refining guidelines for national GHG emission inventories and providing training support and knowledge databases to visualise emission hot spots. EDGAR supports the Arctic Monitoring and Assessment Programme (AMAP) of the Arctic Council by providing methane (CH₄), Persistent Organic Pollutant (POPs) and mercury (Hg) emission data. Finally, EDGAR air pollutant emission estimates contribute to the United Nations Economic Commission for Europe (UNECE) Convention on Long-Range Transboundary Air Pollution (CLRTAP) and the Task Force on Hemispheric Transport of Air Pollution (TF-HTAP) with the compilation of global air pollutant emission mosaics¹⁸ (Crippa et al., 2023) and to global atmospheric modelling activities to enhance the scientific understanding of the intercontinental transport of air pollution and related impacts.

Future developments of EDGAR will include the extension of historical and up to date emissions with projections under different climate scenarios, and the development of high spatial resolution emissions in support of sub-national climate territorial policies. Moreover, starting from the EDGAR-FOOD work¹⁹, EDGAR will further provide tools and data to move from a sector-based approach to a system perspective.

Thanks to their transparency and completeness EDGAR data are also being used by an ever-increasing pool of researchers, policy makers and engaged citizens as a reliable source of information on climate-relevant emissions.

(¹⁷) Whenever available, officially reported data, used for tracking progress towards policy targets and for a number of countries or regions, normally provide a more robust and complete picture than the data available under EDGAR. For the EU, for example, the national inventory data is more complete/accurate and should be used as the basis for assessing EU climate progress.

(¹⁸) https://edgar.jrc.ec.europa.eu/dataset_htap_v3

(¹⁹) https://edgar.jrc.ec.europa.eu/edgar_food

2 Global GHG emissions from 1970 until 2022

The evolution of global GHG emissions over the period 1970-2022 is illustrated in Figure 2. Emission trends for the main activity sectors (namely power industry²⁰, industrial combustion and processes²¹, transport²², buildings²³, agriculture²⁴, waste²⁵ and fuel exploitation²⁶) are also shown. Because of the COVID-19 pandemic, global emissions decreased by 3.7% in 2020 compared to 2019 levels, interrupting a more than ten-year increasing trend. Global GHG emissions started to grow after the COVID-19 pandemic, reaching in 2022 the level of 53.8 Gt CO_{2eq}²⁷, which is 2.3% higher than 2019 and 1.4% higher than 2021. In 2020, the GHG emissions from transport experienced the largest drop compared with the pre COVID-19 year (-14.1%). However, in 2022, this sector experienced the largest increase, rising by 4.7%. In 2022, GHG emissions from the building sector only saw a marginal decrease of 0.4% compared with 2021, year in which these emissions grew by 4.6%. Global per-capita emissions in 2022 increased by 0.4% to reach 6.76 t CO_{2eq}/cap, a value still 0.8% lower than in 2019.

Figure 2. Global GHG emissions by sector (left axis, bars) and per capita (right axis, black line), 1970-2022 (in Gt CO_{2eq})

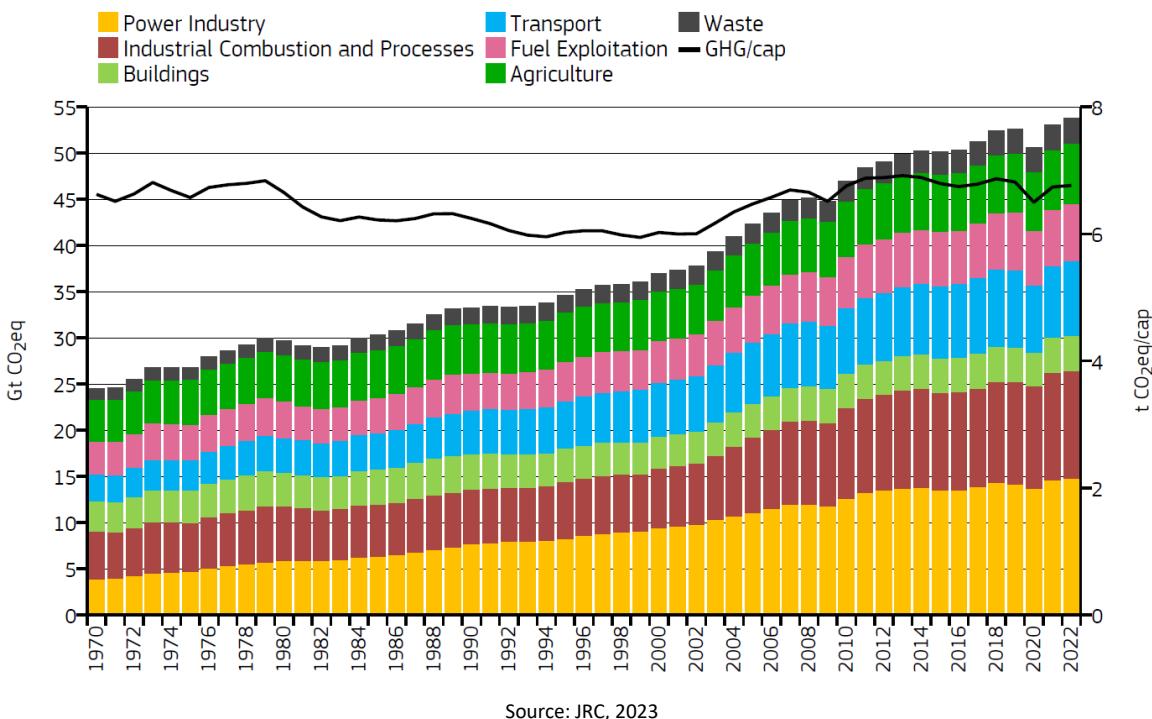


Figure 3 shows total annual GHG emissions of the EU27 and the other five top-emitting countries in the world (China, the United States, India, Russia and Brazil) from 1970 to 2022 including also uncertainty bands showing the 95% confidence interval of the emission estimates²⁸. The corresponding per capita CO₂ emissions (in t

⁽²⁰⁾ Power industry includes power and heat generation plants (public and auto-producers).

⁽²¹⁾ Industrial combustion and processes includes combustion for industrial manufacturing and industrial process emissions (e.g. non-metallic minerals, non-ferrous metals, solvents and other product use, chemicals, etc.).

⁽²²⁾ Transport includes road transport, rail transport, domestic aviation, domestic shipping and inland waterway transport for each country. International shipping and aviation also belong to this sector and are presented separately in the country factsheets due to their international nature. Figure 2 includes also international shipping and aviation under the transport sector.

⁽²³⁾ Buildings includes small-scale non-industrial stationary combustion.

⁽²⁴⁾ Agriculture includes agriculture livestock (enteric fermentation, manure management), agriculture soils (fertilisers, lime application, rice cultivation, direct soil emissions, indirect N₂O emissions from agriculture), field burning of agricultural residues.

⁽²⁵⁾ Waste includes solid waste disposed on land, solid waste composted and hazardous solid waste processing/storage, waste water handling, waste incineration.

⁽²⁶⁾ Fuel exploitation: fuel extraction, transformation and refineries activities, including venting and flaring.

⁽²⁷⁾ Total GHG consists of CO₂, CH₄, N₂O and F-gas emissions which can be expressed in CO_{2eq} using their Global Warming Potential values established in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. More details are provided in Annex 1.

⁽²⁸⁾ The estimated uncertainty considers the accuracy of both activity data and emission factor statistics. The tiered model of IPCC (IPCC, 2006a) is used to estimate the uncertainty, assigning lower/higher uncertainty to more/least developed countries (Solazzo et al., 2021). The overall accuracy depends on the degree of aggregation (global or country level, total or sector-specific, etc.).

$\text{CO}_{2\text{eq}}/\text{cap}$) and the world average are represented in Figure 4. Figure 5 depicts the GHG emissions per unit of GDP PPP (in t $\text{CO}_{2\text{eq}}/\text{k USD}$) in top emitting economies and for the world average.

Figure 3. GHG emissions in top emitting economies and estimated uncertainty (coloured bands), 1970-2022, (in Gt $\text{CO}_{2\text{eq}}$)

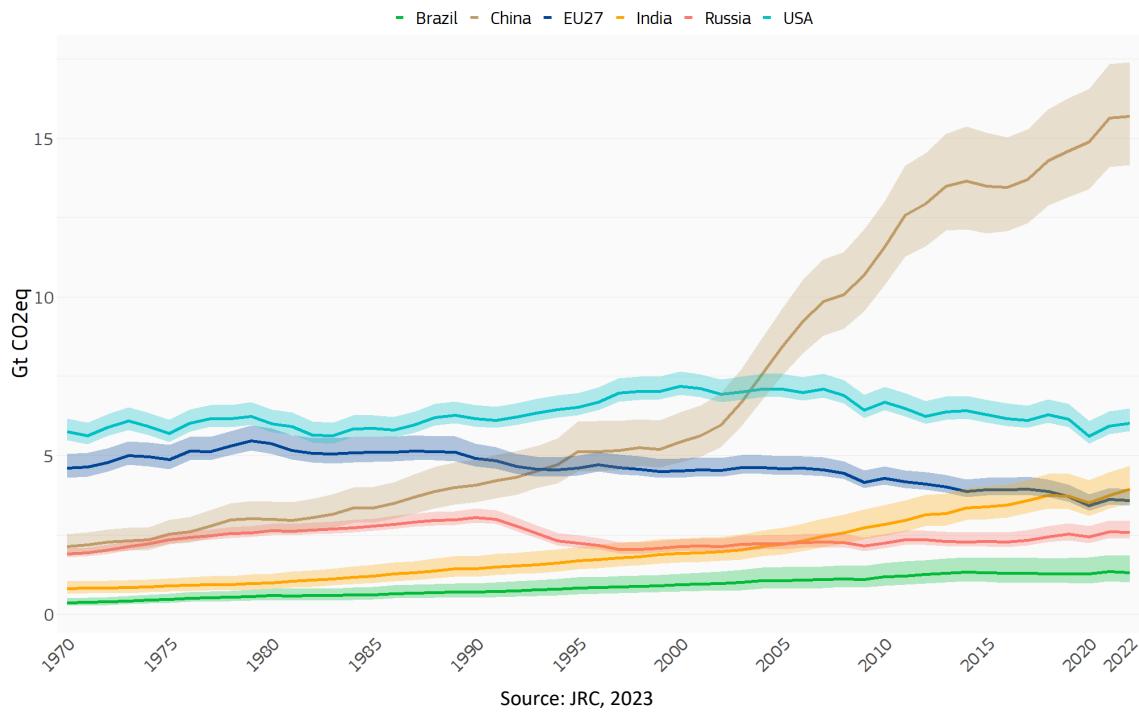


Figure 4. GHG emissions per capita in top emitting economies, 1970-2022, (t $\text{CO}_{2\text{eq}}/\text{cap}$)

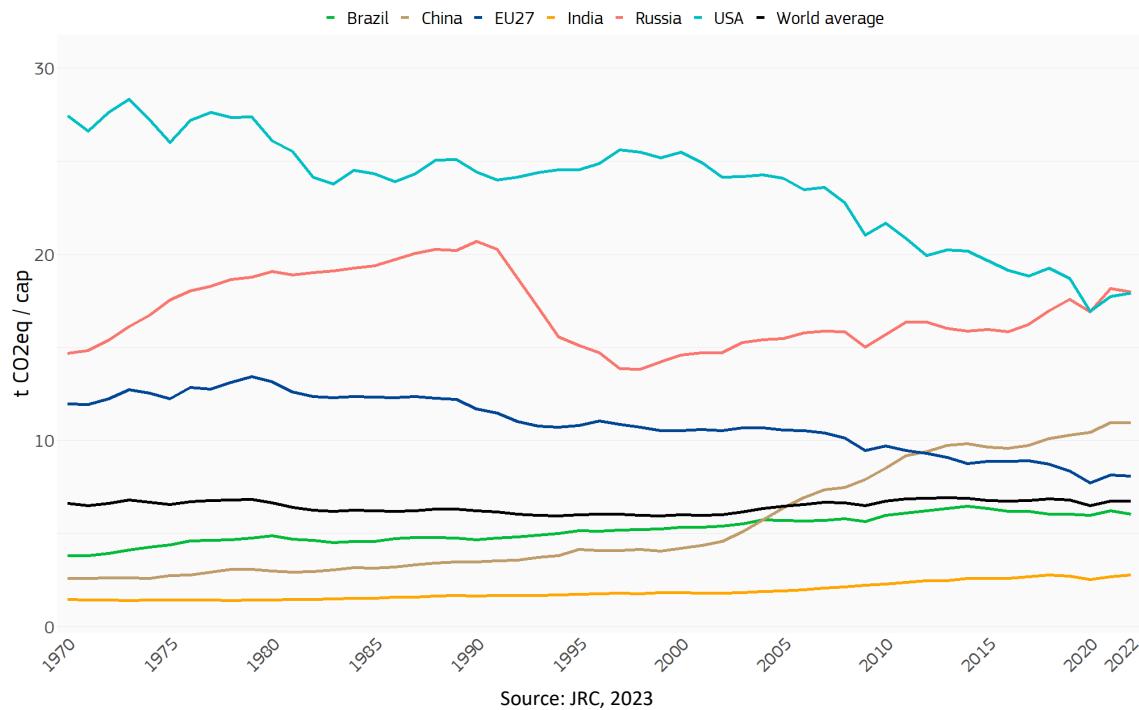
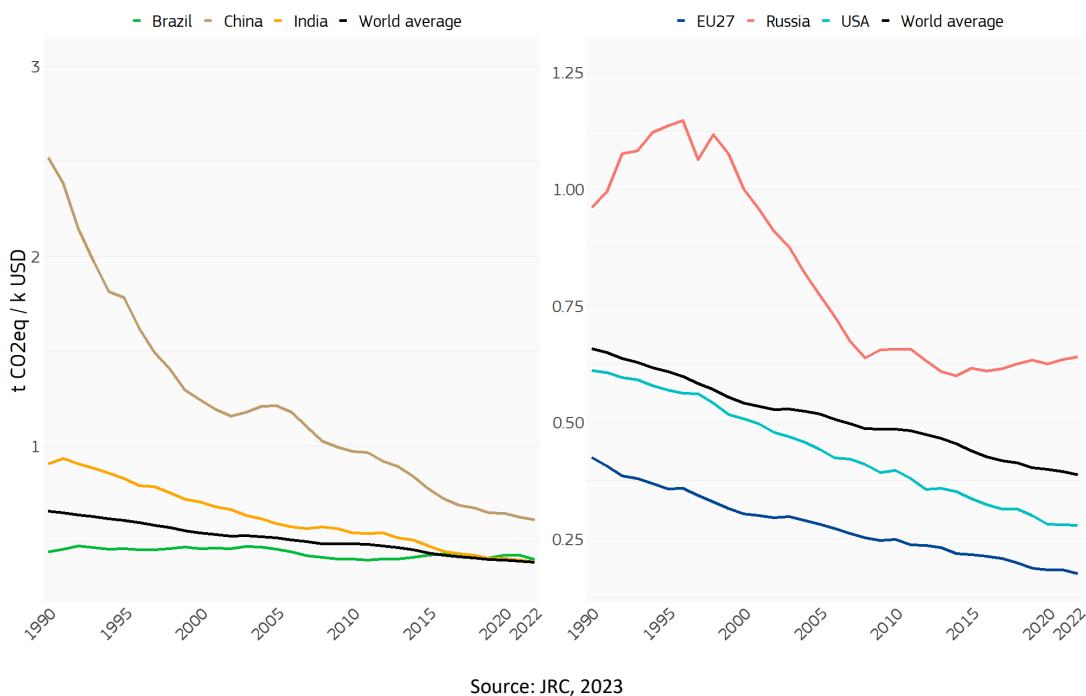


Figure 5. GHG emissions per unit of GDP PPP in top emitting economies, 1990-2022, (t CO₂eq/k USD)²⁹



Source: JRC, 2023

Global greenhouse gas emissions increased by 1.4% or 730 Mt CO₂eq in 2022, reaching a new record high of 53.8 Gt CO₂eq. This growth follows a 3.7% decrease in emissions during 2020, largely influenced by the impact of the COVID-19 pandemic, and a subsequent full rebound in 2021 with a notable increase of 4.8% (refer to Table 1).

Among the countries accounting for more than 1% of global emissions, only the EU27, Russia, Brazil and South Korea experienced a decrease in their total GHG emissions in 2022 compared with 2021, with respective reductions of 0.8%, 1.0%, 2.4%, and 0.7%. All other top emitters experienced a rise in their GHG emissions between 2021 and 2022. Notably, Indonesia saw a significant increase of 10%, while Mexico experienced a rise of 7.1%, and India recorded a growth of 5%. After the rebound of GHG emissions in 2021 and 2022, six regions/countries (EU27, USA, Australia, Japan, Canada, and South Korea) show emissions in 2022 lower than 2019, the last year before the pandemic. All other top emitters, including Turkey, China, Indonesia, Saudi Arabia, India, Mexico, Iran, Brazil, and Russia, have higher levels of emissions in 2022 compared to 2019, showing that their upward trend of emissions continued also after the rebound of emissions in 2021.

Global GHG emissions per capita have increased by about 8.3% from 6.24 t CO₂eq/cap to 6.76 t CO₂eq/cap between 1990 and 2022. In terms of emissions intensity per GDP PPP in 2022 they reached 0.386 tCO₂eq/k USD, which is 2% less than in 2021. However, this decrease was higher when compared with only 0.7% decline observed between 2020 and 2019 (see Table 2).

Table 2 shows GHG emissions and GDP PPP³⁰ changes in G20 economies in 2022 compared with 2021 for the whole world and the largest economies, including the EU27. Table 2 also illustrates the comparison of emissions intensity of each economy (defined as CO₂eq emissions per unit of GDP PPP) between 2022 and 2021, but also 2020 versus 2019 (COVID-19 effect), 2021 and 2022 versus 2019 (rebound effect to pre-pandemic levels). All the reported economies had increases in GDP PPP in 2022 except for Russia, Indonesia and Mexico (see Table 2). For several countries, the recovery pace of GDP PPP in 2022 was higher than the rebound of the emissions, and a decrease of the GHG intensity of economy³¹ was observed when comparing with pre COVID-19 pandemic years but also with

⁽²⁹⁾ On the left hand side emerging economies are represented while industrialised countries are on the right hand side.

⁽³⁰⁾ GDP: Gross Domestic Product GDP, expressed in Purchasing Power Parity (PPP) (constant 2017 international \$, USD). The difference with GDP nominal is that GDP PPP is adjusted for the difference in the level of prices and is in constant prices (but not adjusted for inflation). GDP PPP data (expressed as billion USD, 2017 prices and PPPs) are mainly sourced from World Bank (WB, 2023) and complemented for missing countries with IEA GDP data (IEA, 2022a). For countries where the 2022 GDP data were not available (i.e. Afghanistan, Cuba, Lebanon, Syria, Gibraltar, Greenland, North Korea), the 2021 or 2020 value was considered also for 2022.

⁽³¹⁾ In the column of GHG intensity (in terms of GDP PPP) the following colour code for circles is applied when comparing the 2022 and 2021 data: Red for “increase” and, Green (with check mark) for “decrease”.

2021. However, for some economies such as Russia, Indonesia and Mexico, this recovery was not enough to offset the rebound of emissions.

Table 2. GDP PPP and GHG emissions intensity of economy in G20 countries – 2022 compared to 2021 and yearly change of GHG emissions intensity for period 2019 -2022

| Country | GDP PPP 2022 | Emissions/GDP PPP | | GDP PPP change 2021-2022 | Emissions change 2021-2022 | Emissions/GDP PPP change | | | |
|----------------|--------------|-------------------|-----------|-----------------------------|-------------------------------|--------------------------|-----------|-----------|-----------|
| | | 2022 | 2021-2022 | | | 2021-2022 | 2019-2020 | 2019-2021 | 2019-2022 |
| World | 139438 | 0.386 | 3.4% | | 1.4% ✓ | -2.0% | ✓ -0.7% | ✓ -2.0% | ✓ -3.9% |
| China | 25685 | 0.611 | 3.0% | | 0.3% ✓ | -2.6% | ✓ -0.4% | ✓ -3.5% | ✓ -6.0% |
| United States | 21565 | 0.279 | 2.1% | | 1.6% ✓ | -0.5% | ✓ -6.1% | ✓ -6.6% | ✓ -7.0% |
| EU27 | 20479 | 0.175 | 3.6% | | -0.8% ✓ | -4.3% | ✓ -2.1% | ✓ -2.1% | ✓ -6.3% |
| India | 10057 | 0.392 | 7.0% | | 5.0% ✓ | -1.8% | ● 0.2% | ✓ -2.0% | ✓ -3.8% |
| Japan | 5210 | 0.227 | 1.0% | | 0.6% ✓ | -0.4% | ✓ -1.1% | ✓ -2.0% | ✓ -2.4% |
| Russia | 4027 | 0.641 | -2.1% | | -1.0% ● | 1.1% | ✓ -1.2% | ● 0.2% | ● 1.3% |
| Indonesia | 3419 | 0.363 | 5.3% | | 10.0% ● | 4.5% | ✓ -2.9% | ✓ -4.4% | ✓ -0.1% |
| Brazil | 3250 | 0.403 | 2.9% | | -2.4% ✓ | -5.2% | ● 3.1% | ● 3.2% | ✓ -2.1% |
| United Kingdom | 3136 | 0.136 | 4.1% | | 0.2% ✓ | -3.7% | ● 2.6% | ✓ -0.5% | ✓ -4.2% |
| Türkiye | 2816 | 0.244 | 5.6% | | 3.1% ✓ | -2.3% | ● 1.6% | ✓ -1.0% | ✓ -3.3% |
| Mexico | 2492 | 0.329 | 3.1% | | 7.1% ● | 3.9% | ● 1.6% | ● 0.4% | ● 4.4% |
| South Korea | 2347 | 0.309 | 2.6% | | -0.7% ✓ | -3.2% | ✓ -3.6% | ✓ -3.4% | ✓ -6.4% |
| Canada | 1906 | 0.397 | 3.4% | | 3.2% ✓ | -0.2% | ✓ -3.3% | ✓ -5.2% | ✓ -5.3% |
| Saudi Arabia | 1821 | 0.445 | 8.7% | | 3.9% ✓ | -4.4% | ● 3.7% | ● 3.0% | ✓ -1.5% |
| Australia | 1325 | 0.431 | 3.6% | | 1.7% ✓ | -1.8% | ✓ -3.8% | ✓ -7.8% | ✓ -9.5% |
| Argentina | 1038 | 0.369 | 5.2% | | 1.2% ✓ | -3.8% | ● 6.7% | ● 1.8% | ✓ -2.1% |
| South Africa | 807 | 0.663 | 2.0% | | -2.5% ✓ | -4.5% | ✓ -3.7% | ✓ -8.7% | ✓ -12.8% |
| Germany | 4503 | 0.174 | 1.8% | | -1.1% ✓ | -2.8% | ✓ -3.7% | ✓ -1.0% | ✓ -3.8% |
| France | 3126 | 0.138 | 2.6% | | -2.8% ✓ | -5.2% | ✓ -1.4% | ● 0.7% | ✓ -4.5% |
| Italy | 2579 | 0.153 | 3.7% | | 0.5% ✓ | -3.1% | ✓ -0.4% | ✓ -0.4% | ✓ -3.5% |

Source: JRC, 2023

Box 1. Impacts of the Ukraine war and energy crisis in EU

Since the invasion of Ukraine by Russia in March 2022, significant efforts have been made by the European countries and the US to reduce their dependence on energy imports from Russia. The EU has introduced by mid-May 2022 the REpowerEU³² plan, which establishes an EU Energy Platform to facilitate collective procurement of gas, including Liquified Natural Gas (LNG), and potentially hydrogen in the future. Main actions included in the plan are: exploring alternative approaches to guaranteeing energy provision; enhancing gas storage capacity to ensure accessible and affordable energy for Europeans; encouraging massive funding and support for the expansion of renewable energy initiatives; engagement at reducing gas demand across all member states of the European Union.

REpowerEU plan also suggests raising the EU's target for renewable sources' share in final energy consumption by 2030 from 40% to 45% and also recommends expediting the permitting process for large-scale renewable projects. Additionally, the plan proposes increasing the binding energy consumption reduction target for 2030 from 9% to 13% relative to the levels seen in 2020.

In August 2021, Russian gas accounted for 45% of the EU's gas import, while 40% was sourced from other suppliers, and the remaining portion was fulfilled by LNG. However, by August 2022³², the import of Russian gas declined significantly to 18%, with 50% of the EU's gas coming from other pipeline suppliers, and approximately 30% being LNG. As of September 2022³², the share of Russian gas in the EU's pipeline gas imports has significantly decreased to only 9%.

Council Regulation (EU) 2022/1369³³ adopted a voluntary demand reduction on the gas consumption for winter 2022-2023 by 15%. Between August 2022 and March 2023, the consumption of natural gas in the EU witnessed a decline of 17.7% compared to the average gas consumption for the corresponding months (August to March) from 2017 to 2022³⁴.

According to quarterly reports released by the Market Observatory for Energy of the European Commission³⁵, the EU gas consumption fall drastically by the end of 2022, 21.4% below the consumption in Quarter 3 of 2022. During the Quarter 4 of 2022 retail gas prices for household customers in several EU capital cities saw a significant decrease. This has marked the first time since the start of the crisis that such a reduction has occurred.

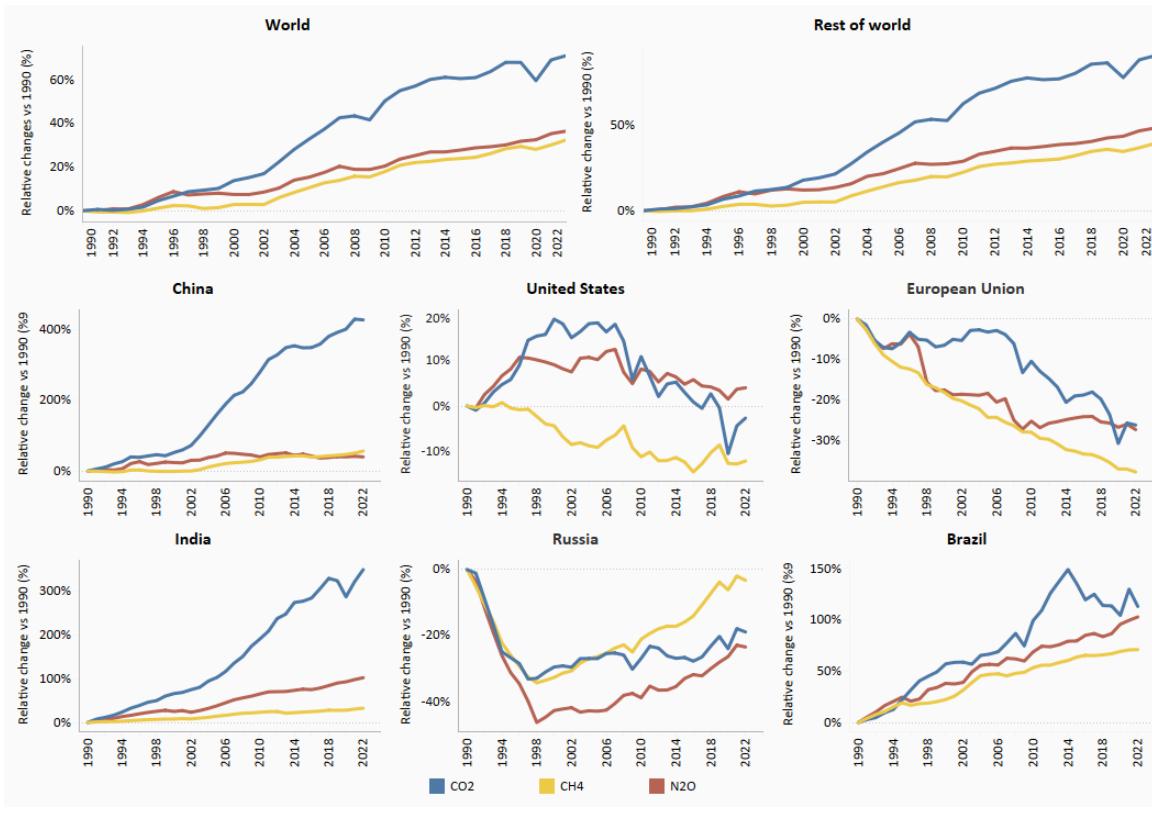
⁽³²⁾ https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

⁽³³⁾ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R1369>

⁽³⁴⁾ <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/DDN-20230419-1>

⁽³⁵⁾ <https://energy.ec.europa.eu/system/files/2023-05/Quarterly%20Report%20on%20European%20Gas%20Markets%20report%20Q4%202022.pdf>

Figure 6. Trends of CO₂, CH₄ and N₂O emissions in world total, rest of the world and top six emitting economies, 1990-2022, relative change vs 1990 (%)



Source: JRC, 2023

In 2022, the majority of GHG emissions primarily consisted of CO₂, resulting from the combustion of fossil fuels (71.6%). CH₄ contributed 21% to the total, while the remaining share of emissions comprised N₂O (4.8%) and F-gases (2.6%). Figure 6 shows the emission trend since 1990 by substance for the world and top emitters. Fossil CO₂ emissions have experienced a significant global increase of over 70% since 1990. In the same period CH₄ increased by 32.4% and N₂O by 36.5%, while F-gases have seen a four-fold increase.

In the EU27, a consistent downward trend is found for CO₂, CH₄, and N₂O, with the trend for CH₄ being more pronounced. The USA experiences the downward trend for the three gases, with the decrease in N₂O emissions similar to that of CO₂.

However, in China and India, fossil CO₂ emissions have significantly increased (by a factor of nearly 5 in China and 4 in India) compared to the increases in CH₄ (by a factor of 1.6 and 1.3, respectively) and N₂O (by a factor of 1.4 and 2, respectively).

In Russia, after a drastic decrease from 1990 to 1998 due to the fall of the USSR and the subsequent economic crisis, CO₂, CH₄ and N₂O emissions have increased. The rate of CH₄ increase has been faster than that of CO₂ and N₂O. Brazil has experienced an overall increase in CO₂, CH₄, and N₂O emissions following a similar trend since 1990. In comparison to 1990, Brazil now ranks as the sixth top emitter, surpassing Japan.

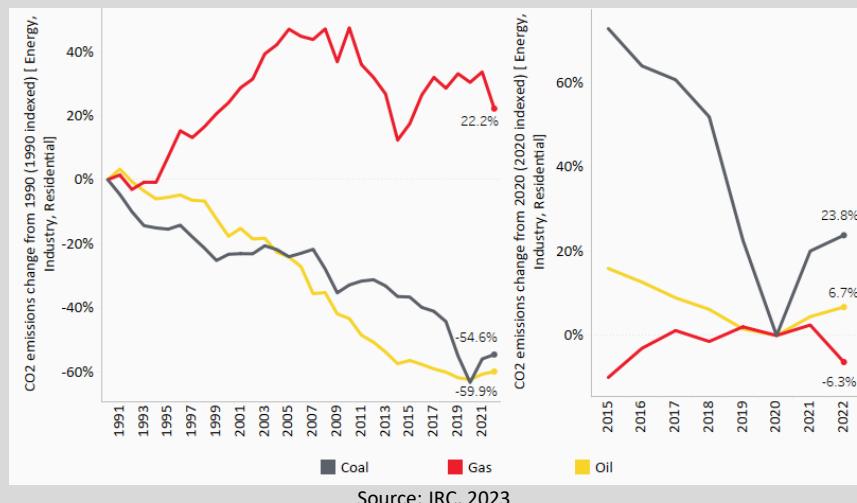
In the EU27, there was a 0.8% (30 Mt CO_{2eq}) decrease in total GHG emissions in 2022 compared to 2021, as indicated in Table 1. It is noteworthy that despite their 2021 rebound, EU27's emissions remained below the pre-COVID-19 levels, continuing their decades-long decreasing trend.

In 2022, several EU27 countries experienced a decrease in their emission levels compared to the previous year, with the largest relative drops observed in Luxembourg (-11.1%), Belgium (-6.4%), Lithuania (-6.3%), Estonia (-6.3%), and the Netherlands (-6.1%). On the other hand, the largest increase in 2022 was observed in Bulgaria (+8.0%), followed by Spain (+7.4%), Portugal (+3.7%), Greece (+3.4%), Ireland (+2.2%), and Malta (+2.0%). In terms of contribution to the EU27's GHG emissions in 2022, Germany remained the largest emitter (21.9%), followed by France (12.0%), Poland (11.2%), Italy (11.0%), and Spain (9.2%).

Box 2. How EU27 energy related CO₂ emissions have changed in 2022

The EU27 energy related CO₂ emissions were in 2020 nearly 45% below the level of 1990. An increase by nearly 9.5% took place in 2021 followed then by a drop of 2.0% in 2022. The main sources of the rebound of the EU27 energy related CO₂ emissions in 2021 were from the coal use in power and industrial sectors, respectively by 21.5% and 14.7%. In residential sector the CO₂ emissions from coal increased by 11% over the same period. The decrease in the level of these energy related emissions in 2022 was determined by the drop of emissions from gas use, with 8.6% less than in 2021 while the increase of emission from coal and oil were respectively 3.1% and 2.2%.

Relative changes in the EU27 energy related CO₂ emissions, 1990-2022 (1990 and 2020 indexed)



Source: JRC, 2023

The EU27 energy related CO₂ emissions from coal has been on decline after 2012 with the largest drop in 2020, year in which these emissions were nearly 16% lower than those from gas. In 2022 these emissions continued to increase further after the rebound in 2021 being nearly 24% (+121 kt) higher when compared with 2020.

The increasing overall trend since 2014 of CO₂ emissions from gas has been interrupted in 2021 showing a decrease by 6.3% (-38 kt) when comparing to 2020. CO₂ emissions from gas consumption saw the largest decreases in residential and industry sectors where a drop by 9.6% and 9.1% respectively took place in 2022 compared to 2020. The reduction was modest in power sector, only by 2.0%.

A shift, even partially, gas-to-coal/oil on energy related CO₂ emissions has been observed in some of the EU27 countries during 2021-2022 period. Six EU27 countries increased their energy related CO₂ emissions in 2022 comparing with 2021: Bulgaria (+11.8%), Spain (+13.2%), Czechia (+2.6%), Ireland (+1.5%), Italy and Greece (+0.3% each).

In Bulgaria, the energy related CO₂ emissions were 16.7% less when sourcing from gas and 18.2% higher when sourcing from coal and 10% higher when sourcing from oil. In Spain, the increase of emissions from coal (+4.9%) was accompanied also with the increase of emissions from gas (+9.6%) as well as from oil (+7.5%) which affected the overall increase of CO₂ emissions between 2021 and 2022. In Greece, despite the energy related CO₂ emissions from gas dropped by 12.0% in 2022 the increase of these emissions from oil (+12.7%) determined the overall trend of CO₂ emissions. In Ireland the drop by 20% of energy related CO₂ emissions were partially compensated by the increase of these emissions from the use of gas (+5.6%) and oil (+10.3%). In Czechia, the energy related CO₂ emissions dropped by 17.4% when sourced from gas and increased by 9.3% higher when sourced from coal. In Italy, the decrease of energy related CO₂ emissions was by only 0.6% when sourced from gas and the increase by 13.9% when sourced from coal.

In other countries the energy related CO₂ emissions decreased mostly in Luxembourg (-24%), in Latvia (-20.3%), in Lithuania (-17.8%), in Hungary (-13.9%) and in Denmark (-12.8%). In countries as Lithuania, Luxembourg and Latvia the drop in the energy CO₂ emissions related to gas was considerable respectively by 25%, 33% and 25% whereas no change was seen in these emissions from coal and oil. Hungary experienced a drop in energy related CO₂ emissions from both gas and coal respectively by 15.4% and 16.7%. Netherlands also decreased the energy related CO₂ emissions from gas by 19% but at the same time, these emissions sourced from oil increased by 7.3%.

Over the same period in some countries, the reduction of emissions from gas has been notably higher compared to the increase from coal: in Estonia, these emissions from gas halved in 2022 after being stable between 2020 and 2021, whereas the emissions from coal increased by 9.1%. In Finland, emissions from gas dropped by 37% in 2022 whereas those from coal and oil remained stable.

⁽³⁶⁾ CO₂ emissions from power, residential and industry sectors are included here.

In the EU27, except for the transport and power industries, all other sectors experienced a decrease in their GHG emissions in 2022. The largest relative drop was observed in the buildings sector, in which emissions decreased by 6.5%. The industrial combustion and processes showed the second-highest decrease, falling by 4.3% below the 2021 levels. Emissions in the transport sector increased by 4.0%, while in the power sector the increase was 1.9%.

From a longer-term perspective, GHG emissions in the EU27³⁷ have been on a decreasing trend over the past three decades, and in 2022 they were 3.6 Gt CO_{2eq}, i.e., 27% below the 1990 level (see Figure 3). The EU27's share of global emissions has also decreased over the last decades (from 14.8% in 1990 to 7.8% in 2015 and 6.7% in 2022).

CO₂ accounted for 78.2% of EU27 GHG emissions in 2022. CH₄ contributed by 13.5%, N₂O by 6% and F-gases with 2.3%. Fossil CO₂ emissions in the EU27 have decreased by 26%, N₂O by 27.1% and CH₄ by 37.6% from 1990. In the same time span, emissions related to F-gases increased by 67.2%. In terms of per capita emissions, the EU27's GHG emissions amounted to 8.09 t CO_{2eq} per person in 2022 (see Figure 4), representing a 0.8% decrease compared to 2021 (8.15 t CO_{2eq}/cap). GHG emissions per unit of GDP PPP reached 0.175 t CO_{2eq}/k USD in 2022, indicating a 4.3% decrease compared to 2021.

In the overall picture for the EU27, the rebound from COVID-19 pandemic situation has caused an interruption of the decreasing trend of coal used in the power sector. In 2021, the rebound in coal utilisation within the EU27 power sector resulted in a notable 20% increase compared to the previous year, during which coal usage decreased by 21%. This upward trend in coal consumption continued in 2022, influenced also significantly by the energy crisis stemming from the conflict in Ukraine. As a response to the uncertainties and rise to extraordinarily high gas prices caused by this crisis, some EU27 Member States have temporarily adjusted their energy mix consumption, favouring an increased on coal to ensure a stable power supply (see Box 1 and Box2).

China's GHG emissions increased by 0.3% in 2022 compared to 2021, reaching 15.7 Gt CO_{2eq}. During the pre-pandemic, pandemic and post-pandemic years, its GHG emissions increased by 2.2%, 1.9% and 5.1% respectively. China's GHG emissions in 2022 were almost four times larger than in 1990 (+285%) and accounted for 29.2% of global GHG emissions (in 1990, this share was 12.2%). This increase is mainly due to increased economic activities which resulted in an increase of CO₂ emissions, which were 5.3 higher than in 1990 and accounted for 80.8% in total national GHG whereas the non-CO₂ GHG gases, i.e. CH₄, F-gases and N₂O, contributed in 2022 by 13.8%, 3.0% and 2.5%, respectively.

The main sectors contributing to the CO₂ emissions in 2022 were power industry (46.6%), industrial combustion (23.9%) and transport (6.9%). The contributions to CH₄ emissions were from fuel exploitation (43.1%), agriculture (29.4%) and waste (23.0%) sectors, while for N₂O they were from agriculture (62.5%) and processes (10.8%). The per capita GHG emissions in 2022 (10.95 t CO_{2eq}/cap) were 6.5% higher than in pre-pandemic 2019 (10.29 t CO_{2eq}/cap), while GHG emission per GDP PPP amounted to 0.611 t CO_{2eq}/kUSD, having the second highest GHG intensity among top emitting economies (see Table 2).

Emissions of GHGs in the **United States** increased in 2022 by 1.6% in comparison with 2021 (see Table 1), reaching about 6.0 Gt CO_{2eq} (see Figure 1). These emissions decreased already by 2.1% in pre-pandemic year followed by a greater decrease of 8.7% in 2020 compared to 2019 to rebound in 2021 with an increase of 5.5% compared to 2020. The contributions to the total national emissions by substance in 2022 were 80.7% CO₂, 12.4% CH₄, 3.7% N₂O and 3.2% F-gases.

Overall, emissions were only 2.4% lower in 2022 than in 1990. Emissions mostly fell between 2005 and 2020 (see Figure 3), primarily due to decreases in CO₂ emissions in the power industry and transport sectors, by 39.5% and by 16.6% respectively. In 2022, emissions per unit of GDP PPP were 0.279 t CO_{2eq}/kUSD, i.e., 0.5% lower than in 2021 (see Table 2), continuing the decreasing trend of the previous years. The per capita GHG emissions in 2022 (17.90 t CO_{2eq}/cap) were 4.3% lower than in 2019 pre-pandemic year (18.70 t CO_{2eq}/cap), very close to Russia's value which is much higher than other top emitters (see Figure 4).

India's GHG emissions increased by 5.0% (or 0.19 Gt CO_{2eq}) in 2022 compared to 2021, reaching a level 5.7% higher than the pre-pandemic 2019 level (see Table 1). In the last three decades, India's emissions have increased almost continuously, and were almost 3 times higher in 2022 than in 1990 (see Figure 3). In 2022 the shares of CO₂, CH₄, F-gases and N₂O in total national emissions expressed in CO_{2eq} were 68.3%, 23.5%, 1.7% and 6.5% respectively.

⁽³⁷⁾ As mentioned in the executive summary, EDGAR emission estimates aim to contribute to the upcoming UNFCCC Global Stocktakes, complementing officially reported national emission inventories which are also based on IPCC reporting guidelines and reviewed by UNFCCC. The EDGAR data are different from those used to track the accomplishment of EU reduction policies and officially submitted to UNFCCC.

The increase in GHG emissions from 1990 in India is mainly due to the increase in CO₂ emissions from power industry and industrial combustion, which were 6 and 4 times higher respectively in 2022 compared to 1990. With a share of approximately 7.3% in the total global emissions in 2022, India is the third largest emitting economy after China and the United States. However, India's per capita emissions (2.79 t CO_{2eq}/cap in 2022) are six times lower than those of the United States and Russia, four times and three times lower than those of China and the EU27 and less than half than those of Brazil. India's emissions per unit of GDP PPP were 0.392 t CO_{2eq}/kUSD in 2022, i.e., 1.9% lower than in 2021.

In 2022, **Russia's** GHG emissions decreased by 1% compared to 2021, and increased by 2% compared to the pre-pandemic level of 2019 (see Table 1). Compared to 1990, in 2022 emissions were 15.5% lower (see Figure 3). With a 4.8% share of global emissions in 2022, Russia was the fifth largest emitter after China, the United States, India and the EU27. Per capita emissions (17.98 t CO_{2eq}/cap in 2022) were at the same level of the United States, but they are higher than those of China (by 64%) and the EU27 (by 122%) (see Figure 4). Emissions per unit of GDP PPP were 0.641 t CO_{2eq}/k USD in 2022, i.e., 1.1% higher than in 2021 (see Table 2).

In 2022, **Brazil's** GHG emissions decreased by 2.4% compared to 2021, and increased by 2.3% compared to the pre-pandemic level of 2019 (see Table 1). Compared to 1990, in 2022 emissions are 88.4% higher (see Figure 3). With a 2.4% share of global emissions in 2022, Brazil is the sixth largest emitter after China, the United States, India, EU27 and Russia. In contrast to the other top emitters, CH₄ accounts for the largest share of emissions (51.1%) followed by CO₂ (35.6%), N₂O (12%) and F-gases (1.2%). In 2022, Brazil per capita emissions were 6.05 t CO_{2eq}/cap, 10.7% lower than the world average.

3 Global GHG emissions from LULUCF from 1990 until 2022

This edition of the EDGAR booklet includes annual estimates of CO₂ emissions and removals from Land Use, Land-Use Change and Forestry (LULUCF), identified as one of the key sectors for tackling climate change and for compliance with emission reduction strategies (IPCC 2019a). The inclusion of emissions from LULUCF helps to provide a more complete overview of global CO₂ fluxes. However, LULUCF is an extremely complex sector to account for in terms of carbon emissions and removals, due to the inherent complexity of terrestrial ecosystems and the difficulty of disentangling anthropogenic and natural fluxes.

In this version of the EDGAR-LULUCF dataset, only the living biomass pools (i.e., above- and below-ground biomass) of the “Forest Land” category and the emissions from biomass burning have been estimated independently, while the other LULUCF fluxes (i.e., non-biomass forest pools and non-forest categories) were taken from a compilation of the official country reporting to the UNFCCC (Grassi et al., 2022). Emissions from biomass burning are estimated within the Global Wildfire Information System (GWIS) (Artés et al., 2019).

We focus on Forest Land (i.e. managed forest existing for at least 20 years and land converted to Forest Land within the previous 20 years) because this category is very important in terms of absolute CO₂ fluxes, but its reporting is often incomplete (especially in developing countries) and the attribution of anthropogenic vs. natural fluxes is very uncertain. Furthermore, within this category, we focus on living biomass because it is by far the most important carbon pool (typically representing >80% of the net CO₂ flux, based on data from Annex I countries). The estimates for forest land presented here combine satellite-derived data to track land use with specific default IPCC factors for forest growth and country statistics for forest harvest (see Annex 2 for details). The IPCC factors provided in the IPCC Guidelines are often very uncertain and show a high variability across different continents (even for the same tree species or forest types). Compared to the 2022 edition, in this version of the dataset a careful and thorough review of the parameters’ values has been performed to obtain a more homogeneous and consistent set of values. It should be noted that our estimates are based on the IPCC Tier 1 approach, i.e. the most basic approach to estimate GHG fluxes.

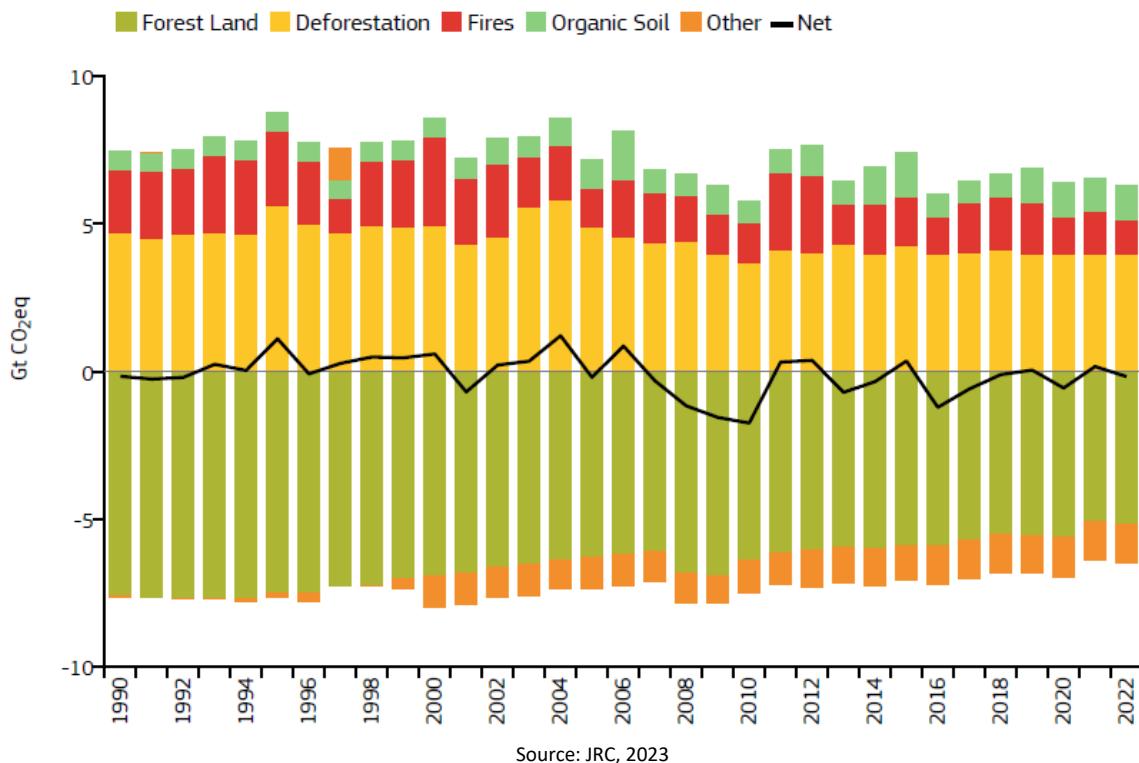
Our estimates serve as a valuable source of information for areas where official estimations are lacking or limited (e.g. several African countries). However, it is important to clarify that our intention is not to challenge or verify the estimates provided by individual countries when they utilize locally available parameters, reliable datasets, and advanced methods (Tier 2 or Tier 3). This particularly applies to Annex I countries. This year, we have substantially improved our methodology, thoroughly updated, and reviewed the reference data.

In terms of attribution of anthropogenic fluxes, the approach used here is, in principle, comparable with what most countries include in their GHG reporting prepared following the IPCC Guidelines for National GHG inventories (IPCC, 2006a; IPCC, 2019b), but differs from the global models used in the IPCC reports (e.g., IPCC, 2022). Global models typically consider as managed forest only those areas subject to intense harvest, whereas countries may define managed forest more broadly within their GHG Inventories and thereby include a much larger area. In addition, countries generally include in their GHG inventories most of the natural response of land to human-induced environmental changes (e.g., CO₂ fertilization, etc.), while the global model approach treats this response as part of the non-anthropogenic flux (Grassi et al., 2021; IPCC, 2019a). Our approach is closer to country GHG inventories because we filter the total satellite-derived forest area with non-intact forest area, which is a reasonable proxy for countries’ managed forests (Grassi et al., 2021), and because the IPCC growth factors are expected to incorporate most of the recent human-induced environmental changes.

For the other LULUCF fluxes, we use a compilation of countries’ data officially reported to the UNFCCC (Grassi et al., 2022), including GHG Inventories for Annex I parties (complete time series 1990-2022, with 2022 assumed to be equal to 2021) and other GHG reporting such as National Communications, Biennial Update Reports, Nationally Determined Contributions and REDD+ submissions for Non-Annex I parties (often incomplete time series, gap-filled when necessary). In this booklet, we aggregated the available data into categories aimed to be a minimum common denominator between the detailed reporting of Annex I countries, the often coarse reporting from non-Annex I countries, and the outputs by the global models (Grassi et al., 2023; Friedlingstein et al., 2022). These categories are ‘deforestation’, ‘organic soil’, and ‘other’. Deforestation includes CO₂ emissions reported under ‘Forest conversion to other land use categories’. Organic soils includes data from all land uses, including peat fires (e.g., in Indonesia). The category ‘other’ includes all the fluxes not covered in the previous categories, e.g. from non-biomass forest pools and from other land use categories such as cropland, grassland, wetlands, settlements,

and Other Land. We also include in EDGAR-LULUCF part of the emissions associated with wild fires from the GWIS database (see details in Annex 3). Since CO₂ emissions from forest fires in tropical regions can be assumed to be mostly associated to deforestation practices (e.g. Van der Werf et al., 2017), to avoid double counting we excluded them from the EDGAR dataset. Forest fire emissions in non-tropical regions were included in our estimates of net CO₂ fluxes. Moreover, CH₄ and N₂O emissions arising from crops burning are removed from GWIS to avoid double counting with EDGAR emissions from the agricultural residue burning sector. GHG emissions and removals from LULUCF are here below presented for the world (see Figure 7) and for the EU27 (see Figure 8) from 1990 to 2022.

Figure 7. Global GHG emissions and removals from LULUCF sector (in Gt CO_{2eq}), 1990-2022



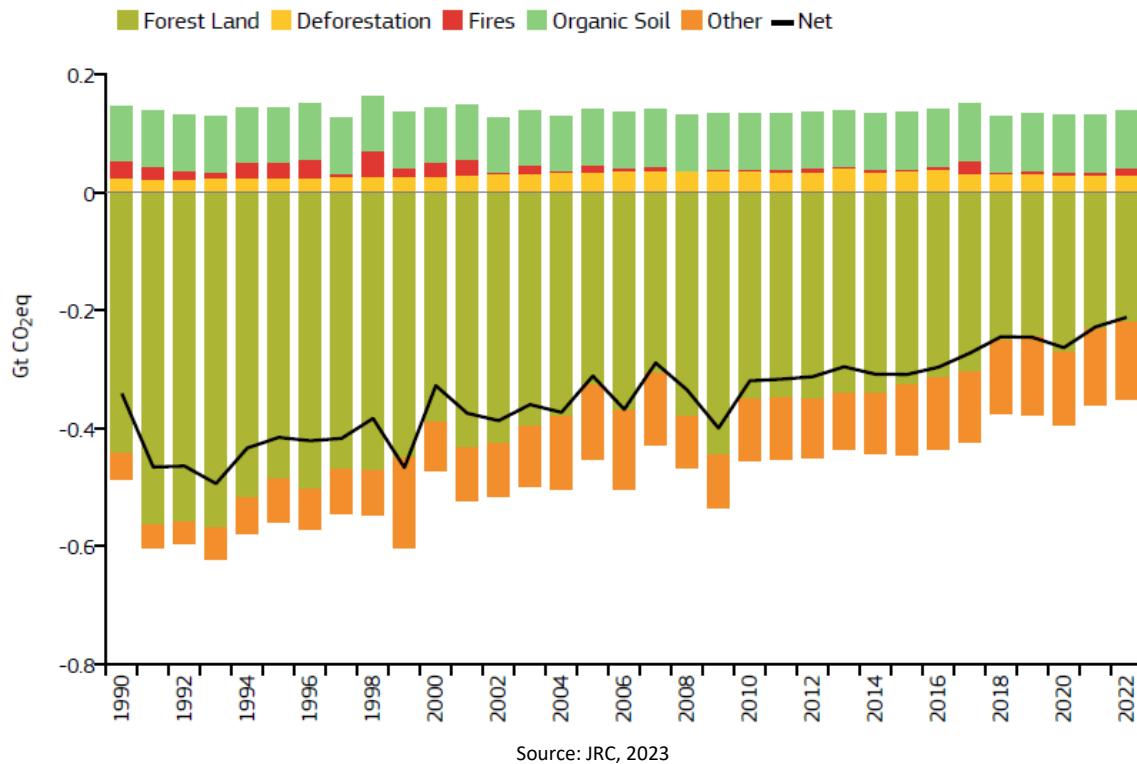
Global: The LULUCF sector was estimated to remove about 0.18 Gt CO_{2eq} (or 1.35 Gt CO_{2eq} excluding wildfires) in 2022, approximately the same level of 1990 and 90% less than in 2010. Including fires, this net removal is equivalent to 1.85% (or 0.33%) of global fossil CO₂ (or total GHGs) emissions without LULUCF of 2022.

Based on our estimates, managed forests (living biomass, excluding deforestation) are by far the largest CO₂ removal category, with an estimated 5.2 Gt in 2022, equivalent to about 13.9% of global anthropogenic fossil emissions (excluding LULUCF) emitted in the same period. This independently estimated net removal is lower than what countries include in their GHG reports (about 6.3 Gt CO₂, Grassi et al. 2022); the difference may be explained by different methodologies and assumptions between country reports and our approach. In particular, we estimate a larger C gain in the boreal area (e.g., in Russian Federation and Canada), mostly due to the IPCC default factors suggesting a greater tree growth than the country GHG reports, and larger C losses in some tropical areas, mostly due to the high values of harvest reported by some countries to FAOSTAT (e.g., India, Ethiopia). In most cases, it can be assumed that the local data and approaches used in country GHG reports which use Tier 2 or Tier 3 methods are better suited for GHG reporting than the global-scale implementation of a default IPCC Tier 1 approach, as done in our study.

In 2022, based on GWIS data, global wildfires contributed to LULUCF emissions for 1.2 Gt CO_{2eq}. For the same year, based on country GHG reports, global deforestation was responsible for net CO₂ emissions of 4.0 Gt CO₂, equivalent to 10.4% (or 7.46%) of the total anthropogenic CO₂ (or GHG) emissions. Among the other components, in 2022 organic soils were a rather stable with emissions emission of about 1.16 Gt CO₂. The large difference between the net LULUCF estimates in this booklet and those from the IPCC reports (which report net anthropogenic land-use emissions of about 5 to 6 Gt CO₂/yr, IPCC, 2022) can be to a large extent explained by different approaches in assessing the “anthropogenic” CO₂ removals, i.e. this booklet (consistently with most

country GHG reports) consider anthropogenic part of the CO₂ removals that global models (as reflected in the IPCC reports) consider natural. Once the difference in defining the ‘anthropogenic’ sink between countries and models are understood, LULUCF estimates can be largely reconciled at global and regional level (Grassi et al. 2021; Grassi et al., 2023).

Figure 8. EU27 GHG emissions and removals from LULUCF sector (in Gt CO_{2eq}), 1990-2202



EU27: The LULUCF sector produced a net removal of CO₂ emissions of 0.212 Gt CO₂ (or 0.224 Gt CO_{2eq} when excluding wildfires) in 2022, approximately 38% less than the 1990s levels. The total CO₂ emitted including wildfires is equivalent to approximately 7.6% of EU27 fossil anthropogenic CO₂ emissions excluding LULUCF.

Living biomass in managed forests is by far the most important C sink, with an estimated net 0.22 Gt CO₂ in 2022, equivalent to 7.9% of fossil CO₂ emitted in EU27 in the same period excluding LULUCF. The other components (non-biomass forest pools, deforestation, organic soils and other, based on country GHG reports) were compensating each other, with a net sink of 0.003 Gt CO₂ in 2022. Based on our estimates, wild fire emissions represent a minor component for EU27 in 2022, with a contribution of 0.012 Gt CO_{2eq}, although this figure obviously vary greatly according to the fire season severity (0.021 Gt CO₂ were emitted in 2017). It is important to highlight that these data are not aimed at criticizing nor challenging what is produced by Member States in their reporting process under the climate agreements, which are by definition with the best data and methods locally available and with several country-specific assumptions. This study is, on the contrary, part of a global methodologically coherent estimation at Tier 1.

4 Conclusions

The Emissions Database for Global Atmospheric Research (EDGAR) is a comprehensive inventory of anthropogenic emission time series from 1970 until 2022 for GHG. The data used in this report consists of the IEA-EDGAR CO₂, EDGAR CH₄, EDGAR N₂O and EDGAR F-gases version 8.0. An IPCC-based bottom-up emission calculation methodology is applied to all countries, demonstrating that consistent inventories can be developed for all countries within the limitations of the quality of the available statistical data.

EDGAR complements the national inventories and reporting prepared by Parties to the Paris Agreement, in particular by producing a timely independent emissions estimate³⁸ based on the consistent application of homogeneous information and methodological tools across countries. In particular, the time series of EDGAR can provide collective emissions trend information for all countries that will be needed for the UNFCCC's Global Stocktake in 2023.

Overall, EDGAR provides an important input to the analysis of global GHG emission trends with its 52-year time series.

This report shows that global GHG emissions from anthropogenic activities have increased by nearly 1.5% annually on average since 1990, and they were around 62% higher in 2022 than in 1990. Global GHG emissions remained rather constant between 2014 and 2016, reaching a peak in 2019 at 52.6 Gt CO_{2eq}. After falling by 3.7% in 2020 (mainly because of the COVID-19 pandemic and its associated impacts), and rebounding during 2021, they were 2.3% higher in 2022 than in 2019.

In 2022, among the six major economies collectively contributing 61.6% to the global GHG emissions (China, USA, India, EU27, Russia, and Brazil), four showed increases in their emissions compared to pre-COVID values of 2019 (China +7.4%; India +5.7%; Russia +2.0%; Brazil +2.3%) while two showed a decrease (USA -2.2% and EU27 -3.4%).

This edition of the EDGAR booklet also includes estimates of GHG emissions from Land Use, Land Use Change and Forestry (LULUCF), resulting in a global removal of approximately 0.18 Gt CO_{2eq} in 2022. In the EU27, LULUCF removed about 0.21 Gt CO_{2eq} in 2022, reducing its absorption capacity significantly compared to 1990.

This edition of the EDGAR booklet also includes estimates of GHG emissions from Land Use, Land-Use Change and Forestry (LULUCF), resulting in a global net removal of approximately 0.18 Gt CO_{2eq} in 2022. This small net global flux actually reflects the difference between much larger removals (mostly from forest land) and emissions (mostly from deforestation and fires), each close to around 6 Gt CO_{2eq}. In the EU27, LULUCF reduced its absorption capacity significantly compared to 1990, but nevertheless it is still an important net removal, equal to about 0.21 Gt CO_{2eq} in 2022.

Overall, the reduction in global greenhouse gas emissions witnessed in 2020, although partially offset by the economic recovery in 2021, has been surpassed by several major economies. These countries are now reverting to the pre-pandemic patterns, including the trend of decreasing carbon intensity that was prevalent among most leading economies. However, it is worth mentioning that countries like Russia, Mexico, and Indonesia have observed an increase in the intensity of GHG emissions within their economies.

⁽³⁸⁾ In the official National Inventory Reports, the latest reporting year can be up to two years prior to the submission year.

References

- Artés, T., Oom, D., De Rigo, D., Durrant, T.H., Maianti, P., Libertà, G. and San-Miguel-Ayanz, J., A global wildfire dataset for the analysis of fire regimes and fire behaviour, *Scientific data*, 6(1), 1-11, 2019, <https://doi.org/10.1038/s41597-019-0312-2>.
- BGS, British Geological Society for non-ferrous metals, 2023, <https://www.bgs.ac.uk/datasets/uk-and-world-mineral-statistics-datasets/>, Last access: March 2023.
- Crippa, M., Guzzardi, D., Butler, T., Keating, T., Wu, R., Kaminski, J., Kuenen, J., Kurokawa, J., et al., 2023, The HTAP_v3 emission mosaic: merging regional and global monthly emissions (2000–2018) to support air quality modelling and policies. *Earth System Science Data* 15 (6) 2667-2694, 2023, [10.5194/essd-15-2667-2023](https://doi.org/10.5194/essd-15-2667-2023).
- Dhakal, S., J.C. Minx, F.L. Toth, A. Abdel-Aziz, M.J. Figueroa Meza, K. Hubacek, I.G.C. Jonckheere, Yong-Gun Kim, G.F. Nemet, S. Pachauri, X.C. Tan, T. Wiedmann: Emissions Trends and Drivers. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change, Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, Cambridge University Press, Cambridge, UK and New York, NY, USA, doi: 10.1017/9781009157926.004, 2022.
- EDGARv8.0, EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO₂, EDGAR CH₄, EDGAR N₂O, EDGAR F-GASES version 8.0, (2023) European Commission, JRC (Datasets).
- EI, Energy Institute, 2023 Statistical Review of World Energy, 2023, <https://www.energyinst.org/statistical-review>, Last access: July 2023.
- EIA, U.S. Energy Information Administration, 2023, <https://www.eia.gov/opendata>, Last access: May 2023.
- EPA, Natural Gas and Petroleum Systems in the GHG Inventory: Additional Information on the 1990-2021 GHG Inventory (published April 2023), 2023, <https://www.epa.gov/ghgemissions/natural-gas-and-petroleum-systems-ghg-inventory-additional-information-1990-2021-ghg>, Last access: July 2023.
- ESA, Land Cover CCI Product User Guide Version 2. Tech. Rep., 2017, maps.elie.ucl.ac.be/CCI/viewer/download/ESACCI-LC-Ph2-PUGv2_2.0.pdf, Last access: July 2023.
- FAO, Global ecological zones for FAO forest reporting: 2010 Update, Forest Resources Assessment Working Paper 179. 2013, FAO, Rome.
- FAOSTAT, Statistics Division, Food and Agriculture Organization of the United Nations, <https://www.fao.org/faostat>, 2023, Last access: April 2023.
- Friedl, M., Sulla-Menashe, D., MCD12Q1 MODIS/Terra+Aqua Land Cover Type Yearly L3 Global 500m SIN Grid V006 [Data set]. NASA EOSDIS Land Processes DAAC, 2019, <https://doi.org/10.5067/MODIS/MCD12Q1.006>.
- Friedlingstein, P., O'Sullivan, M., Jones, M. W., Andrew, R. M., Gregor, L., Hauck, J., Le Quéré, C., Luijkx, I. T., Olsen, A., Peters, G. P., Peters, W., Pongratz, J., Schwingshackl, C., Sitch, S., Canadell, J. G., Ciais, P., Jackson, R. B., Alin, S. R., Alkama, R., Arneth, A., Arora, V. K., Bates, N. R., Becker, M., Bellouin, N., Bittig, H. C., Bopp, L., Chevallier, F., Chini, L. P., Cronin, M., Evans, W., Falk, S., Feely, R. A., Gasser, T., Gehlen, M., Grätz, T., Gloege, L., Grassi, G., Gruber, N., Gürses, Ö., Harris, I., Hefner, M., Houghton, R. A., Hurt, G. C., Iida, Y., Ilyina, T., Jain, A. K., Jersild, A., Kadono, K., Kato, E., Kennedy, D., Klein Goldewijk, K., Knauer, J., Korsbakken, J. I., Landschützer, P., Lefèvre, N., Lindsay, K., Liu, J., Liu, Z., Marland, G., Mayot, N., McGrath, M. J., Metzl, N., Monacci, N. M., Munro, D. R., Nakaoka, S.-I., Niwa, Y., O'Brien, K., Ono, T., Palmer, P. I., Pan, N., Pierrot, D., Pocock, K., Poulter, B., Resplandy, L., Robertson, E., Rödenbeck, C., Rodriguez, C., Rosan, T. M., Schwinger, J., Séférian, R., Shutler, J. D., Skjelvan, I., Steinhoff, T., Sun, Q., Sutton, A. J., Sweeney, C., Takao, S., Tanhua, T., Tans, P. P., Tian, X., Tian, H., Tilbrook, B., Tsujino, H., Tubiello, F., van der Werf, G. R., Walker, A. P., Wanninkhof, R., Whitehead, C., Willstrand Wranne, A., Wright, R., Yuan, W., Yue, C., Yue, X., Zaehle, S., Zeng, J., and Zheng, B.: Global Carbon Budget 2022, *Earth Syst. Sci. Data*, 14, 4811–4900, 2022.
- Giglio, L., Boschetti, L., Roy, D. P., Humber, M. L., and Justice, C. O., The Collection 6 MODIS burned area mapping algorithm and product. *Remote Sensing of Environment*, 217, 72-85, 2018.

GGFR/NOAA, 2012-2022 data for gas consumption for flaring, 2023, <https://www.worldbank.org/en/programs/gasflaringreduction/global-flaring-data#indicators-by-country>, Last access: June 2023.

GCSA, Global Cement and Concrete Association, GNR project - Reporting CO₂, 2022, <https://gccassociation.org/gnr/>, Last access: July 2023.

Grassi, G., Stehfest, E., Rogelj, J. et al., Critical adjustment of land mitigation pathways for assessing countries' climate progress. Nat. Clim. Chang. 11, 425–434, 2021, <https://doi.org/10.1038/s41558-021-01033-6>.

Grassi, G., Conchedda, G., Federici, S., Abad Viñas, R., Korosuo, A., Melo, J., Rossi, S., Sandker, M., Somogyi, Z., Vizzarri, M., and Tubiello, F. N.: Carbon fluxes from land 2000–2020: bringing clarity to countries' reporting, Earth Syst. Sci. Data, 14, 4643–4666, 2022, <https://doi.org/10.5194/essd-14-4643-2022>.

Grassi, G., Schwingshackl, C., Gasser, T., Houghton, R., Sitch, S., Canadell, J., Cescatti, A., Ciais, P., Federici, S., Friedlingstein, P., Kurz, W., Sanchez, M., Vinas, R., Alkama, R., Bultan, S., Ceccherini, G., Falk, S., Kato, E., Kennedy, D., Knauer, J., Korosuo, A., Melo, J., McGrath, M., Nabel, J., Poulter, B., Romanovskaya, A., Rossi, S., Tian, H., Walker, A., Yuan, W., Yue, X. & Pongratz, J., Harmonising the Land-Use flux estimates of global models and national inventories for 2000–2020, Earth System Science Data, 15, 1093–1114, 2023.

Höglund-Isaksson, L., Bottom-up simulations of methane and ethane emissions from global oil and gas systems 1980 to 2012, Environ. Res. Lett. 12, 024007, 2017, <https://doi.org/10.1088/1748-9326/aa583e>.

IATA, International Air Transport Association Statistics, 2023, <https://www.iata.org/en/iata-repository/pressroom/fact-sheets/industry-statistics/>, Last access : July 2023.

IEA, World energy balances 2022 Edition, <http://www.iea.org/>, 2022a.

IEA, Greenhouse Gas Emissions from Energy - 2022 Edition, <http://www.iea.org>, 2022b.

IFA, Urea consumption (updates 2010–2019) and production (updates 2020) statistics, 2022, <https://www.ifastat.org/>, Last access: June 2023.

IPCC, Guidelines for National Greenhouse Gas Inventories: Volume 1: General Guidance and Reporting, Sanz Sánchez, M.J., Bhattacharya, S., Mareckova, K., 2006a, <https://www.ipcc-nngip.iges.or.jp/public/2006gl/vol1.html>.

IPCC, Guidelines for National Greenhouse Gas Inventories: Volume 4- Agriculture, Forestry and Other Land Use, 2006b, <https://www.ipcc-nngip.iges.or.jp/public/2006gl/vol4.html>.

IPCC, Summary for Policymakers. In Special Report on Climate Change and Land (eds Shukla, P. R. et al.), WMO, 2019a.

IPCC, Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Hayama: Institute for Global Environmental Strategies; 2019b.

IPCC, Summary for Policymakers. In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, 2022, doi: 10.1017/9781009157926.001.

Janssens-Maenhout, G., Crippa, M., Guzzardi, D., Muntean, M., Schaaf, E., Dentener, F., Bergamaschi, P., Pagliari, V., Olivier, J. G. J., Peters, J. A. H. W., van Aardenne, J. A., Monni, S., Doering, U., Petrescu, A. M. R., Solazzo, E., and Oreggioni, G. D.: EDGAR v4.3.2 Global Atlas of the three major greenhouse gas emissions for the period 1970–2012, Earth Syst. Sci. Data, 11, 959–1002, 2019, <https://doi.org/10.5194/essd-11-959-2019>.

Kleinschmit, D., Mansourian S., Wildburger, C., Purret A., Illegal logging and related timber trade - Dimensions, Drivers, Impacts and Responses. A Global Scientific Rapid Response Assessment Report. International Union of Forest Research Organizations (IUFRO), 2016.

NBSC, National Bureau of Statistics of China, 2023, <http://www.stats.gov.cn/english/>, Last access: June 2023.

Olivier, J.G.J. Janssens-Maenhout, G., Muntean, M., Peters, J.A.H.W., Trend in Global CO₂ emissions: 2016 Report, PBL/JRC Report 2016, <https://www.pbl.nl/en/publications/trends-in-global-CO2-emissions-2016-report>, 2016.

Olivier, J.G.J, Trends in global CO₂ and total greenhouse gas emissions: 2021 Summary Report, PBL Netherlands Environmental Assessment Agency, The Hague, 2022.

Oreggioni, G. D., F. Monforti Ferraio, M. Crippa, M. Muntean, E. Schaaf, D. Guizzardi, E. Solazzo, M. Duerr, M. Perry and E. Vignati, Climate change in a changing world: Socio-economic and technological transitions, regulatory frameworks and trends on global greenhouse gas emissions from EDGAR v.5.0, Global Environmental Change 70: 102350, 2021.

Otón, G., Lizundia-Loiola, J., Pettinari, M.L., Chuvieco, E., Development of a consistent global long-term burned area product (1982–2018) based on AVHRR-LTDR data. International Journal of Applied Earth Observation and Geoinformation 103, 102473, 2021, <https://doi.org/10.1016/j.jag.2021.102473>.

Potapov, P., Hansen, M. C., Laestadius L., Turubanova S., Yaroshenko A., Thies C., Smith W., Zhuravleva I., Komarova A., Minnemeyer S., Esipova E., The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013, Science Advances, 2017.

Poulter, B., Aragao, L., Andela, N., Bellassen, V., Ciais, P., Kato, T., Lin, X., Nachin, B., Luyssaert, S., Pederson, N., Peylin, P., Piao, S., Pugh, T., Saatchi, S., Schepaschenko, D., Schelhaas, M., & Shvidenko, A., The global forest age dataset and its uncertainties (GFADv1.1), National Aeronautics and Space Administration, 2019, <https://doi.org/10.1594/PANGAEA.897392>.

RFA, Renewable Fuels Association, Industrial statistics, 2023.

Seiler, W., & Crutzen, P. J. Estimates of gross and net fluxes of carbon between the biosphere and the atmosphere from biomass burning. Climatic change, 2(3), 207-247, 1980.

Solazzo, E., Crippa, M., Guizzardi, D., Muntean, M., Choulga, M., and Janssens-Maenhout, G., Uncertainties in the Emissions Database for Global Atmospheric Research (EDGAR) emission inventory of greenhouse gases, Atmos. Chem. Phys., 21, 5655–5683, 2021, <https://doi.org/10.5194/acp-21-5655-2021>.

UN, United Nations Statistics Industrial Commodity and Energy Statistics Database, 2023.

UNDP, population statistics (2019), World Population Prospects (WPP), The 2019 Revision Report United Nations, Department of Economic and Social Affairs, Population Division, 2019.

UNEP, United Nations Environment Programme, Emissions Gap Report 2022: The Closing Window — Climate crisis calls for rapid transformation of societies, 2022, Nairobi, <https://www.unep.org/emissions-gap-report-2022>.

UNFCCC, National Inventory Submissions 2023, <https://unfccc.int/ghg-inventories-annex-i-parties/2023>, 2023a, Last access: June 2023.

UNFCCC, GHG Review Tools, <https://rt.unfccc.int/locator>, 2023b, Last access: June 2023.

UNFCCC, GHG Data Interface, https://di.unfccc.int/detailed_data_by_party, 2023c, Last access: May 2023.

UNDS/ENVSTAT, UN Environment Statistics, <https://unstats.un.org/unsd/envstats/index.cshtml>, Last access: May 2023.

USDA, Foreign Agricultural, www.fas.usda.gov, 2023, Last access: May 2023.

USGS, USGS Commodity Statistics, <https://www.usgs.gov/centers/nmic/commodity-statistics-and-information>), 2023, Last access: May 2023.

Van Der Werf, G.R., Randerson, J.T., Giglio, L., Van Leeuwen, T.T., Chen, Y., Rogers, B.M., Mu, M., Van Marle, M.J., Morton, D.C., Collatz, G.J. and Yokelson, R.J., Global fire emissions estimates during 1997–2016, Earth System Science Data, 9(2), pp.697-720, 2017.

WB, data of GDP PPP, (constant 2017 international \$) (expressed in 1000 US dollar, and adjusted to the Purchasing Power Parity of 2017) for 1990-2022, World Bank, 2023, Last access: July 2023.

World Steel Association, (worldsteel), Steel Statistical Yearbook 2022, <https://worldsteel.org/wp-content/uploads/Steel-Statistical-Yearbook-2022.pdf>, 2022.

World Steel Association, (worldsteel), https://worldsteel.org/steel-topics/statistics/annual-production-steel-data/?ind=P1_crude_steel_total_pub/CHN, 2023, Last access: May 2023.

List of abbreviations and definitions

AR5 - Fifth Assessment Report of IPCC
Cap - capita (population)
BGS - British Geological Society
CH₄ - Methane, greenhouse gas with GWP-100 = 28-30 under IPCC AR5
CO₂ - Carbon dioxide
DG CLIMA - Directorate-General for Climate Action, European Commission
EDGAR - Emissions Database for Global Atmospheric Research
EI – Energy Institute (formerly British Petroleum Company plc)
EIA - Energy Information Administration (of the U.S.)
EU27 - European Union with 27 Member States
F-gases – Fluorinated gases
GCSA - Global Cement and Concrete Association
GDP - Gross Domestic Product
GGFR - Global Gas Flaring Reduction Partnership of the World Bank
GHG - Greenhouse Gas
Gt - Gigatonnes (1000 megatonnes = 10⁹ metric tonnes)
GWP-100 Global Warming Potential over a 100-year period
IEA - International Energy Agency of the OECD (Paris)
IFA - International Fertiliser Association
IMF - International Monetary Fund
IPCC - Intergovernmental Panel on Climate Change
JRC - Joint Research Centre of the European Commission
k USD - 1000 US Dollar GDP
LULUCF - Land use, land-use change and forestry
Mt - Megatonnes (10⁶ tonnes or 1 tera gramme) mass of a given (greenhouse gas) substance
NBSC - National Bureau of Statistics of China
NOAA U.S. - National Oceanic and Atmospheric Administration
N₂O Nitrous oxide, greenhouse gas with GWP-100 = 265 under IPCC AR5
n/a - Not Available
OECD - Organisation for Economic Co-operation and Development
PPP - Purchasing Power Parity
t- tonne (1 t or 1 mega gramme) mass of a given (greenhouse gas) substance
UNFCCC - United Nations Framework Convention on Climate Change
UNPD - United Nations Population Division
USD - U.S. Dollar
USDA – United States Department of Agriculture
USGS - United States Geological Survey
Worldsteel - Word Steel Association
yr – Year

List of boxes

| | |
|---|----|
| Box 1. Impacts of the Ukraine war and energy crisis in EU..... | 12 |
| Box 2. How EU27 energy related CO ₂ emissions have changed in 2022..... | 14 |

List of figures

| | |
|--|----|
| Figure 1. GHG emissions (in Gt CO ₂ eq) and contribution of the major emitting economies and the rest of the world in 2022 (in Gt CO ₂ eq) | 5 |
| Figure 2. Global GHG emissions by sector (left axis, bars) and per capita (right axis, black line), 1970-2022 (in Gt CO ₂ eq) | 9 |
| Figure 3. GHG emissions in top emitting economies and estimated uncertainty (coloured bands), 1970-2022 (in Gt CO ₂ eq) | 10 |
| Figure 4. GHG emissions per capita in top emitting economies, 1970-2022, (t CO ₂ eq/cap) | 10 |
| Figure 5. GHG emissions per unit of GDP PPP in top emitting economies, 1990-2022 (t CO ₂ eq/k USD) | 11 |
| Figure 6. Trends of CO ₂ , CH ₄ and N ₂ O emissions in world total, rest of the world and top six emitting economies, 1990-2022, relative change vs 1990 (%) | 13 |
| Figure 7. Global GHG emissions and removals from LULUCF sector (in Gt CO ₂ eq), 1990-2022 | 18 |
| Figure 8. EU27 GHG emissions and removals from LULUCF sector (in Gt CO ₂ eq), 1990-2022 | 19 |

List of tables

| | |
|---|----|
| Table 1. Shares in 2022 global emissions, yearly GHG emission relative changes over the period 2019-2022 and the CAGR in 1990-2022 (%) | 5 |
| Table 2. GDP PPP and GHG emissions intensity of economy in G20 countries – 2022 compared to 2021 and yearly change of GHG emissions intensity for period 2019 -2022..... | 12 |
| Table 3. Main activities included in EDGAR emissions estimations | 29 |
| Table 4. Overview on F-gases by sector included in EDGARv8.0 | 32 |

Annexes

Annex 1. Bottom-up methodology for global GHG emissions compilation

The EDGAR v8.0 GHG emissions presented in this report include IEA-EDGAR CO₂ data (v2)³⁹ (IEA 2022b) covering fossil CO₂ emissions from combustion and processes, EDGAR CH₄, EDGAR N₂O and EDGAR F-gases up to 2022. In EDGAR, the emissions per country and compound are calculated on an annual basis and sector-wise by multiplying the country-specific activity and technology mix data by country-specific emission factors and reduction factors for installed abatement system for each sector. For the greenhouse gas emission factors, the global default values recommended in the IPCC 2006 guidelines (IPCC, 2006a) were used and where recommended, region-specific values were applied for other sources.

Regarding GHG emissions, all anthropogenic activities leading to climate relevant emissions are included (see Table 3), except biomass/biofuel combustion (short-cycle carbon) in the power, industry, buildings, transport, and agricultural sectors for CO₂ only. Large-scale biomass burning and land use, land-use change and forestry (LULUCF) are now part of the EDGAR estimations for CO₂ emissions.

EDGAR makes use of the IPCC sectorial classification, and a consistent bottom-up emission calculation methodology is applied to all countries, so that emissions of different countries can be compared, considering their respective levels of detail, uncertainties or data limitations. In particular, for developing countries with less robust and systematic statistical data infrastructures and limited experience in reporting their emission inventories, EDGAR can provide information and support them in complying with their inventory preparation.

In order to compute emissions up to the year t-1 for all sectors and gases, a Fast-Track approach is applied. For combustion sources, both IEA-EDGAR CO₂ (v2) emissions and non-CO₂ GHGs are extended until 2022 using the Energy Institute (EI, 2023) detailed statistics by fuel type for the years 2021 and 2022, while still assuming the same sectoral breakdown as in the last year of the IEA energy balance statistics. As a consequence of this approach, the emissions for the Fast-Track years (2021-2022) reported in this booklet will be updated in subsequent editions of this booklet, using future releases of the IEA energy balance statistics up to most recent years. For agriculture related sources, USDA (2023) data are used to extend FAOSTAT statistics up to 2022. For the other sectors with lower contributions to global GHG emissions, the time series have been extended for the latest years using proxy data and relative changes in activity data and trends to be applied to the latest available year. More details on the assumptions of the Fast-Track methodology are included in the following description of each emitting sector when relevant.

⁽³⁹⁾ IEA-EDGAR CO₂ emissions from fossil fuel combustion are those reported by IEA from 1990 to 2020. Emissions from 1970 to 1989 are still based on IEA data, but complemented with additional statistics gathered over the years and included in previous releases of the EDGAR database. Furthermore, it includes non-energy use emissions computed from the IEA energy balances (IEA, 2022a) which are however not reported in the IEA CO₂ emissions (IEA, 2022b).

Table 3. Main activities included in EDGAR emissions estimations

| GHG (fossil CO ₂ , CH ₄ , N ₂ O, F-gases) | | IPCC 2006 categories | LULUCF (CO ₂ , CH ₄ , N ₂ O) | | IPCC 2006 categories |
|--|--|--|---|--|---|
| POWER INDUSTRY | Power and heat generation plants (public and auto-producers) | 1A1a | FOREST LAND | Forest land remaining forest land and other lands converted to forest | 3B1 |
| INDUSTRIAL COMBUSTION AND PROCESSES | Combustion for industrial manufacturing, industrial processes (e.g. iron and steel, cement, aluminium, chemicals, production, solvents, etc.) | 1A2+2+5A (only from non-agricultural activities) | DEFORESTATION | Deforestation including tropical fires | 3B2bi+3B3bi+3B5bi+3B6bi |
| BUILDINGS | Small scale non-industrial stationary combustion | 1A4+1A5 | ORGANIC SOIL | Drainage of organic soils | |
| TRANSPORT | Road, non-road, domestic and international aviation, inland waterways and international shipping | 1A3 | OTHER | Non biomass forest pools, cropland, grassland, settlements, wetlands and other lands | 3B2+3B3+3B4+3B5+3B6 |
| AGRICULTURE | Livestock (enteric fermentation, manure management), agricultural soils (fertilisers, lime application, rice cultivation, direct soil emissions, indirect N ₂ O emissions from agriculture), field burning of agricultural residues | 3A+3C1b+3C2+3C3+3C4+3C5+3C6+3C7+5A (only from agricultural activities) | FIRE | Forest fires (boreal, temperate), peat fires, shrubland fires, non-tropical savannah fires | 3C1a (excluding tropical areas)+3C1c+3C1d |
| FUEL EXPLOITATION | Fuel extraction, transformation and refineries activities, including venting and flaring | 1B+5B | | | |
| WASTE | Solid waste disposed on land, solid waste composted and hazardous solid waste processing/storage, waste water handling, waste incineration | 4 | | | |

Source: JRC, 2023

For combustion sources: detailed IEA-EDGAR CO₂ (v2) emissions (IEA, 2022b) are used for the period 1970-2020 together with CH₄ and N₂O emissions from EDGARv8.0 (IEA, 2022a). To extend GHG emission time series from combustion sources up to 2022, trends based on EI (2023) consumption data by fuel type (coal, oil and gas) are applied to the corresponding 2020 values. In particular, EI (2023) oil regional consumption data trends from Jet/Kerosene fuel are applied to domestic aviation emissions to extend them up to 2022. To extend GHG emissions from international aviation transport, we rely on the latest data from the Industry Statistics from IATA Statistics (IATA, 2023), while for shipping (international and domestic) we use fuel oil regional consumption statistics from EI (2023). Biofuel combustion related emissions are extended using FAOSTAT (2023) data for primary solid biomass and charcoal, while biodiesel and biogasoline are derived from EI (2023).

For the countries belonging to “Other Africa”⁴⁰, “Other Non-OECD Asia”⁴¹ and “Other Non-OECD Americas”⁴² in the IEA classification: the combined share of CO₂ emissions from all these countries in global total is very small, e.g. in 2020, this was less than 1%. To allocate the corresponding activity data and emissions to each single country, we used splitting factors derived from the U.S. Energy Information Administration (EIA, 2023) country specific data on fuel consumption and production of coal, oil and natural gas. Consequently, the uncertainties in GHG emission estimations for these countries are larger than the ones for individually reported countries, in particular for the sectorial subdivision. Additional reliable data and information are needed to further improve their GHG emissions allocation.

For the fugitive emissions: CO₂ emissions from coke production for 2020 and 2021 follow the same relative change as reported for the crude steel production by the World Steel Association (worldsteel, 2023). CO₂ flared at oil and gas extraction facilities for 1994 onwards is based on the total amount of gas flared derived from satellite observation of the intensity of flaring lights per country (GGFR/NOAA, 2023). CH₄ emissions from venting are estimated based on data and information from UNFCCC (2023b), EPA (2023) and Höglund-Isaksson (2017). Compared to previous EDGAR CH₄ emission estimates, we also include fugitive emissions from abandoned mines following the methodology of the IPCC 2019 Refinements (IPCC, 2019b).

For the metal industry: the largest contribution is from blast furnaces, which in addition to the CO₂ emissions from blast furnace gas combustion (accounted for under the energy sector) emit also CO₂ from the coke/coal input as reducing agent and limestone used for iron and steel production. Here the crude steel production statistics reported by World Steel Association (worldsteel, 2023) are used as input to calculate CO₂ emissions. Ferro-alloys production data are from USGS (2023) up to 2019 and BGS (2023) up to 2021 which are further extended to the year 2022 using the pig iron production trends and data from World Steel Association (worldsteel, 2022), USGS (2023), BGS (2023) and NBSC (2023) for China.

For non-metallic minerals: CO₂ emissions from carbonates used in cement clinker production are based on reported or estimated cement clinker production. Cement production was calculated from cement production reported by the USGS (2023), except for China for the latest years (NBSC, 2023). The clinker-to-cement ratio is based on the clinker production data until 2020 from UNFCCC (2023a) for the Annex I countries, and for USA up to 2022 using USGS (2023) data; for China it is calculated from World Cement (2022). For Brazil, Egypt, Philippines and Thailand, we used clinker production ratios from the GCSA (2022) up to the year 2019 and then applied a constant trend. The changes in the lime production from USGS (2023) are applied to extrapolate CO₂ emissions from all other carbonate uses (glass production, etc.). Concerning the feedstock use for chemicals production, the ammonia production from USGS (2023) is used, except for urea consumption and production, where data are provided by the International Fertiliser Industry Association (IFA, 2022). It is assumed that small soil liming emissions follow the gross ammonia production trend.

For waste: GHG emissions from waste **incineration** (no energy recovery) include open burning of municipal solid waste (MSW), industrial solid waste, biogenic waste, clinical waste, sewage sludge waste, waste from cremation⁴³ and other waste. For Annex I countries the main data source for the activity data is the UNFCCC Locator (UNFCCC,

⁽⁴⁰⁾ Includes Burkina Faso; Burundi; Cape Verde; Central African Republic; Chad; Comoros; Djibouti; Gambia; Guinea; Guinea-Bissau; Lesotho; Liberia; Malawi; Mali; Mauritania; Namibia (until 1990); Réunion (until 2010); Sao Tome and Principe; Seychelles; Sierra Leone; and Somalia..

⁽⁴¹⁾ Includes Afghanistan; Bhutan; Cambodia (until 1994); Cook Islands; East Timor; Fiji; French Polynesia; Kiribati; Lao People’s Democratic Republic (until 1999); Macau, China; Maldives; Mongolia (until 1984); New Caledonia; Palau (from 1994); Papua New Guinea; Samoa; Solomon Islands; Tonga and Vanuatu.

⁽⁴²⁾ Includes Anguilla, Antigua and Barbuda; Aruba; Bahamas; Barbados; Belize; Bermuda; Bonaire; British Virgin Islands; Cayman Islands; Dominica; Falkland Islands (Malvinas); French Guiana (until 2010); Grenada; Guadeloupe (until 2010); Martinique (until 2010); Montserrat; Puerto Rico (for natural gas); Saba (from 2012); Saint Eustatius (from 2012); Saint Kitts and Nevis; Saint Lucia; Saint Pierre and Miquelon; Saint Vincent and the Grenadines; Sint Maarten (from 2012); Suriname (until 1999); and the Turks and Caicos Islands.

⁽⁴³⁾ Data sourced from <https://www.cremation.org.uk>

2023b). Population is used to fill the backward trend. To estimate waste incineration in non-Annex I countries, per capita generation figures from the IPCC are used, considering specific country or region data and urban population information for the year 2000. The fraction of MSW incinerated in 2000 is determined based on the total IPCC numbers for the fraction of incinerated MSW, with consideration for country or region-specific data. The dataset for waste incineration is completed using also reports from Non-Annex I countries to the UNFCCC, specifically on annual net emissions/removals under waste incineration (UNFCCC, 2023c). The year 2000 is taken as the base year, and population data is utilized to fill in the backward and forward trends.

CH₄ and N₂O emissions associated with **wastewater handling** have been updated until 2021, following the IPCC (2006c) methodology as outlined in Janssens-Maenhout et al. (2019). These updates consider the latest statistics from FAO (2023) on meat, pulp, sugar production, average protein supply, as well as data from UN (2023) and RFA (2023) for alcohol production. The population data, both urban and rural, are sourced from UNDP (2019).

The emissions from **landfills** are calculated using the first-order exponential decay method, following the 2006 IPCC Guidelines. For Annex I countries, waste data reported by the parties via the UNFCCC Locator tool is considered. To account for the global domain, additional sources include UN statistics on municipal solid waste (MSW) collection and landfill disposal, as well as per capita MSW generation rates and disposal fractions from the IPCC Guidelines. Non-Annex I countries maintain a constant per capita landfill waste estimate based on the latest available year, as advised by the IPCC Guidelines. In developing countries, municipal waste collection is assumed to occur solely in urban areas, utilizing urban population data from UN statistics (UNDP, 2019) (Janssens-Maenhout et al., 2019). For a more detailed information, refer to Oreggioni et al. (2021).

The emissions from waste **composting** are calculated using the UNFCCC Locator for the Annex-I countries. The methodology applied is that of IPCC using the emission factor for “wet weight waste” for both CH₄ and N₂O. In the case of non-Annex I countries, UNSD/ENVSTAT (2023) country data are utilized. The urban population is employed to address the backward and upward trends, following a similar procedure as applied to waste incineration.

Hazardous waste emissions are estimated using sources as Eurostat (for EU27, UK, Turkey and Western Balkan (WB) countries) and the UNSD/ENVSTAT (2023). The Non-Annex I countries are categorized into two groups: (i) countries with UNSD/ENVSTAT (2023) data on hazardous waste, and (ii) countries without UNSD/ENVSTAT (2023) data on hazardous waste. Additional data sources used are used as the biennial data from EPA⁴⁴ for the USA.

For agriculture: The agricultural sector encompasses various activities, including the application of urea and agricultural lime, enteric fermentation, rice cultivation, manure management, fertilizer use (both synthetic and from manure), and agricultural waste burning in fields. However, the current analysis does not consider large-scale biomass burning from savannah. Estimation of emissions from the agricultural sector relies on activity data obtained from FAOSTAT (2023) and emission factors provided by the IPCC Guidelines (2006b). CH₄ emission factors for enteric fermentation in both dairy and non-dairy cattle have been updated to incorporate the IPCC 2006 Tier 2 methodology. Agriculture related emissions are extended up to 2022 making use of crop and livestock specific data at macro regional level from USDA (2023).

Fluorinated gases (F-gases): EDGARv8.0 includes, among other substances, the fluorinated gases (F-gases), a class of man-made chemicals used in a wide range of industrial applications. F-gases play an important role in some key sectors of the economy, such as the production of magnesium and aluminium or the semiconductor manufacturing. F-gases represent a set of powerful greenhouse gases which is significantly contributing to climate change. F-gases include three main groups: (1) Hydrofluorocarbons (HFCs) mainly used as refrigerants, blowing agents for foams and solvents; (2) Perfluorocarbons (PFCs) used in the electronics sector (3) sulphur hexafluoride (SF₆) used mainly as insulating gas, in high voltage switchgear and in the production of magnesium and aluminium (refer to Table 4). Details on the methodology and data sources used are provided in Olivier et al. (2022).

(⁴⁴) <https://rcrapublic.epa.gov/rcriinfoaction/modules/br/trends/view>

Table 4. Overview on F-gases by sector included in EDGARv8.0

| General category | | | PFCs | HFCs |
|----------------------|--|---------------------|---|---|
| Substances | SF6 | NF3 | C2F6, C3F8, C4F10, C5F12, C6F14, c-C5F8, CH4 | HFC-23, HFC-32, HFC-41, HFC-125, HFC-134, HFC-134a, HFC-143, HFC-143a, HFC-152a, HFC-227ea, HFC-236fa, HFC-245fa, HFC-365mfc, HFC-43-10-mee, HFC-131b, HFC-142b |
| Industrial processes | Non-Ferrous metal production Chemical industry Electronic industry Electrical equipment | Electronic industry | Non-Ferrous metal production Electronic industry PFC use in fire extinguishers other application | Refrigeration and air conditioning Fire extinguishers Solvents Aerosols foam blowing other application |

Source: JRC, 2023

Changes compared to previous editions of the report

The current version of this report includes several updates compared to previous editions which may result in differences in final emission estimates by country and by sectors. The main changes are summarised here below:

- **Updated Global Warming Potential:** According to the 27th Conference of the Parties (COP27) decision, all Parties must use Global Warming Potential (GWP-100) value from the IPCC's Fifth Assessment Report for their emission reporting under the United Nations Framework Convention on Climate Change (UNFCCC) and under the Paris Agreement. Therefore, we adopted the IPCC GWP-100 AR5 metrics⁴⁵ to compute total GHG emissions in CO_{2eq} instead of the previously used AR4 values. Overall, global GHG emissions expressed in CO_{2eq} using the AR5 GWP-100 values are 2.3% higher than those obtained using the AR4 metrics.
- **New sectorial detail:** GHG emissions are provided with higher sectoral detail, in particular to disaggregate the previous 'other sector'. Specifically, we included: Power Industry, Industrial combustion, Buildings, Transport, Agriculture, Fuel exploitation, Processes, Waste. In the country fact sheets presented in this booklet, emissions from Industrial combustion and processes are shown in an aggregated sector ('Industrial Combustion and Processes'), while they are provided separately in the underlying data set, available as an Excel spreadsheet.
- **Updated statistics** and data sources are used for all emitting sectors, thus resulting in possible differences with previous estimates.

⁽⁴⁵⁾ https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf, pages 73-79.

Annex 2. Methodology for the estimation of emissions from Land Use, Land-Use Change and Forestry (LULUCF)

The EDGAR-LULUCF component is the third release of a dataset developed by the JRC. Compared to the previous releases, it includes new estimates of emissions and the removals from living biomass in the whole Forest Land sector, therefore including the Forest Land remaining Forest Land category (i.e. managed forest existing from at least 20 years) and the areas converted to forest land in the previous 20 years, covered by the Land converted to Forest Land category. Wild fire emissions are also included in current EDGAR-LULUCF estimates and are based on the Global Wildfire Information System (GWIS) data, as discussed in Annex 3. The net fluxes from the other land use categories, namely Deforestation (the Forest Land converted to Other Land category), Organic Soils, and the remaining categories and pools grouped under the “Other” term, are derived from a dataset based on the official country GHG reports submitted to UNFCCC (see Grassi et al. 2022). The resulting dataset is largely complete on most land uses for developed countries, while the GHG reports from several developing countries are still rather incomplete (in this case, gap-filling was done to ensure a complete time series, see Grassi et al. 2023).

The dataset for Forest Land living biomass is produced through a geographically explicit global scale implementation of the IPCC Tier 1 approach for Greenhouse Gas Inventories (GHGI), as outlined in the IPCC Guidelines (IPCC, 2006 and 2019 Refinement), that combines activity data (areas of land stable in the different land use categories, and conversions among them) and various default factors and country statistics to estimate separately the carbon removals (gains) and emissions (losses). Tier 1 is the most basic and widely-applicable approach, while Tier 2 requires the use of locally-derived parameters, and Tier 3 involves more advanced modelling. Parties to the UNFCCC are required to use at least Tier 2 when estimating categories and carbon pools most significant for their GHG inventory. Compared to the previous year, the methodology was reviewed and improved, and the parameters and ancillary data used were also reviewed and updated.

The activity data for the gains consist in the areas of the different land use categories, which we assessed by means of one of the most widely used recent spatial land cover datasets, the “Land cover classification gridded maps from 1992 to present derived from satellite observations”, part of the Copernicus Climate Change Service (C3S). This dataset guarantees backward compatibility with the ESA Climate Change Initiative (CCI) Land Cover Dataset (ESA, 2017) previously released for the years 1992-2015.

The dataset currently furnishes annual global land cover maps for the period 1992-2020 at approximately 300m spatial resolution at the equator developed harmonizing data from different sensors, such as AVHRR from 1992 to 1999, SPOT-Vegetation from 1998 to 2012, MERIS (2003-2012), PROBA-V and Sentinel-3 OLCI (S3 OLCI) from 2013. Data are released with a two-year delay, meaning that the latest available global map refers at the moment to 2020.

The legend consists of 22 classes which follow the FAO Land Cover Classification System (LCCS). The Land Cover maps were converted to IPCC land use classes by means of a conversion table which considers, for each of the 22 LCCS classes, the shares within the pixel of the different IPCC land use categories (Forest Land-partitioned in broadleaf and needle leaf, Cropland, Grassland, Settlements, Wetlands, and Other Land), based on the definition of each LCCS classes. For each pixel of the map, these shares were then converted to actual land areas belonging to the various IPCC categories used within GHG inventories. An Intact Forest layer (Potapov et al., 2017) was used to distinguish managed from unmanaged forest, assuming intact forests to be a good proxy for unmanaged forests (see Grassi et al. 2021).

The activity data for the losses are the country harvest production statistics (industrial roundwood and fuelwood, partitioned in broadleaf and needle leaf) from the FAOSTAT database. When possible, harvest data were corrected for illegal and informal logging, not registered in official statistics, using estimates from different datasets (see Kleinschmit et al. 2016).

At the EU level, a calibration procedure was applied on the original satellite-derived land use areas to best harmonize the temporal behaviour of the ESA/Copernicus time series with the trajectory of the country GHG inventories, showing an increase in the EU forest cover.

In the Tier 1 approach, activity data are modelled into gains and losses through a series of default emission factors and parameters (forest growth rate, Biomass Conversion and Expansion Factors, wood density, carbon density, root-to-shoot ratio etc.) available for the whole world. The IPCC Guidelines contain tables with default parameters values compiled from existing literature, varying by geographical area (continents) and vegetation

characteristics (broadleaf/needleleaf, naturally growing/planted forest, age class, etc.). In our geographically explicit modelling approach, the appropriate parameters were assigned to each forest type according to vegetation/climate/management characteristics identified through ancillary spatial and statistical datasets such as the FAO-GEZ (Global Ecological Zones dataset, FAO 2013), the FAO Forest Resource Assessment (FRA), etc. Compared to last year, the ancillary data used were updated. The shares for the 0-20, 21-100 and over 100 years old age classes were obtained at the country level from the GFAD 1.1 database (Poulter et al. 2019). The shares of Naturally-growing and Planted were also updated using the latest FAO-FRA. This allowed the partitioning of each pixel area according to vegetation characteristics essential to select the correct parameters in each context, such as the tree type (broadleaf or needle leaf), the type of forest (e.g., Tropical Rainforest, Temperate Continental Forest, etc., from FAO/GEZ), the vegetation characteristics (planted trees or natural grown forest), and the forest age class (less or equal 20 years old, between 21 and 100, and over 100 years old). The default parameters are obtained from the IPCC Guidelines (2006 and 2019 Refinement), the official reference for the production of national GHG Inventories. These parameters values are compiled from a wide range of literature and present a high degree of heterogeneity among the different continents (also for the same tree species or forest type), reflecting the difficulty of identifying specific parameters which are truly representative for the IPCC forest species/types or climate zone.

Compared to last year, the set of parameters used this year is more solidly grounded in the IPCC Guidelines. The standard IPCC Tier 1 approach considers two forest age classes, 0-20 years old and above 21 years old. From the previous results we found that this approach overestimates the forest gain, as it does not consider the ageing of forests which reduces the carbon absorption capability of trees. Within the standard IPCC framework a 21 years old forest absorbs like a 300 years old forest. An important improvement implemented this year refers therefore to the subdivision of the “above 21 years old” class in two classes, a 21-100 years old class and another one for forests above 100 years old. For these “older” forests, we used the parameters for primary forests furnished by the IPCC Guidelines.

Since land cover areas after 2020 were not available, while 2021 FAOSTAT harvest data were available, 2021 and 2022 gains are assumed to be constant. 2021 losses are produced from the FAOSTAT data, while 2022 harvest data are estimated through an interpolation of the previous 5 years.

The results for Forest Land were evaluated in comparison with the available official country GHG reports, generally produced using more advanced Tiers, as it is the case of Annex I countries. When possible, we compared both the results in terms of emissions and removals, as well as the areas. While for most developed areas (e.g. EU, USA) the match is fairly good for at least part of the time series, the differences observed for some other countries (e.g. Canada, Russia, some African and South-Asian countries) may depend on the assumptions made and methods used by the specific countries. In fact, within their inventories countries can make specific choices based on local characteristics and local expertise that cannot be extrapolated in a dataset like ours and applied at the global level. Also, several countries adopt stock-difference methods which are very different from our gain/loss approach, and in fact we notice the biggest discrepancies between our results and country data where stock difference approaches are implemented.

The Tier 1 estimates presented here are aimed to provide a globally-consistent overview for LULUCF using IPCC official default methodologies. These estimates can provide useful information on areas for which no or little official estimations are available (e.g. several African countries). It is however important to highlight that the EDGAR-LULUCF estimates are expressly not aimed at challenging nor verifying the estimates produced by individual countries, generally made using locally available data and parameters at Tier 2, or advanced Tier 3 modelling approaches.

By definition, each country should use the best locally available data and expertise to produce its inventories, while we are on purpose adopting a global Tier 1 approach, using the best data and parameters available at the global scale, inevitably less precise and reliable.

To date, the database provides georeferenced information on the following items:

1. Land Use Area subdivided by
 - a. Tree type: Broadleaf, Needleleaf
 - b. Age Class: <=20 years, 21-100 years, >100 years
 - c. System: Planted, Naturally growing
2. C GAINS (Removals from the atmosphere) subdivided as the Land use areas above
3. C LOSSES (Emissions in the atmosphere) subdivided by
 - a. Plant type: Broadleaf, Needleleaf

Harvest type: Fuelwood, Industrial roundwood.

Annex 3. Methodology for the estimation of emissions from large scale biomass burning

Estimates of atmospheric emissions due to biomass burning have conventionally been derived adopting ‘bottom up’ inventory-based methods (Seiler & Crutzen, 1980). The IPCC AFOLU guidelines thus estimate the emissions as:

$$L = A \times Mb \times Cf \times Gef \quad [\text{Equation 1}]$$

where:

L [g] is the quantity of emitted gas or particulate

A [m^2] is the area affected by fire

Mb [$g m^{-2}$] is the fuel loading per unit area

Cf [$g g^{-1}$] is the combustion factor i.e. the proportion of biomass consumed as a result of fire

Gef [$g g^{-1}$] is the emission factor or emission ratio, i.e. the amount of gas released for each gaseous species per unit of biomass load consumed by the fire.

As the methodology developed is based on the IPCC Tier 1 approach for Greenhouse Gas Inventories (GHGI), as outlined in the IPCC Guidelines (IPCC, 2006 and 2019 Refinement), the parameters of equation 1 are typically not available for each pixel, but reference values are used instead, for instance those given in tables 2.4, 2.5 and 2.6 of the IPCC guidelines. Those reference values are stratified by landcover class, and it is convenient to rewrite equation 1 as:

$$L_{lc} = A_{lc} \times Mb_{lc} \times Cf_{lc} \times Gef_{lc} \quad [\text{Equation 2}]$$

where:

L_{lc} [g] is the quantity of emitted gas or particulate for landcover class lc

A_{lc} [m^2] is the total area burned in landcover class lc

Mb_{lc} , Cf_{lc} and Gef_{lc} are the fuel load, the combustion factor and the emission factor derived from the IPCC tables for landcover class lc .

The total emission over the whole area of interest is the summation of L_{lc} for all the landcover areas:

$$L = \sum L_{lc} \quad [\text{Equation 3}]$$

The IPCC 2006 AFOLU guidelines contain tables for biomass consumed as a function of the landcover, but the vegetation types used are not immediately compatible with the legend of any of the current landcover products. To this end, a procedure was developed to combine data on area burned, landcover, JRC climatic characterization and soil classification map, as described in the following.

- **Area burned**

The area burned used is derived from the GlobFire Database developed under the umbrella of the Global Wildfire Information System (GWIS) (Artés et al., 2019). This burned area product is derived from the most recent Collection 6 Moderate Resolution Imaging Spectroradiometer (MODIS) burned area product (MCD64A1), which maps the extent of fire at 500m resolution and the approximate day of burning (Giglio et al., 2018).

- **Landcover**

The Annual International Geosphere-Biosphere Programme (IGBP) classification legend of the global MODIS landcover product MCD12A1 (Friedl & Sulla-Menashe, 2019) was used. The MCD12A1 global land product is part of the standard MODIS suite, and has been produced at annual intervals since the beginning of the mission. The current Collection 6 version has a spatial resolution of 500m, and it is distributed in the same sinusoidal tiled geometry as the MCD64A1 product, allowing for the computation of stratified total area burned A_{lc} in equation 2 without the need for resampling or reprojection. For each pixel, the MCD12A1 product provides a class label assigned following different legends to cover the needs of multiple user communities. The IPCC legend (LC_Type1) was used in the present application.

- **JRC climatic characterisation and soil classification map**

The Climatic Zone and Soil Type raster maps were created by the Joint Research Centre in support of the European Commission guidelines for the calculation of land carbon stocks for the purpose of Annex V to Directive 2009/28/EC. The Climatic Zone layer is defined based on the classification of IPCC (IPCC, 2006b). Soil types are classified according to the World Reference Base (WRB). The raster data layers were resampled and reprojected to the MODIS sinusoidal projection, and tiled into the MODIS geometry, to ensure interoperability with the MODIS MCD64A1 and MCD12A1 products.

The result of the merged approach is a 500 m landcover map, which uses a set of vegetation classes compatible with the IPCC tables. The procedure is fully automatic, and is repeated for every year from 2000 to 2019, to ensure that the statistics are generated using the most appropriate landcover information for the year.

For the period between 1982 to 1999, where MODIS burned area data were not available, images from the Advanced Very High Resolution Radiometer Long Term Data Record burned area product (AVHRR-LTDR) were used. The final burned area product (designated as FireCCILT10) (Otón et al., 2021) estimated BA in a spatial resolution of 0.05° for the period between 1982 and 2017 (excluding 1994, due to input data gaps).

This product is the longest global burned area product currently available, extending almost 20 years back from the existing NASA (MODIS) and European Space Agency (ESA) burned area products. Despite FireCCILT10 and MCD64A1 are based on different sensors and methodologies, Otón et al. (2021) reported high correlation values ($r^2 > 0.9$) between burned area estimations from both with better agreement in tropical regions rather than boreal regions. Spatial trends were found to be similar to existing global burned area products, but temporal trends showed unstable annual variations, most likely linked to the changes in the AVHRR sensor and orbital decays of the NOAA satellites.

The methodology applied for this period was similar to the one developed for the MODIS period (2000-2019), including the resampling and reprojection to the MODIS sinusoidal projection, and tiled into the MODIS geometry, to ensure interoperability with the MCD12A1 products.

Annex 4. Content of country fact-sheets

For each country, a fact sheet is provided with the time series of GHG emissions from all anthropogenic activities except land use, land-use change, forestry and large scale biomass burning. The upper panel of the fact sheet includes GHG annual totals from 1990 until 2022 per sector. A pie chart is also shown representing the share of each individual GHG (fossil CO₂, CH₄, N₂O, F-gases) to the 2022 country total. Then, an overview table with total emissions by country for the years 1990, 2005 (Kyoto Protocol), 2015 (Paris Agreement), and 2022 is also reported, together with per capita, per GDP (PPP constant 2017 international \$, USD) emissions, and population data. Along with the summary of the GHG emission time series for each country, a graphical visualisation aids the interpretation of the emission changes by sector over time at the bottom of each page.

The graphs compare GHG emissions for the last available year (2022) with the emission levels of the previous year (2021) and of two key years: 1990 (base year for national greenhouse gases inventory) and 2005, when the Kyoto Protocol came into effect. Emissions stalling, rising or dampening for the year 2022 are expressed in terms of % change with respect to these two years, for sectors specified as follow:

Legend of the sectors:



Power Industry - Power and heat generation plants (public & autoproducers)



Industrial Combustion and Processes - Combustion for industrial manufacturing and processes



Buildings – Small scale non-industrial stationary combustion



Transport – Mobile combustion (road & rail & ship & aviation)



Fuel Exploitation – Fuel extraction, transformation and refineries



Agriculture – Agricultural soils, livestock, field burning of agricultural residues, indirect N₂O emissions from agriculture



Waste – Solid waste disposal and waste water treatment



All sectors – Sum of all sectors. The pie chart represents the GHG sectorial share in 2022.

-  indicates a reduction in 2022 emissions by the amount expressed by the percentage value (in green)
-  indicates growth in 2022 emissions by the amount expressed by the percentage value (in red)
-  In the cases where 2022 emissions have reduced or have grown by less than 5% with respect to the reference year, or have stalled, a horizontal orange arrow is shown. Also in this case the amount is expressed by the percentage value (in orange)

An “n/a” is used to indicate either a sector missing throughout the time series (meaning that no data are reported for that sector) or that no data are available for the reference years or 2022. When computing the emission trend for the sum of all sectors, no value is reported in the case of incomplete statistics for the most emitting sectors for the year 1990 (as for example Greenland).

Country-specific GHG emission time series data can be downloaded at the following website: https://edgar.jrc.ec.europa.eu/report_2023.

Annex 5. GHG emissions for the world, international transport and the EU27

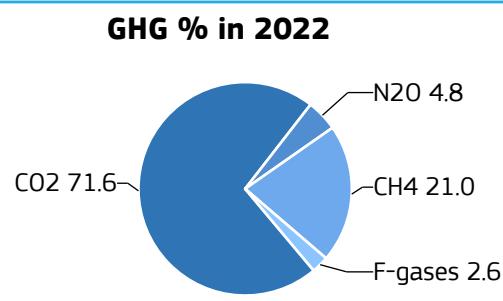
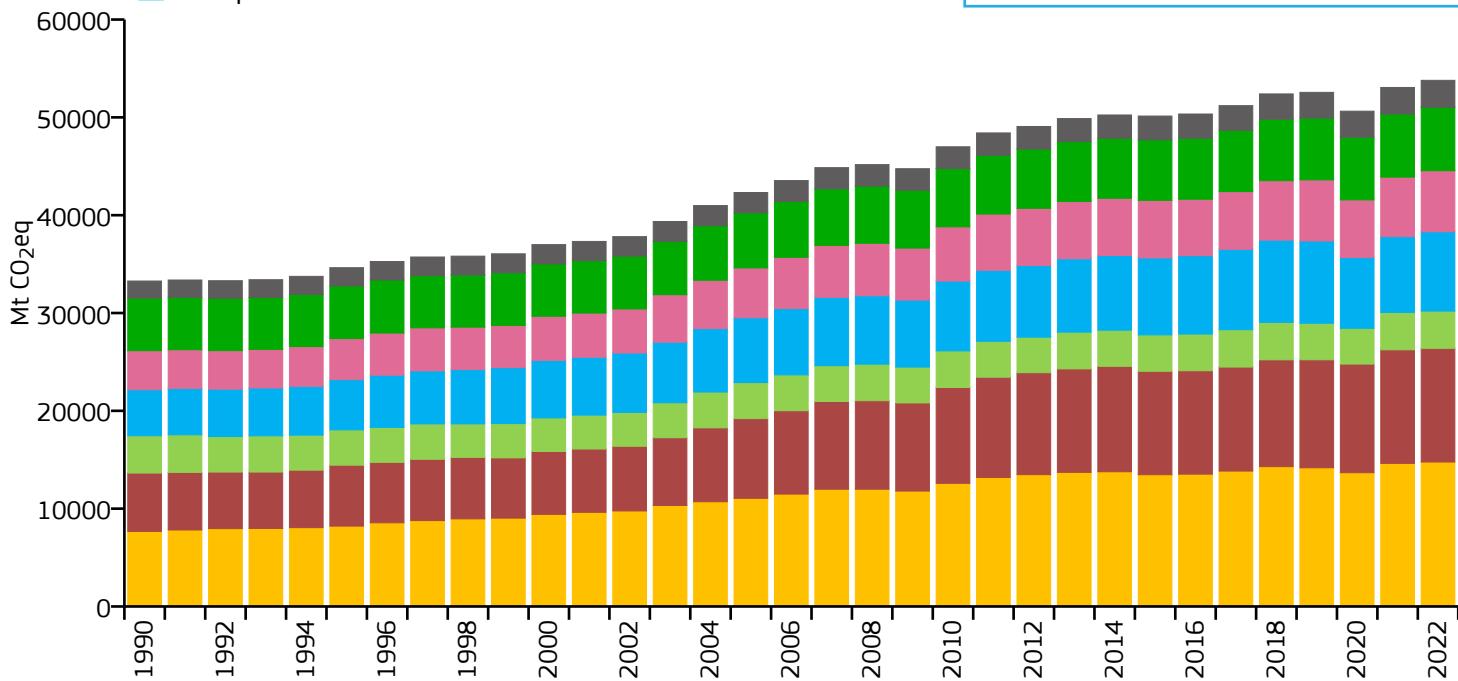
Global totals for all countries, including international shipping and aviation, followed by the international transport sector (shipping and aviation).

Total EU27 emissions from Member States: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

WORLD

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|

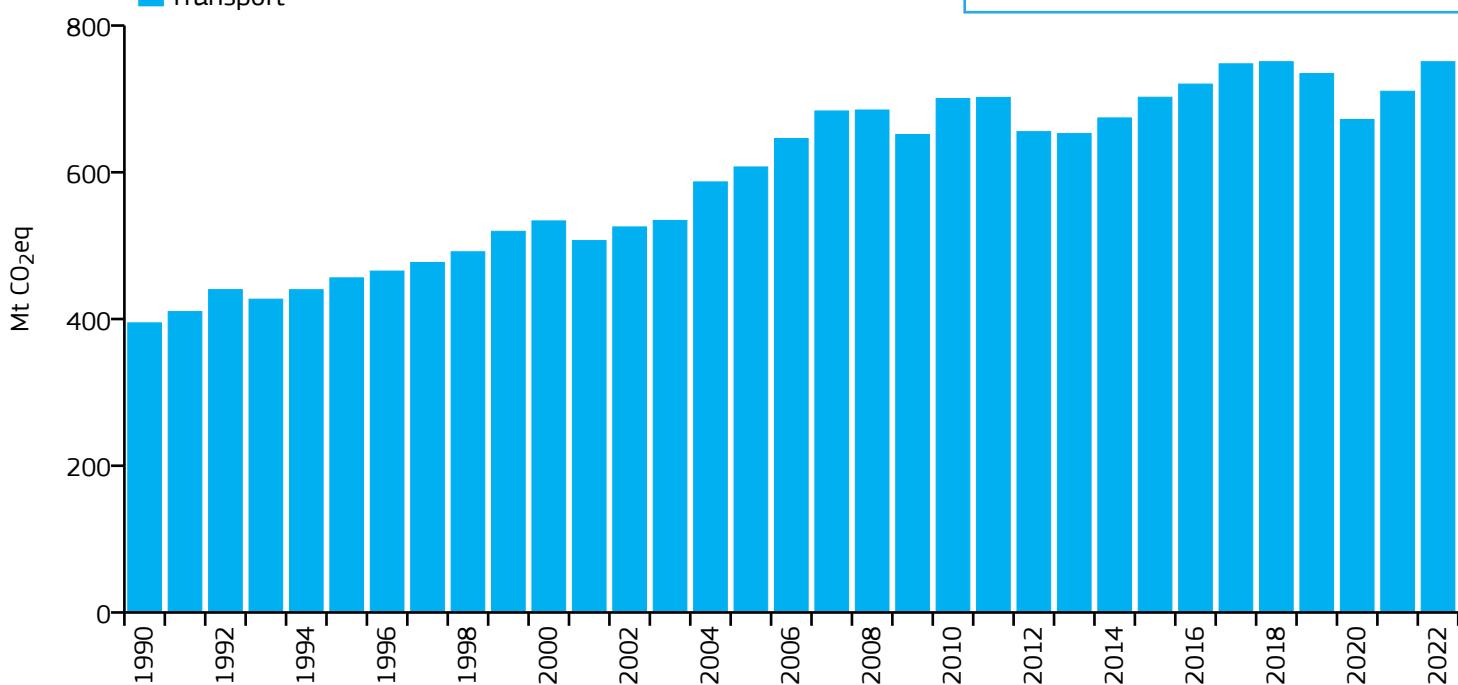
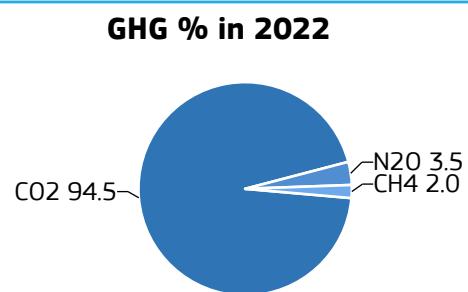
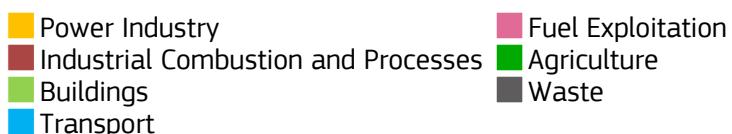


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 53786.039 | 6.762 | 0.386 | 7.954G |
| 2015 | 50134.384 | 6.792 | 0.436 | 7.381G |
| 2005 | 42318.428 | 6.470 | 0.515 | 6.540G |
| 1990 | 33268.121 | 6.242 | 0.641 | 5.330G |

2022 vs 1990**2022 vs 2005****2022 vs 2021**

International Shipping

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|--|--|--|------------|
| 2022 | 750.699 | n/a | n/a | n/a |
| 2015 | 702.303 | n/a | n/a | n/a |
| 2005 | 607.270 | n/a | n/a | n/a |
| 1990 | 394.751 | n/a | n/a | n/a |

2022 vs 1990

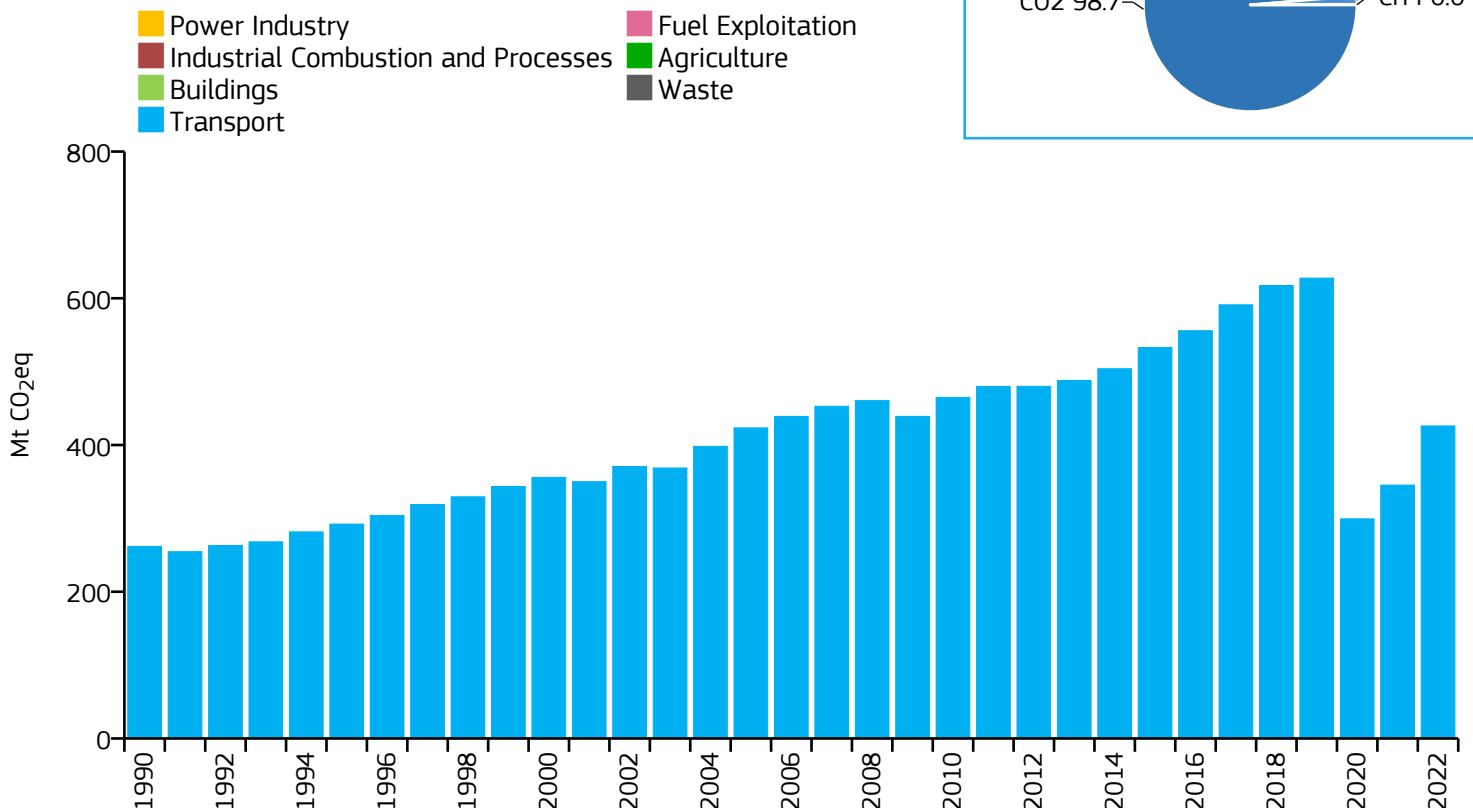
2022 vs 2005

2022 vs 2021

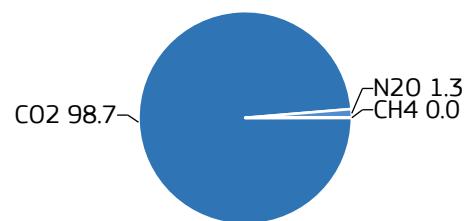
| | | | | |
|--|-------------------------------------|-------------|-------------|------------|
|  | Power Industry | n/a | n/a | n/a |
|  | Industrial Combustion and Processes | n/a | n/a | n/a |
|  | Buildings | n/a | n/a | n/a |
|  | Transport | +90% | +24% | +6% |
|  | Fuel Exploitation | n/a | n/a | n/a |
|  | Agriculture | n/a | n/a | n/a |
|  | Waste | n/a | n/a | n/a |
|  | All sectors | n/a | n/a | n/a |

International Aviation

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 425.964 | n/a | n/a | n/a |
| 2015 | 532.878 | n/a | n/a | n/a |
| 2005 | 423.309 | n/a | n/a | n/a |
| 1990 | 261.804 | n/a | n/a | n/a |

2022 vs 1990

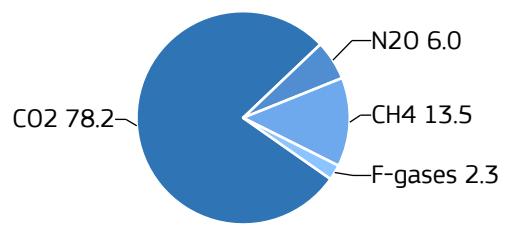
2022 vs 2005

2022 vs 2021

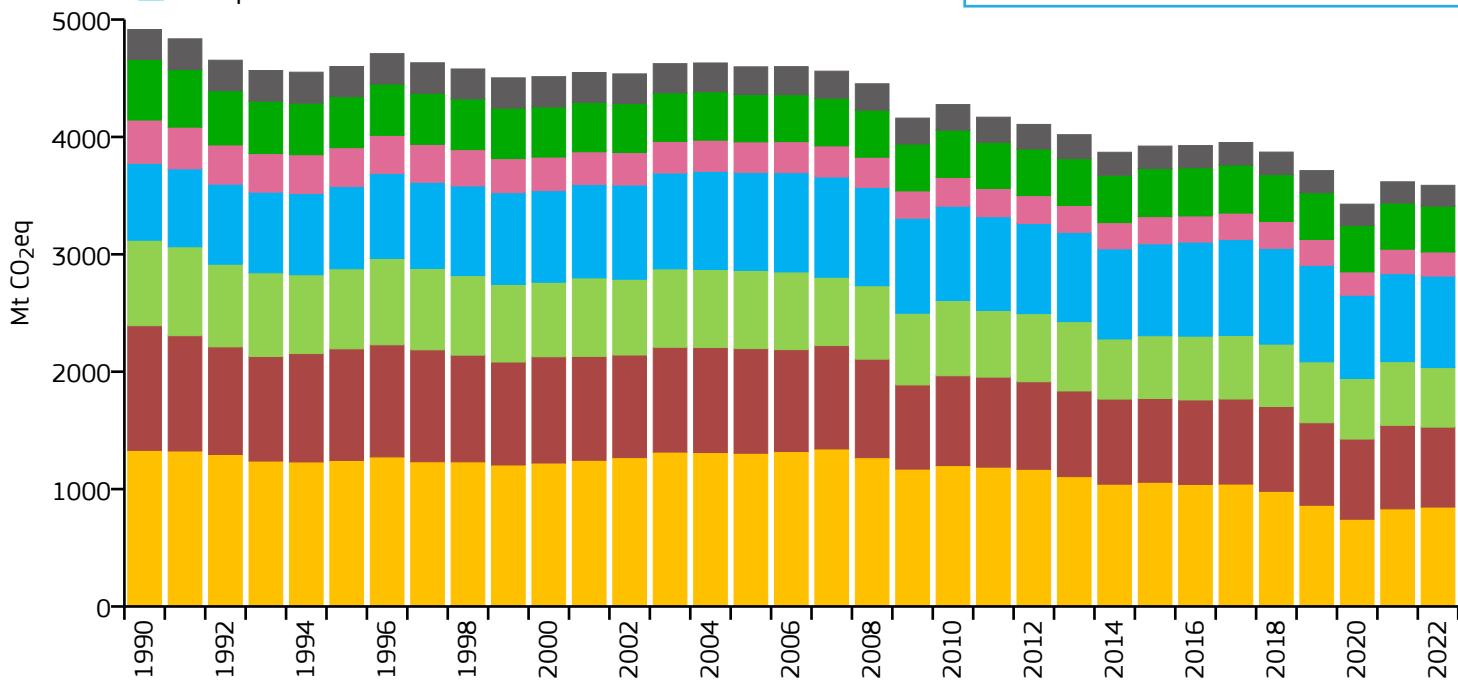
| | 2022 vs 1990 | 2022 vs 2005 | 2022 vs 2021 |
|-------------------------------------|--------------|--------------|--------------|
| Power Industry | n/a | n/a | n/a |
| Industrial Combustion and Processes | n/a | n/a | n/a |
| Buildings | n/a | n/a | n/a |
| Transport | +63% | +1% | +23% |
| Fuel Exploitation | n/a | n/a | n/a |
| Agriculture | n/a | n/a | n/a |
| Waste | n/a | n/a | n/a |
| All sectors | n/a | n/a | n/a |

EU27

GHG % in 2022

**GHG emissions by sector**

- | |
|--|
| Yellow: Power Industry Brown: Industrial Combustion and Processes Green: Buildings Blue: Transport Pink: Fuel Exploitation Dark Green: Agriculture Grey: Waste |
|--|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 3587.796 | 8.087 | 0.175 | 443.641M |
| 2015 | 3922.022 | 8.871 | 0.216 | 442.095M |
| 2005 | 4597.105 | 10.564 | 0.282 | 435.163M |
| 1990 | 4915.144 | 11.697 | 0.405 | 420.198M |

2022 vs 1990**2022 vs 2005****2022 vs 2021**

Annex 6: GHG emissions by country

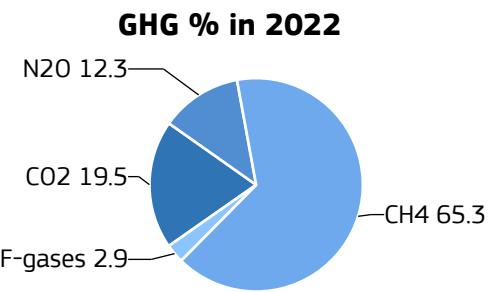
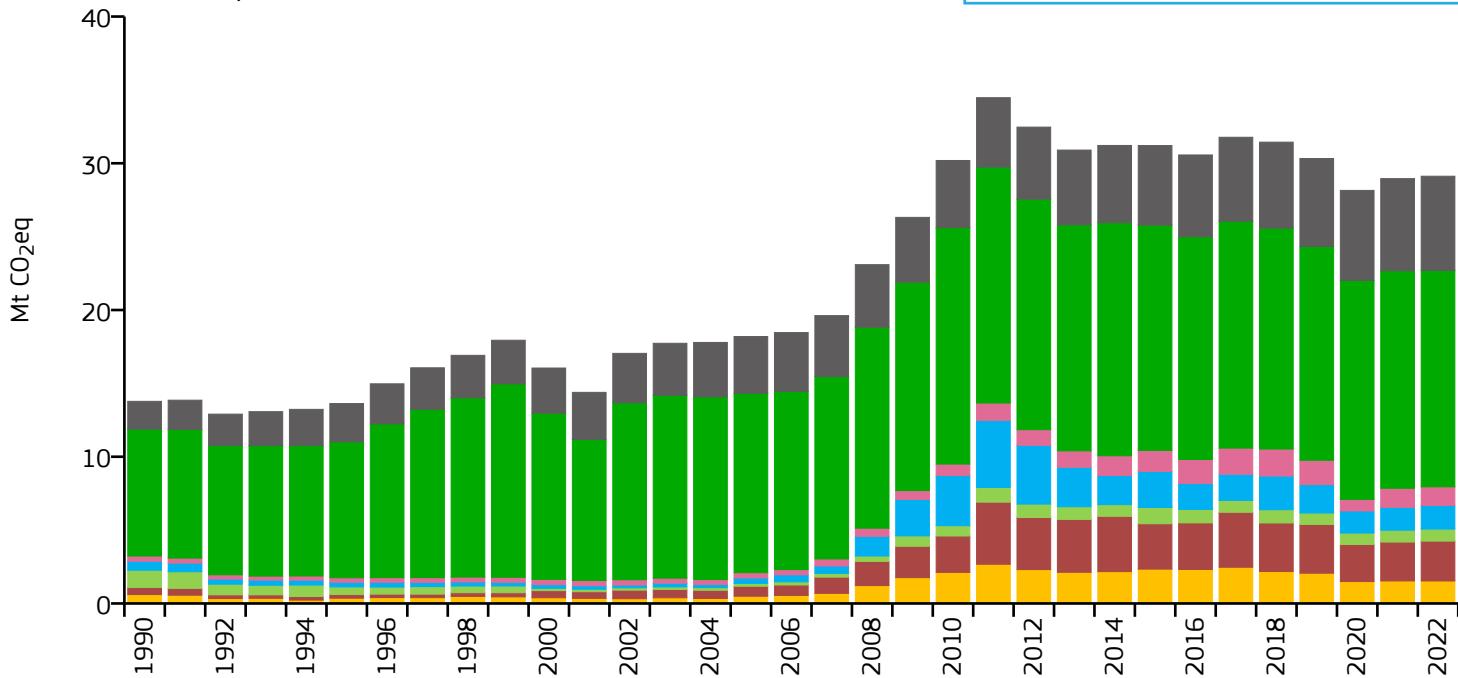
The following countries are presented:

Afghanistan; Albania; Algeria; Angola; Anguilla; Antigua and Barbuda; Argentina; Armenia; Aruba; Australia; Austria; Azerbaijan; Bahamas; Bahrain; Bangladesh; Barbados; Belarus; Belgium; Belize; Benin; Bermuda; Bhutan; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; British Virgin Islands; Brunei; Bulgaria; Burkina Faso; Burundi; Cabo Verde; Cambodia; Cameroon; Canada; Cayman Islands; Central African Republic; Chad; Chile; China; Colombia; Comoros; Congo; Cook Islands; Costa Rica; Côte d'Ivoire; Croatia; Cuba; Curaçao; Cyprus; Czechia; Democratic Republic of the Congo; Denmark; Djibouti; Dominica; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Estonia; Eswatini; Ethiopia; Falkland Islands; Faroe Islands; Fiji; Finland; France and Monaco; French Guiana; French Polynesia; Gabon; Georgia; Germany; Ghana; Gibraltar; Greece; Greenland; Grenada; Guadeloupe; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; Hong Kong; Hungary; Iceland; India; Indonesia; Iran; Iraq; Ireland; Israel and Palestine, State of; Italy; San Marino and the Holy See; Jamaica; Japan; Jordan; Kazakhstan; Kenya; Kiribati; Kuwait; Kyrgyzstan; Laos; Latvia; Lebanon; Lesotho; Liberia; Libya; Lithuania; Luxembourg; Macao; Madagascar; Malawi; Malaysia; Maldives; Mali; Malta; Martinique; Mauritania; Mauritius; Mexico; Moldova; Mongolia; Morocco; Mozambique; Myanmar/Burma; Namibia; Nepal; Netherlands; New Caledonia; New Zealand; Nicaragua; Niger; Nigeria; North Korea; North Macedonia; Norway; Oman; Pakistan; Palau; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Poland; Portugal; Puerto Rico; Qatar; Réunion; Romania; Russia; Rwanda; Saint Helena, Ascension and Tristan da Cunha; Saint Kitts and Nevis; Saint Lucia; Saint Pierre and Miquelon; Saint Vincent and the Grenadines; Samoa; São Tomé and Príncipe; Saudi Arabia; Senegal; Serbia and Montenegro; Seychelles; Sierra Leone; Singapore; Slovakia; Slovenia; Solomon Islands; Somalia; South Africa; South Korea; Spain and Andorra; Sri Lanka; Sudan and South Sudan; Suriname; Sweden; Switzerland and Liechtenstein; Syria; Taiwan; Tajikistan; Tanzania; Thailand; The Gambia; Timor-Leste; Togo; Tonga; Trinidad and Tobago; Tunisia; Türkiye; Turkmenistan; Turks and Caicos Islands; Uganda; Ukraine; United Arab Emirates; United Kingdom; United States; Uruguay; Uzbekistan; Vanuatu; Venezuela; Vietnam; Western Sahara; Yemen; Zambia; Zimbabwe.

Afghanistan

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 29.118 | 0.732 | 0.479 | 39.780M |
| 2015 | 31.208 | 0.925 | 0.438 | 33.736M |
| 2005 | 18.191 | 0.726 | 0.551 | 25.071M |
| 1990 | 13.776 | 1.125 | 0.450 | 12.249M |

2022 vs 1990

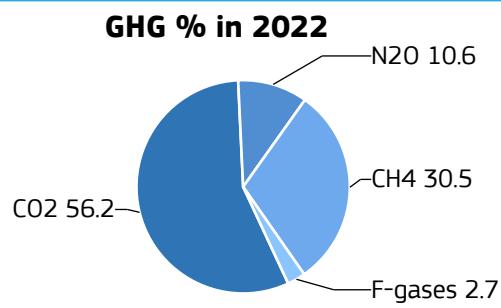
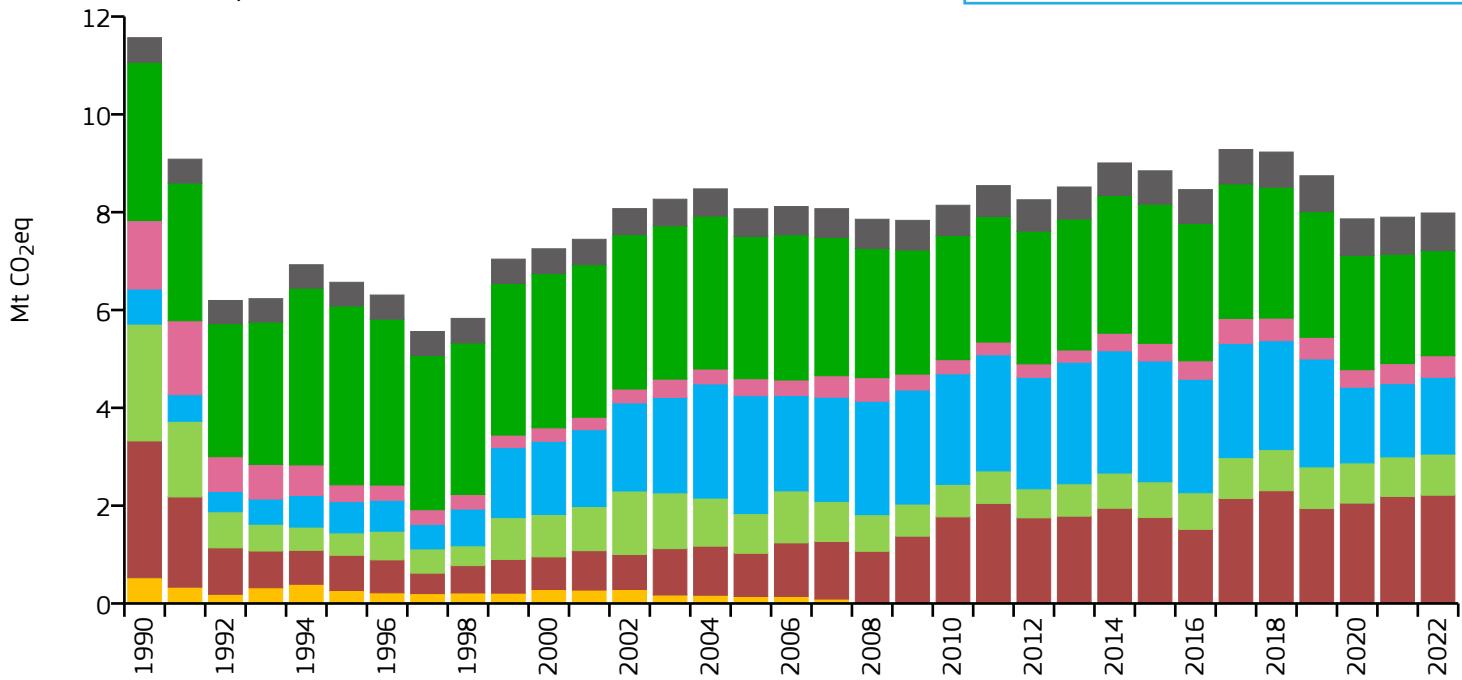
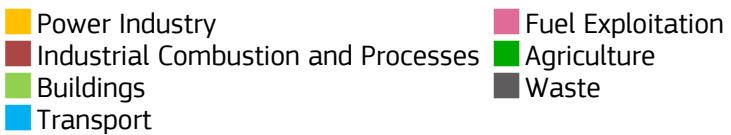
2022 vs 2005

2022 vs 2021



Albania

GHG emissions by sector

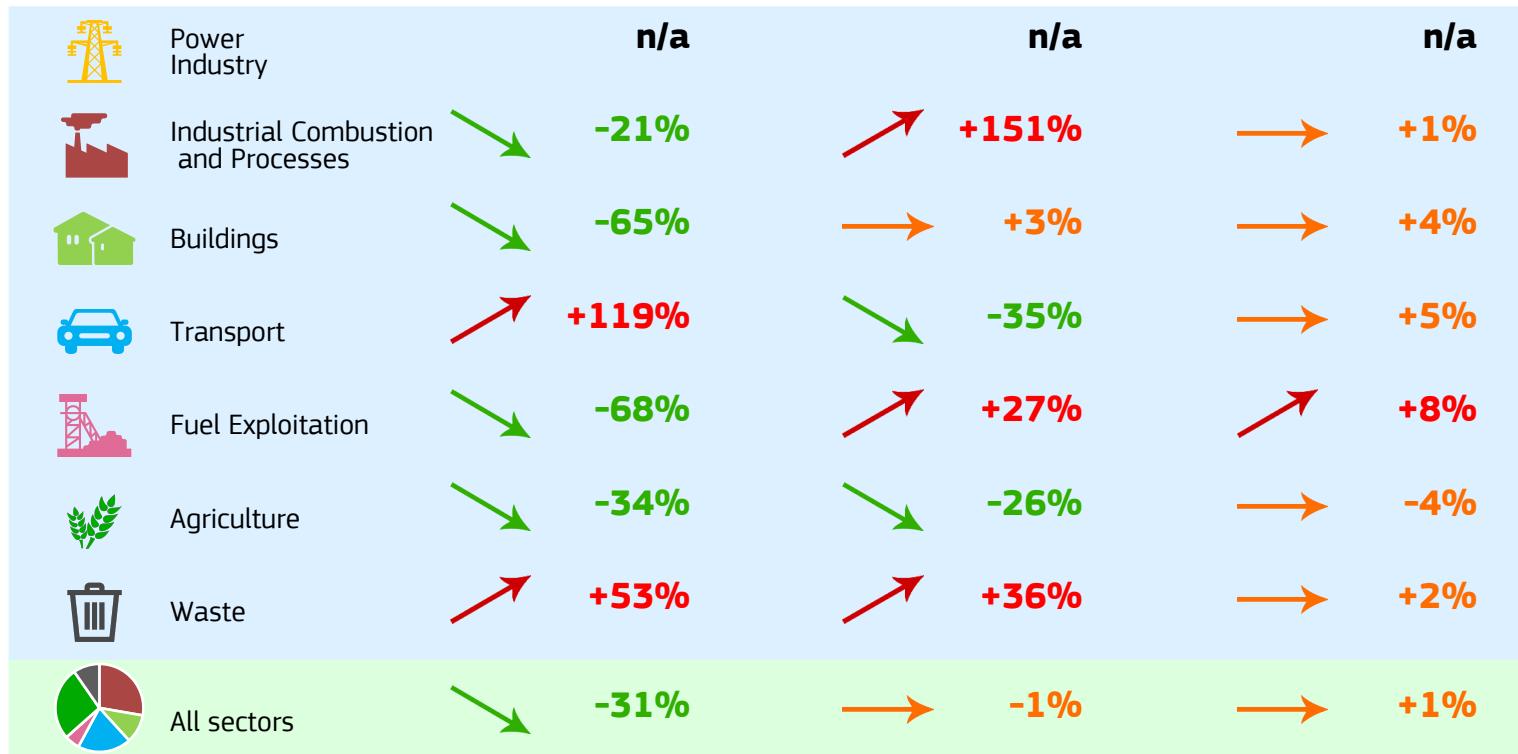


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 7.983 | 2.709 | 0.186 | 2.947M |
| 2015 | 8.846 | 3.026 | 0.259 | 2.923M |
| 2005 | 8.070 | 2.621 | 0.333 | 3.079M |
| 1990 | 11.568 | 3.525 | 0.729 | 3.281M |

2022 vs 1990

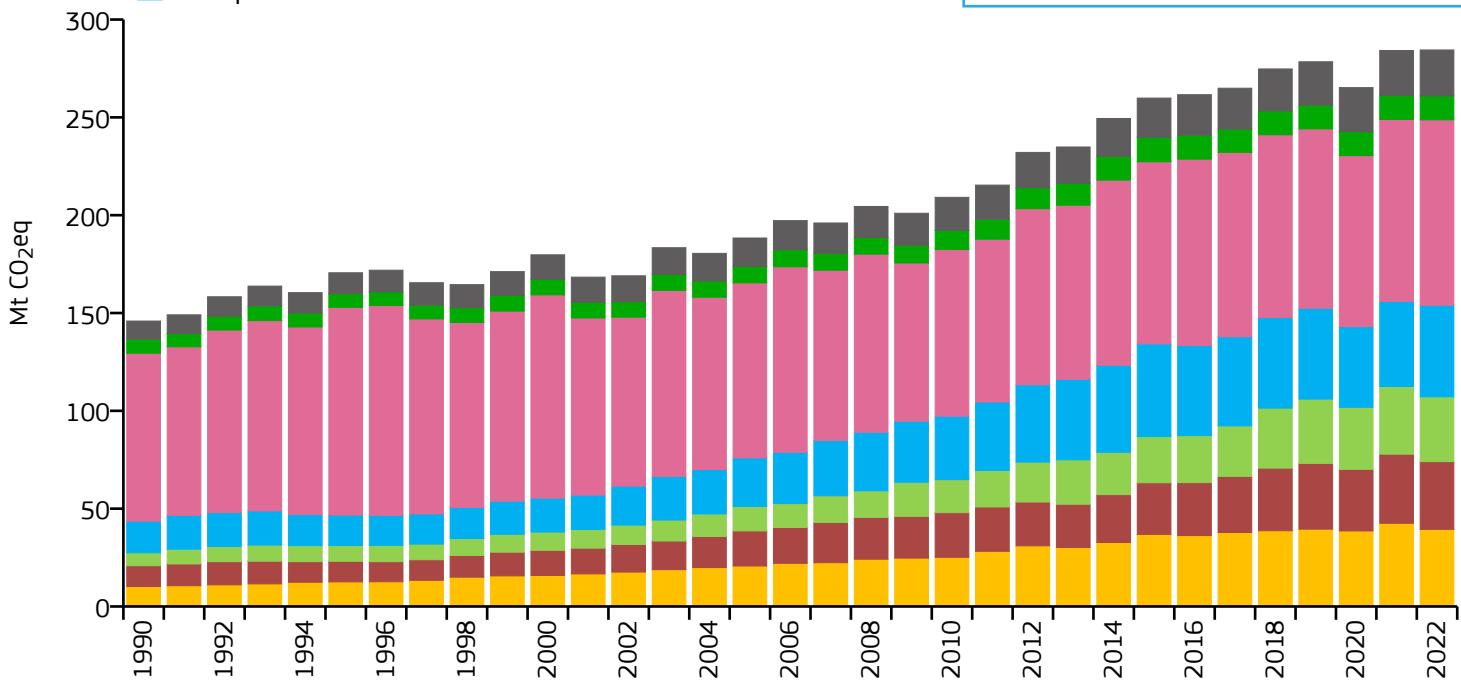
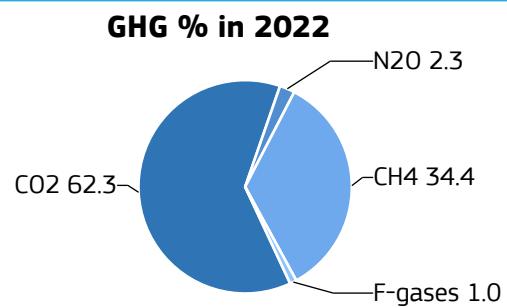
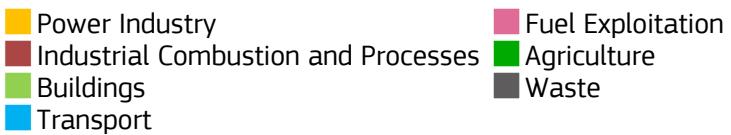
2022 vs 2005

2022 vs 2021



Algeria

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 284.445 | 6.380 | 0.566 | 44.585M |
| 2015 | 259.852 | 6.517 | 0.559 | 39.871M |
| 2005 | 188.338 | 5.658 | 0.541 | 33.288M |
| 1990 | 145.887 | 5.630 | 0.648 | 25.912M |

2022 vs 1990

2022 vs 2005

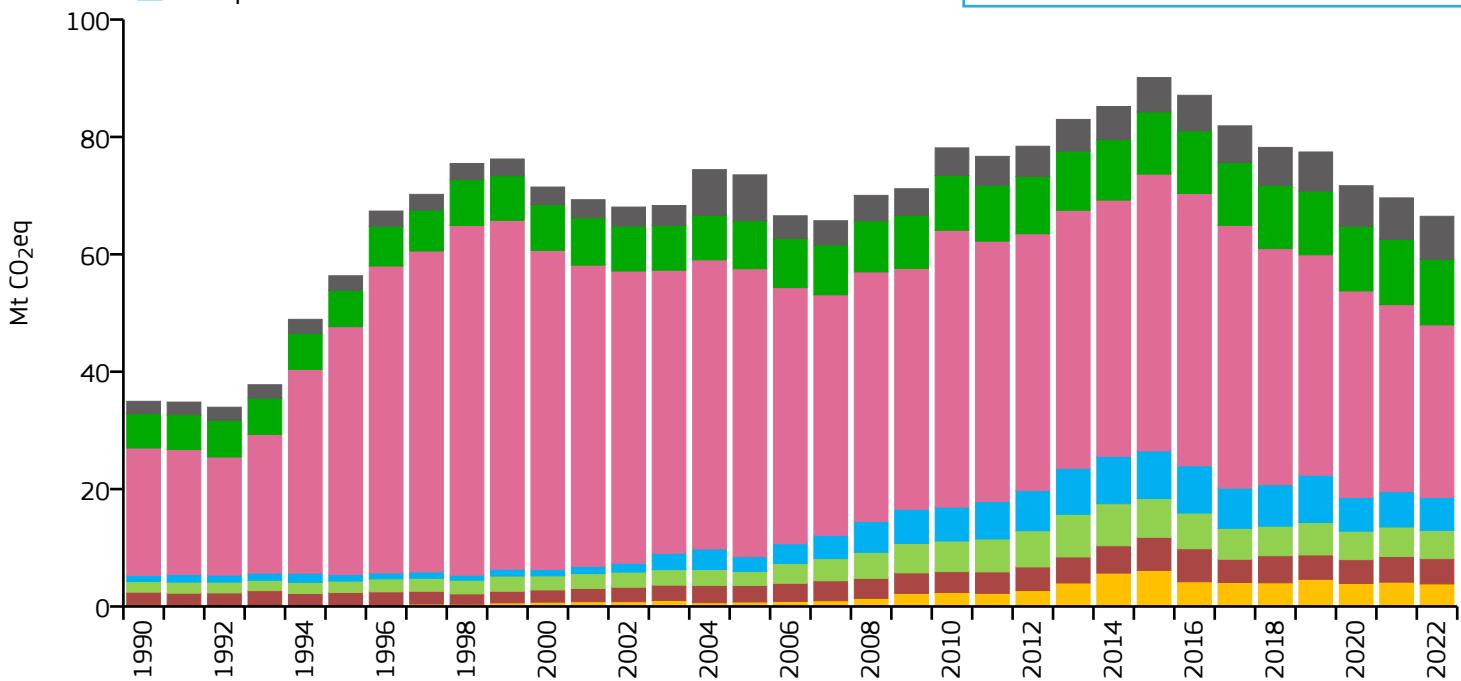
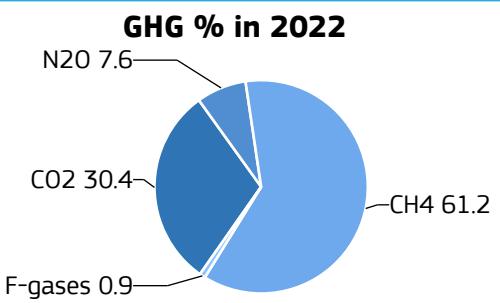
2022 vs 2021



Angola

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 66.480 | 1.900 | 0.316 | 34.988M |
| 2015 | 90.111 | 3.234 | 0.402 | 27.859M |
| 2005 | 73.534 | 3.761 | 0.609 | 19.552M |
| 1990 | 34.957 | 2.872 | 0.510 | 12.171M |

2022 vs 1990

2022 vs 2005

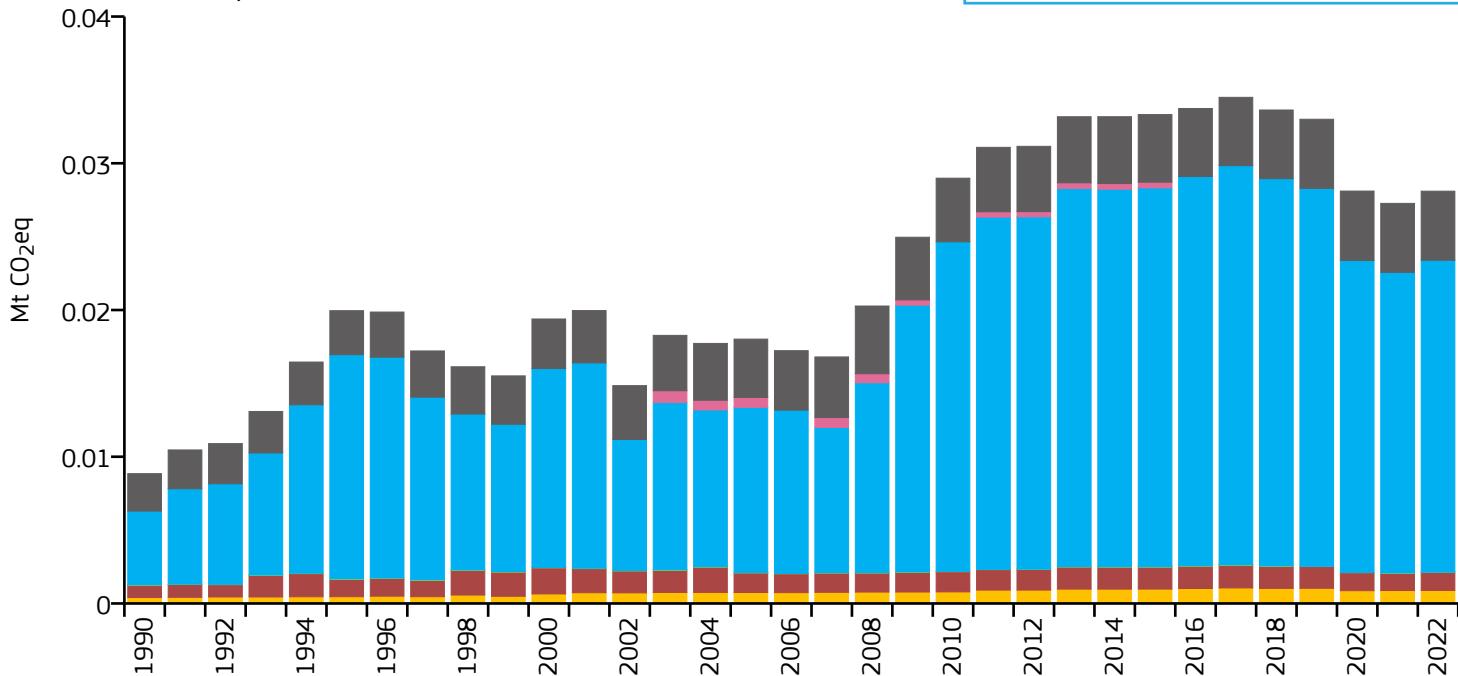
2022 vs 2021



Anguilla

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.028 | 1.873 | 0.111 | 15.000k |
| 2015 | 0.033 | 2.280 | 0.134 | 14.611k |
| 2005 | 0.018 | 1.426 | 0.041 | 12.638k |
| 1990 | 0.009 | 1.061 | 0.036 | 8.334k |

2022 vs 1990

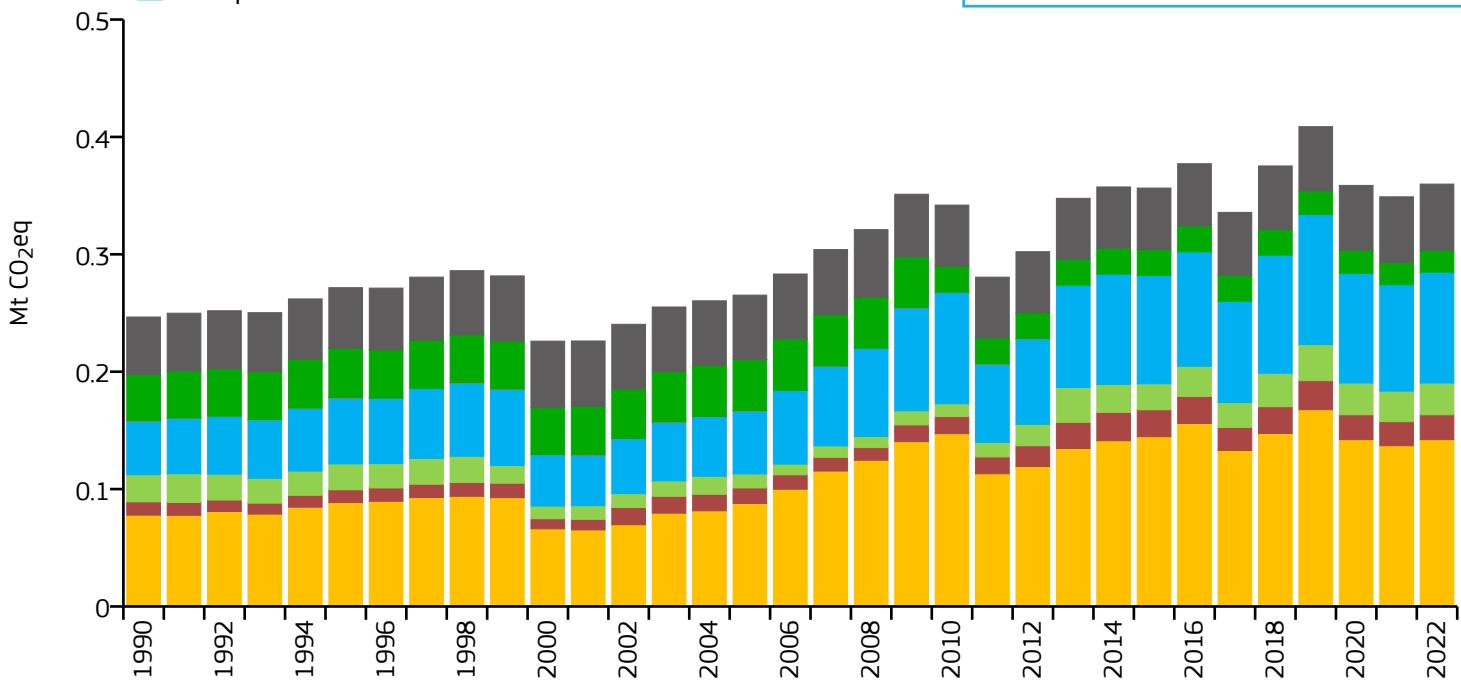
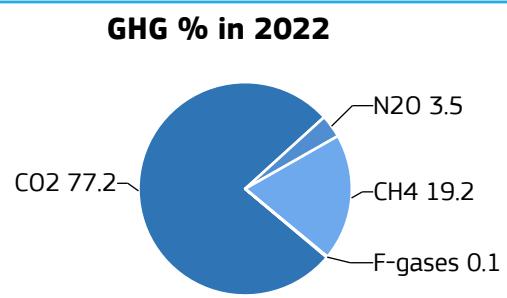
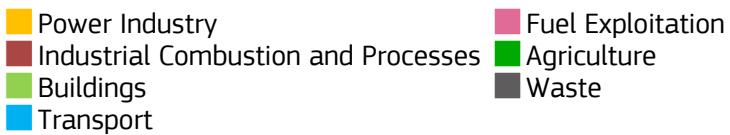
2022 vs 2005

2022 vs 2021



Antigua and Barbuda

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.360 | 3.363 | 0.179 | 107.000k |
| 2015 | 0.356 | 3.567 | 0.205 | 99.923k |
| 2005 | 0.265 | 2.972 | 0.165 | 89.253k |
| 1990 | 0.247 | 3.697 | 0.255 | 66.696k |

2022 vs 1990

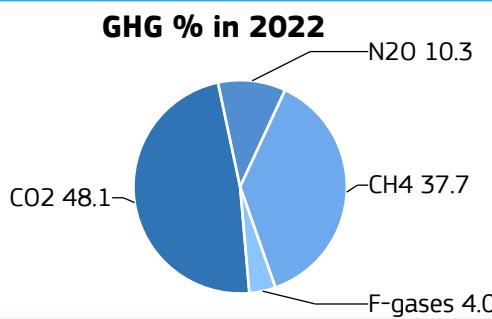
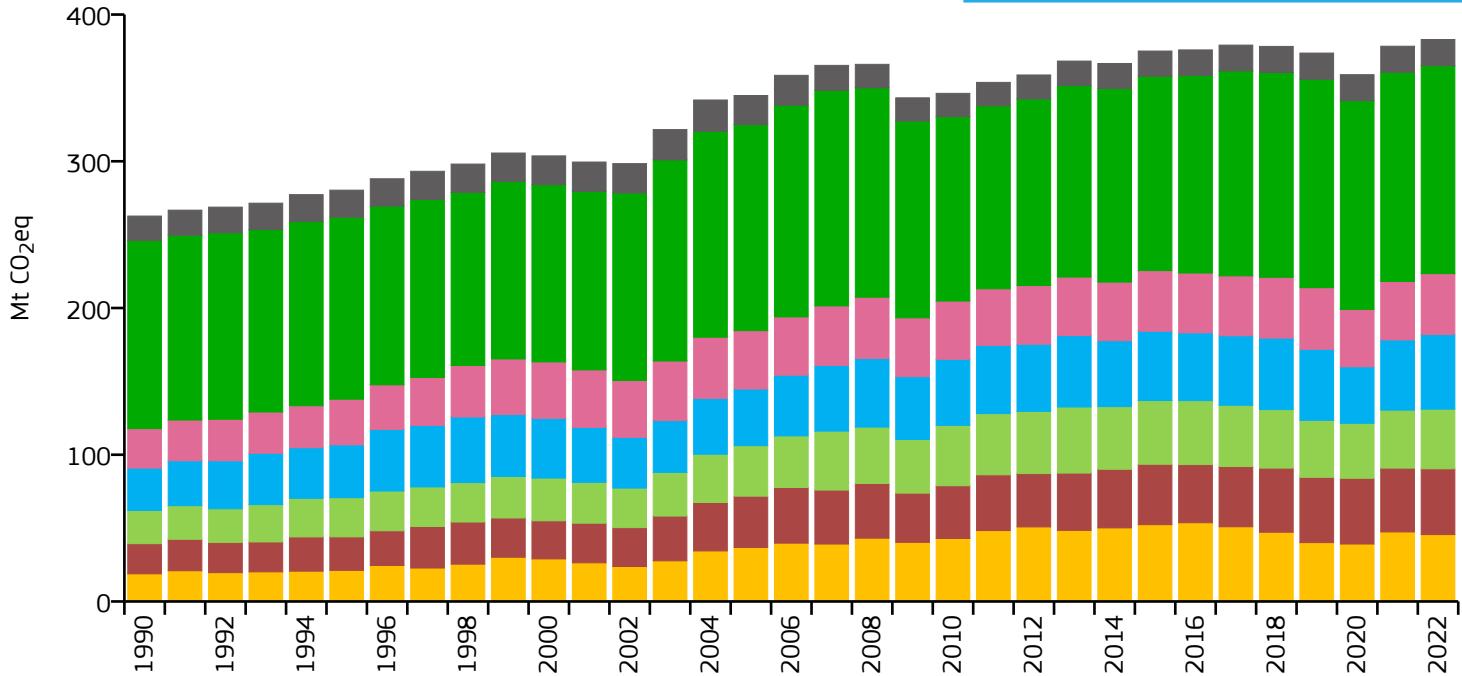
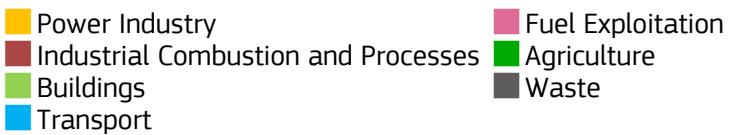
2022 vs 2005

2022 vs 2021



Argentina

GHG emissions by sector

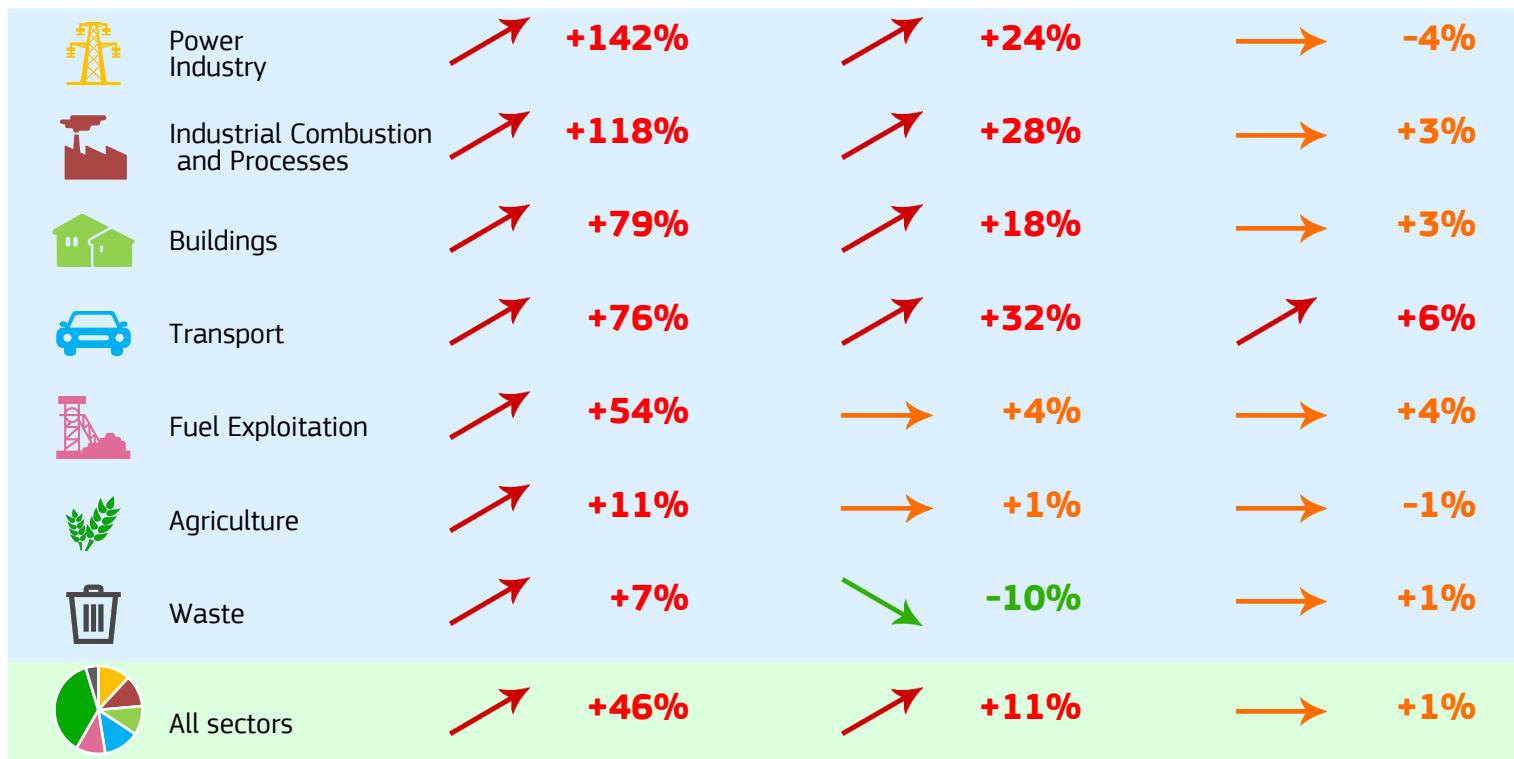


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 382.992 | 8.269 | 0.369 | 46.314M |
| 2015 | 375.125 | 8.640 | 0.363 | 43.418M |
| 2005 | 344.827 | 8.809 | 0.456 | 39.145M |
| 1990 | 262.670 | 8.025 | 0.569 | 32.730M |

2022 vs 1990

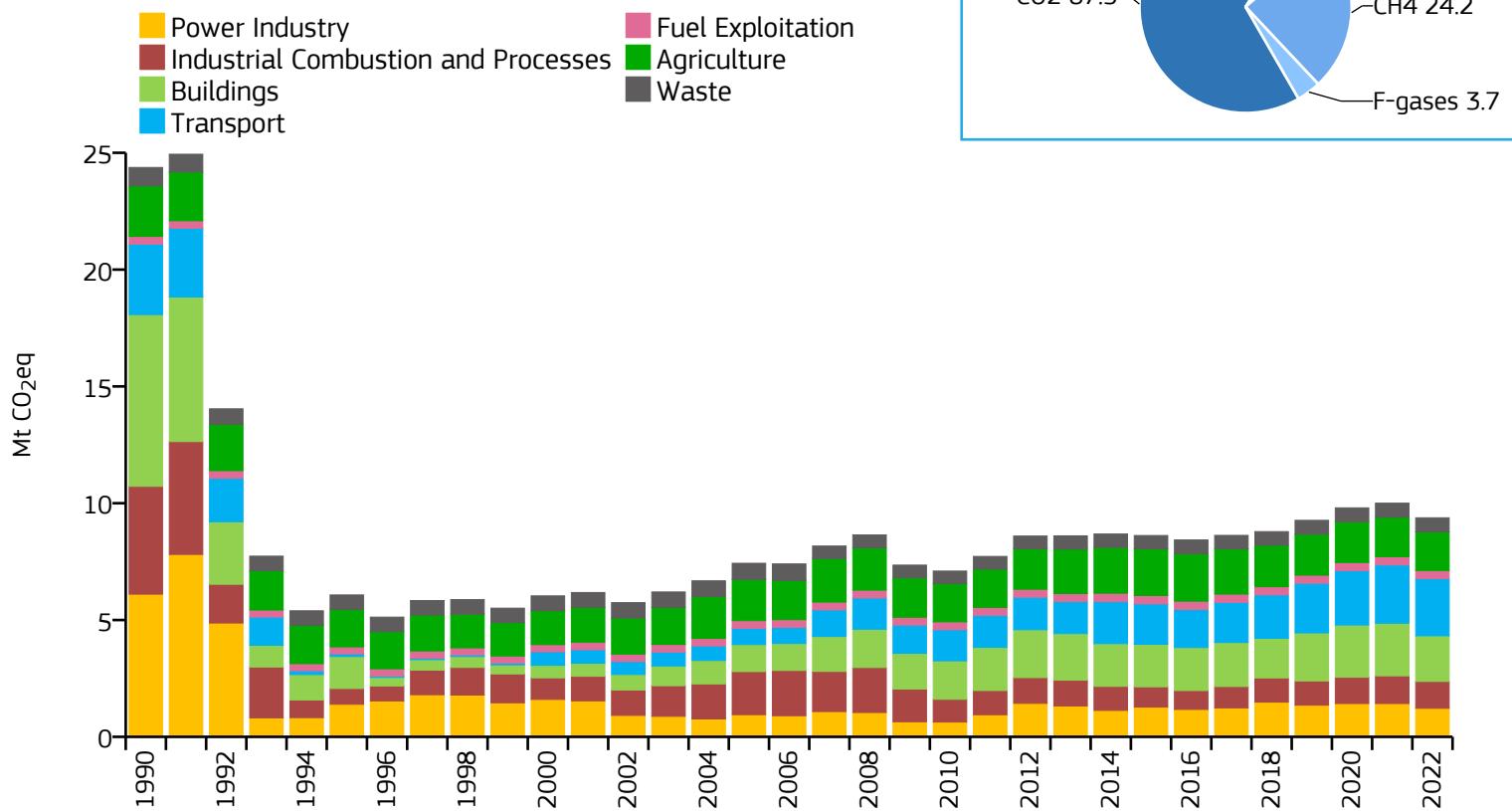
2022 vs 2005

2022 vs 2021



Armenia

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 9.377 | 3.189 | 0.210 | 2.940M |
| 2015 | 8.618 | 2.954 | 0.260 | 2.917M |
| 2005 | 7.430 | 2.492 | 0.336 | 2.981M |
| 1990 | 24.373 | 6.889 | 1.330 | 3.538M |

2022 vs 1990

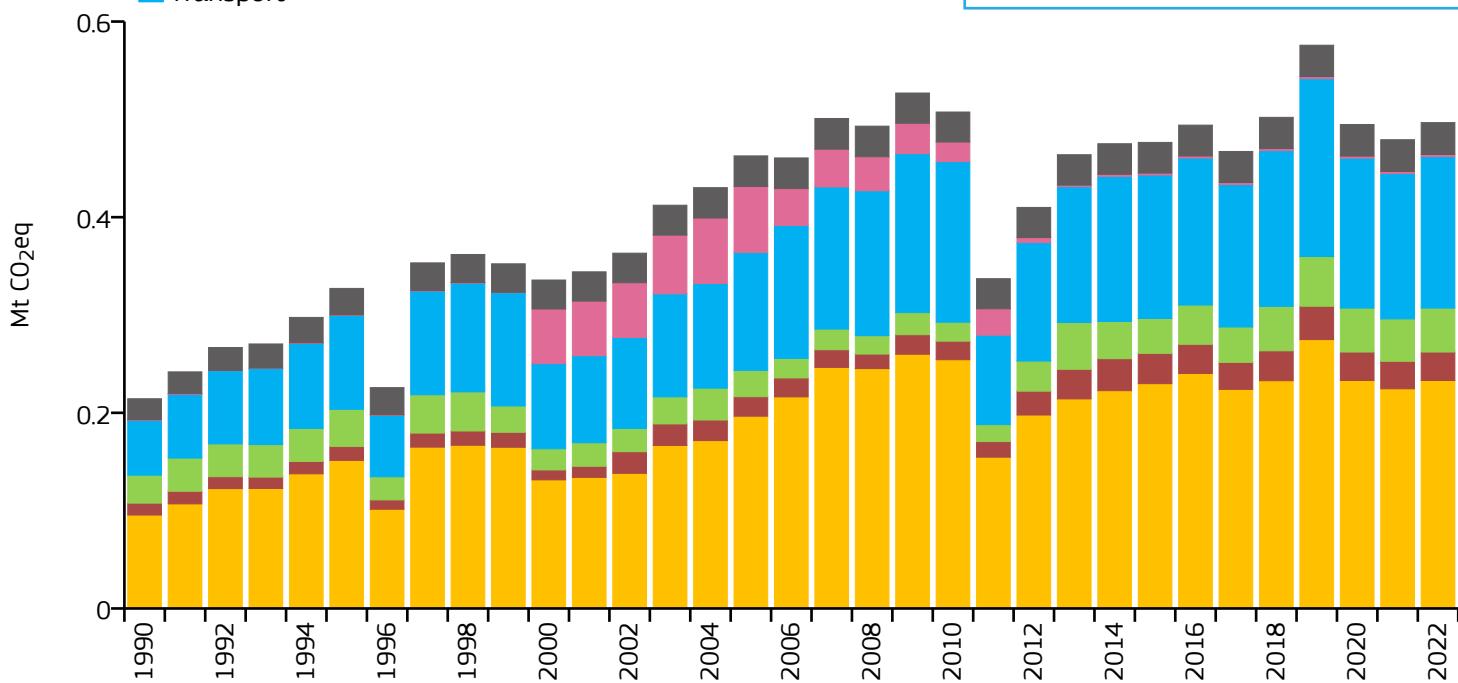
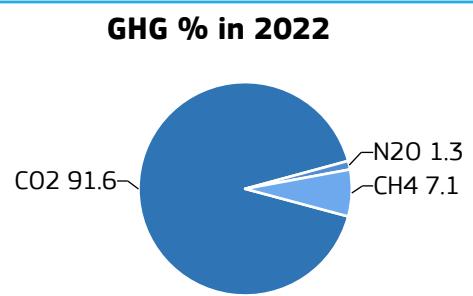
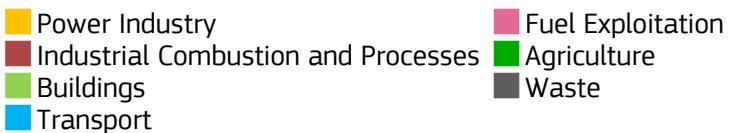
2022 vs 2005

2022 vs 2021



Aruba

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.497 | 4.642 | 0.103 | 107.000k |
| 2015 | 0.476 | 4.566 | 0.125 | 104.341k |
| 2005 | 0.463 | 4.625 | 0.125 | 100.031k |
| 1990 | 0.214 | 3.449 | 0.106 | 62.149k |

2022 vs 1990

2022 vs 2005

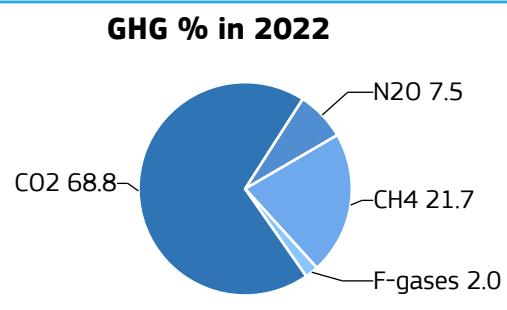
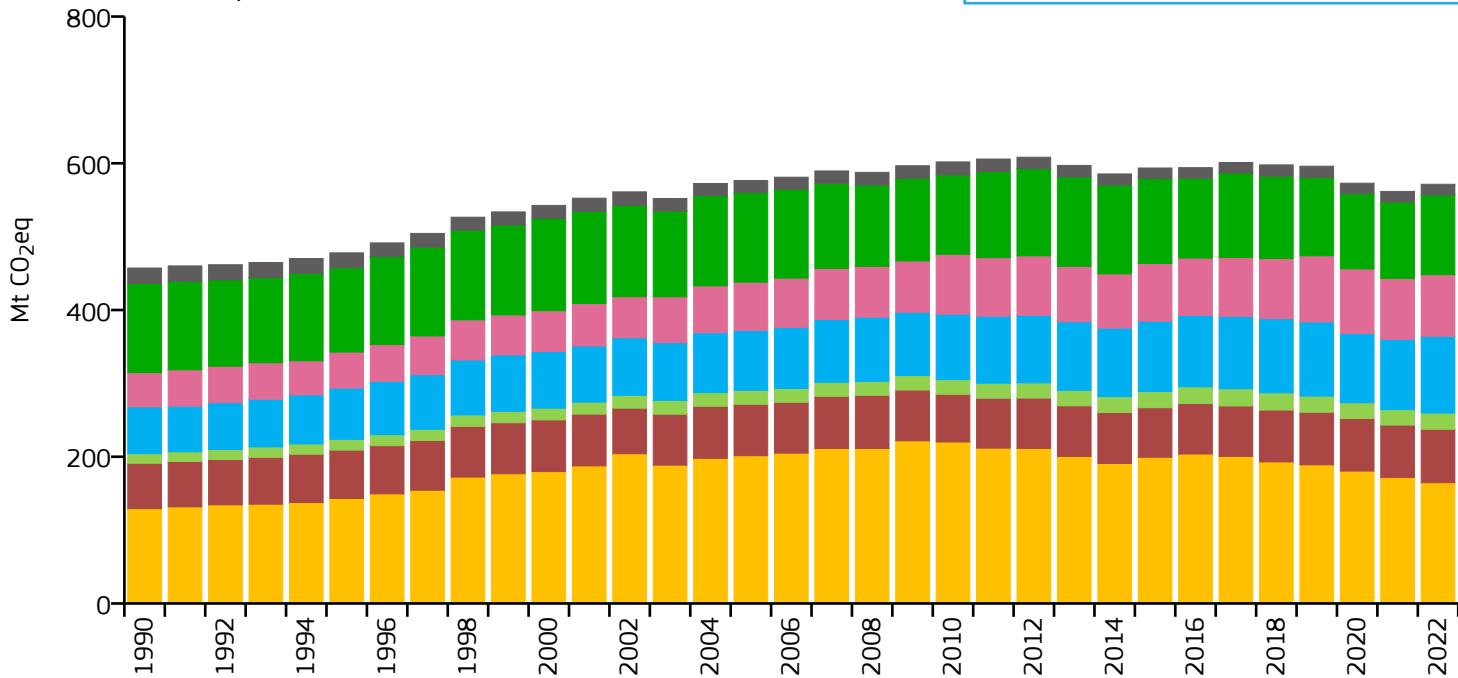
2022 vs 2021



Australia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

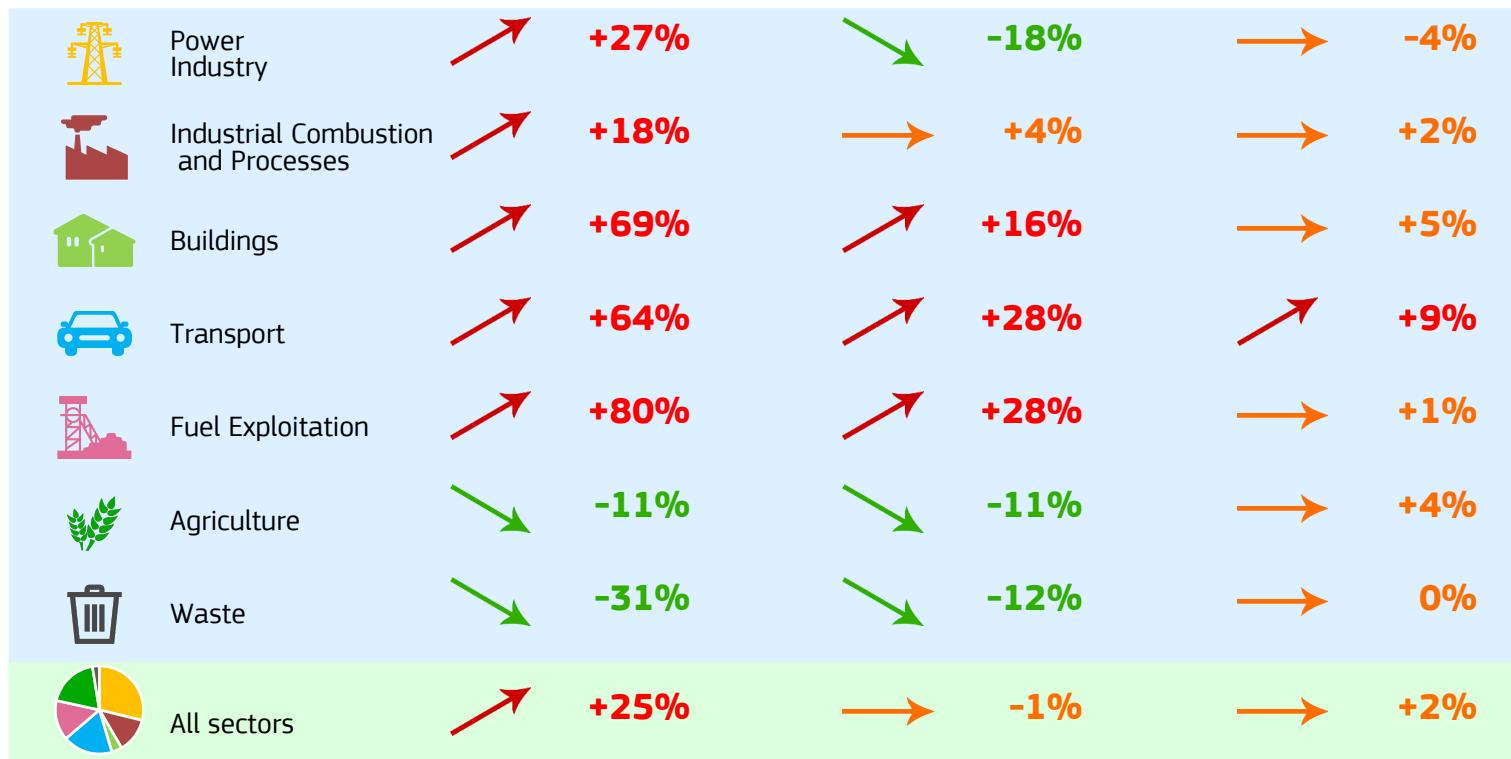


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 571.382 | 21.979 | 0.431 | 25.997M |
| 2015 | 593.561 | 24.940 | 0.524 | 23.800M |
| 2005 | 576.590 | 28.489 | 0.669 | 20.239M |
| 1990 | 457.217 | 26.830 | 0.864 | 17.041M |

2022 vs 1990

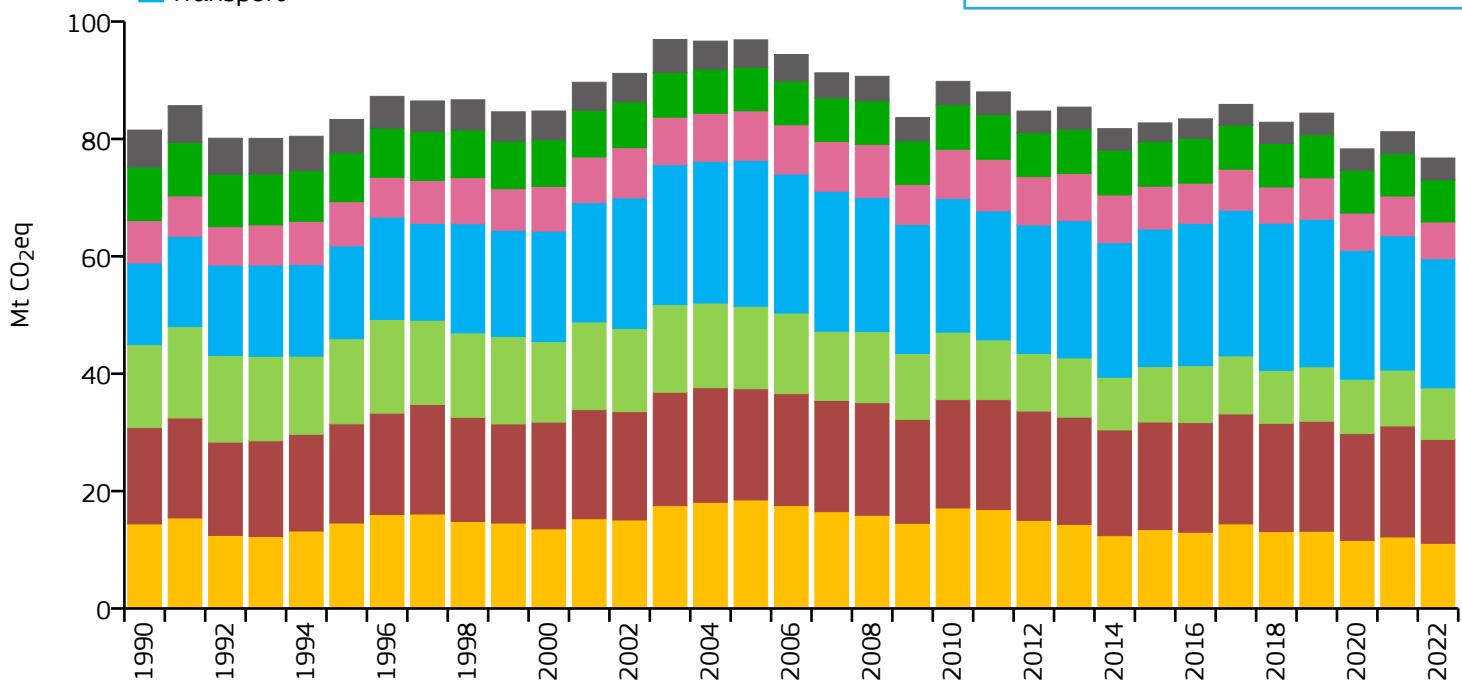
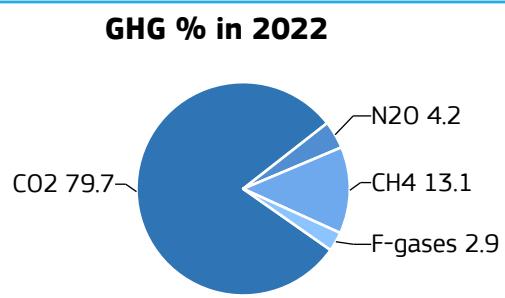
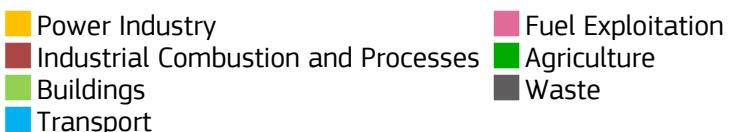
2022 vs 2005

2022 vs 2021



Austria

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 76.743 | 8.700 | 0.151 | 8.821M |
| 2015 | 82.724 | 9.532 | 0.181 | 8.679M |
| 2005 | 96.878 | 11.738 | 0.238 | 8.254M |
| 1990 | 81.508 | 10.553 | 0.283 | 7.724M |

2022 vs 1990

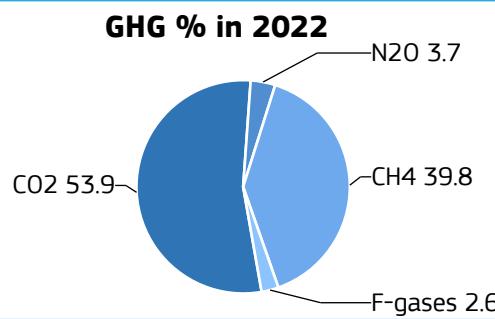
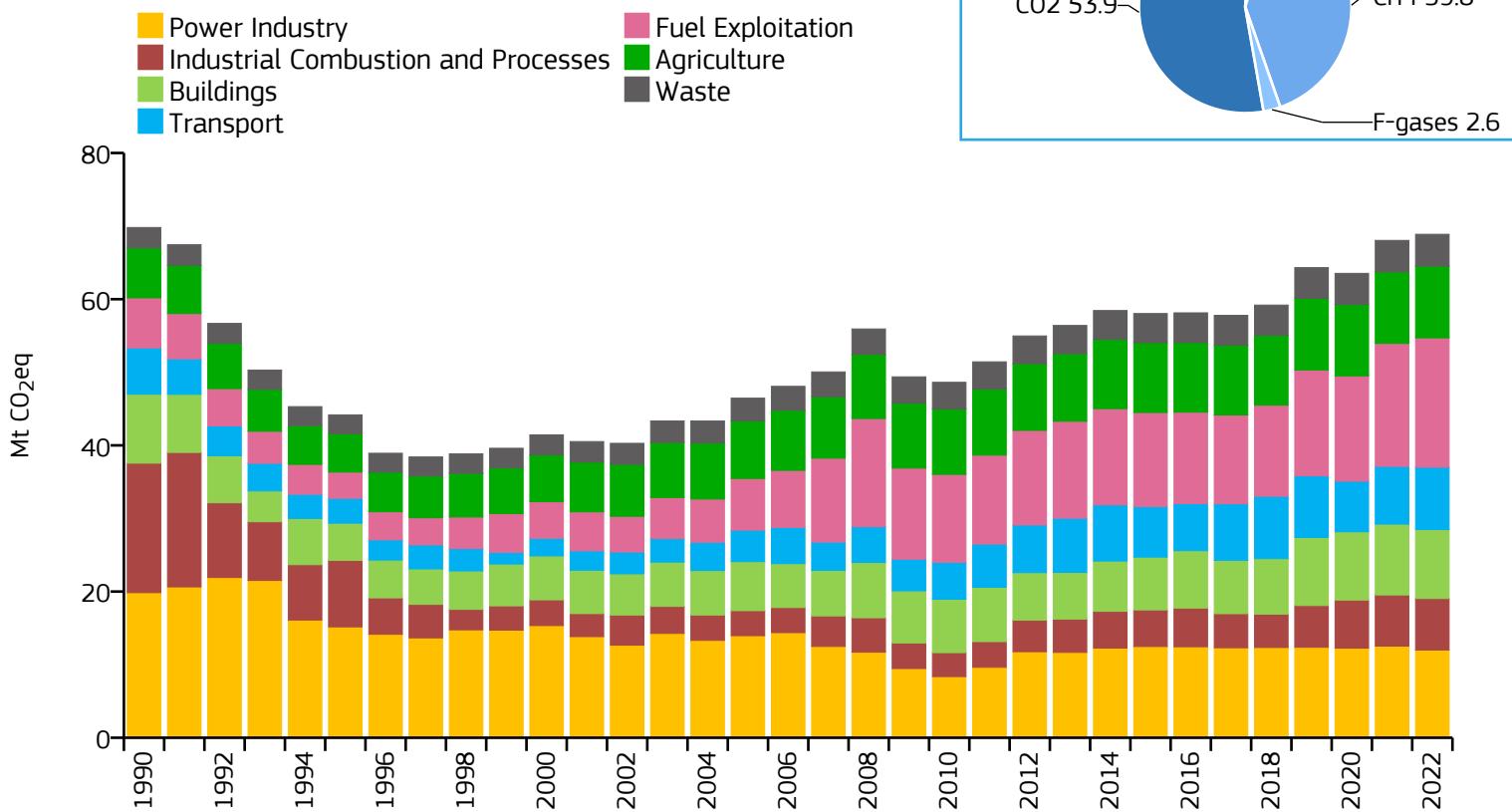
2022 vs 2005

2022 vs 2021



Azerbaijan

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 68.877 | 6.718 | 0.450 | 10.252M |
| 2015 | 58.032 | 6.034 | 0.405 | 9.617M |
| 2005 | 46.459 | 5.441 | 0.779 | 8.539M |
| 1990 | 69.808 | 9.638 | 1.277 | 7.243M |

2022 vs 1990

2022 vs 2005

2022 vs 2021

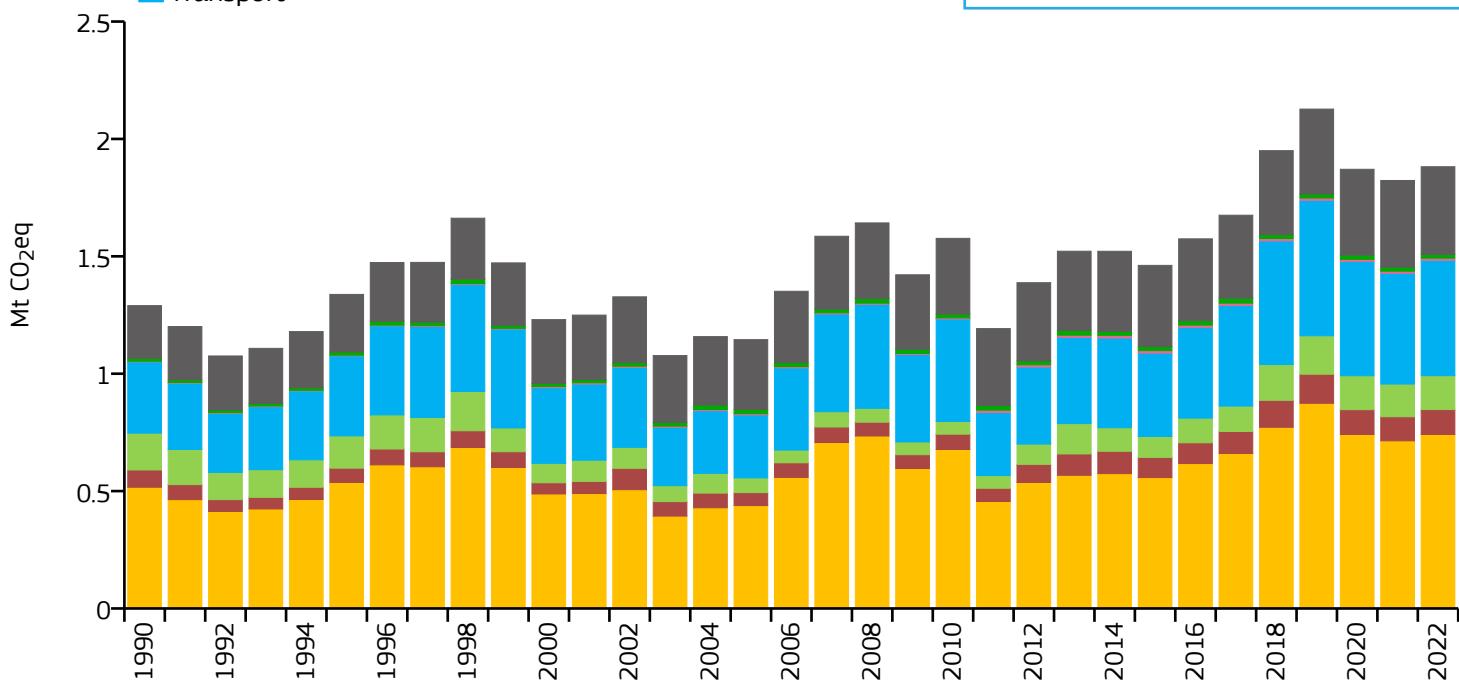
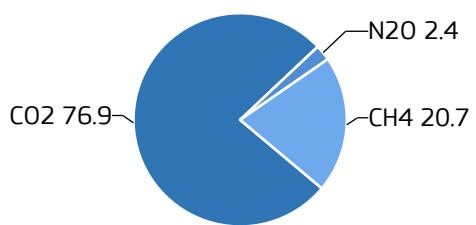


Bahamas

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1.882 | 4.545 | 0.134 | 414.000k |
| 2015 | 1.461 | 3.778 | 0.110 | 386.838k |
| 2005 | 1.145 | 3.478 | 0.088 | 329.249k |
| 1990 | 1.290 | 5.032 | 0.134 | 256.336k |

2022 vs 1990

2022 vs 2005

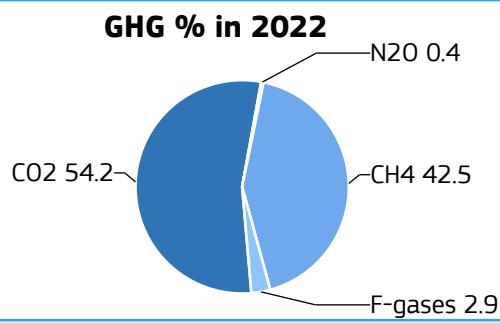
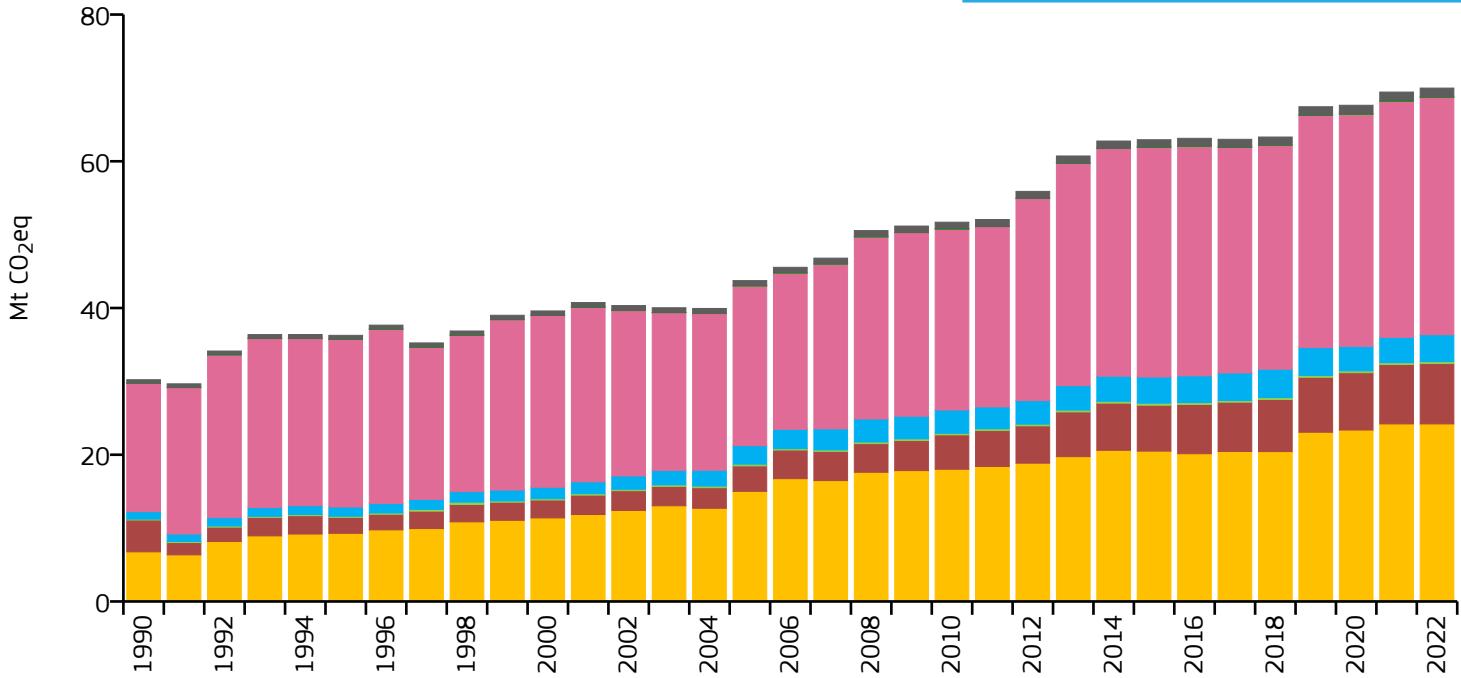
2022 vs 2021



Bahrain

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

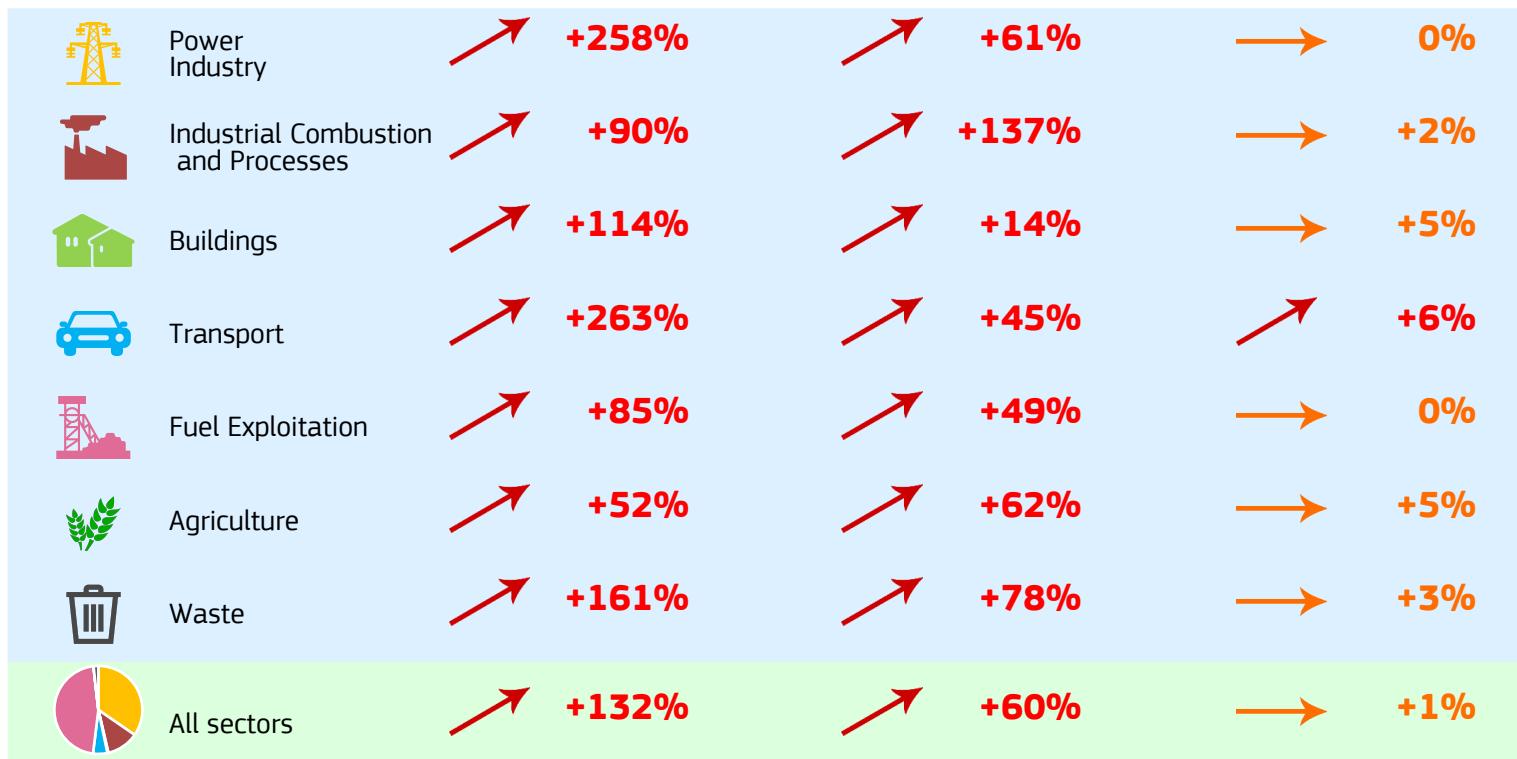


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 69.976 | 39.290 | 0.917 | 1.781M |
| 2015 | 62.937 | 45.877 | 0.954 | 1.372M |
| 2005 | 43.733 | 49.184 | 1.036 | 889.168k |
| 1990 | 30.224 | 60.944 | 1.579 | 495.931k |

2022 vs 1990

2022 vs 2005

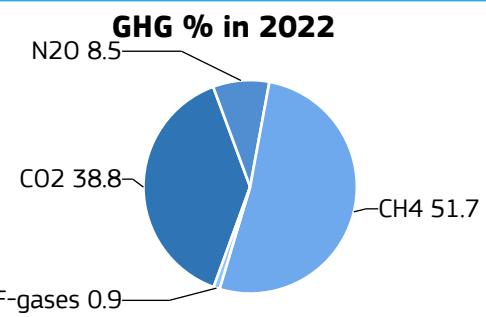
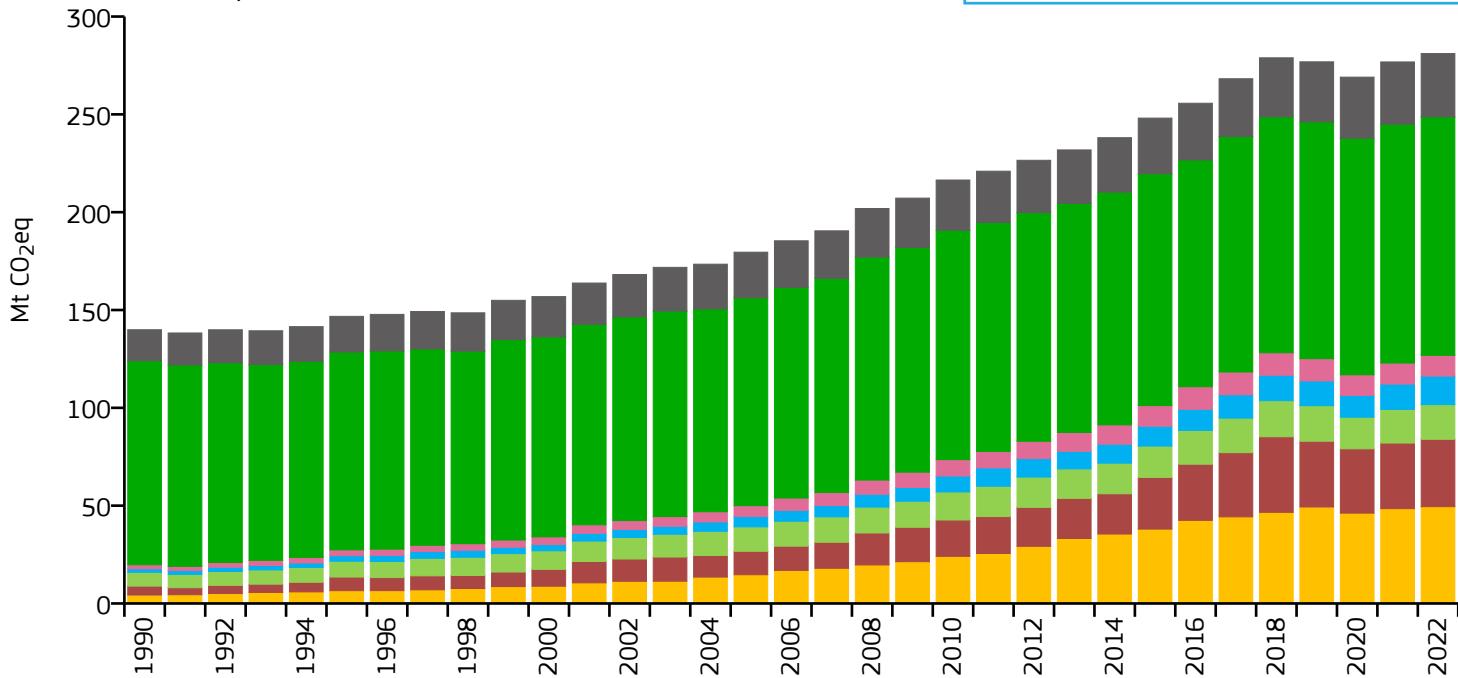
2022 vs 2021



Bangladesh

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 281.082 | 1.623 | 0.262 | 173.229M |
| 2015 | 248.088 | 1.539 | 0.362 | 161.201M |
| 2005 | 179.555 | 1.252 | 0.478 | 143.431M |
| 1990 | 139.913 | 1.318 | 0.755 | 106.189M |

2022 vs 1990

2022 vs 2005

2022 vs 2021

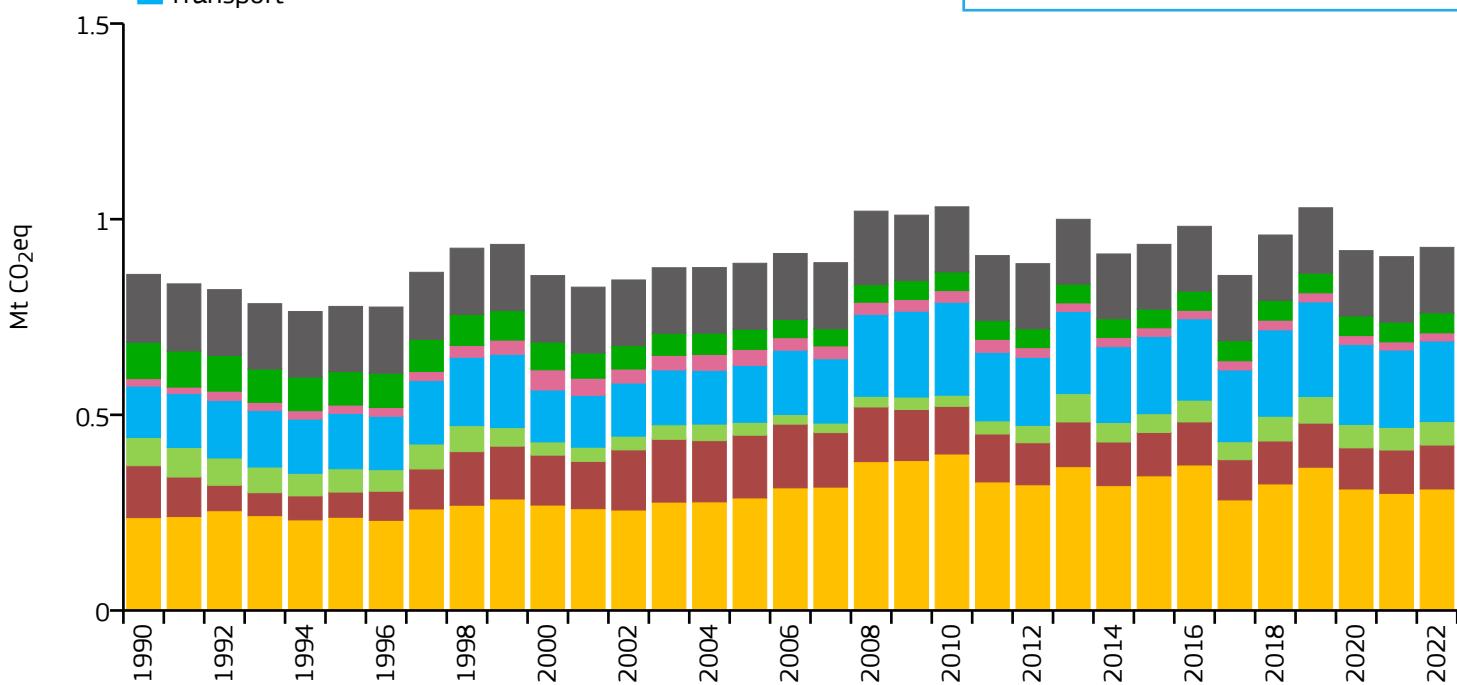
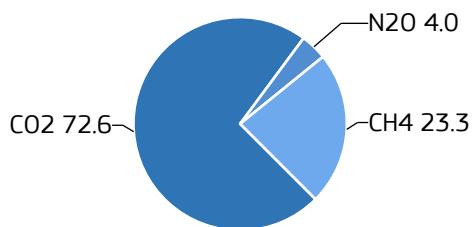


Barbados

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.928 | 3.222 | 0.218 | 288.000k |
| 2015 | 0.936 | 3.292 | 0.213 | 284.217k |
| 2005 | 0.887 | 3.238 | 0.204 | 274.009k |
| 1990 | 0.859 | 3.299 | 0.235 | 260.374k |

2022 vs 1990

2022 vs 2005

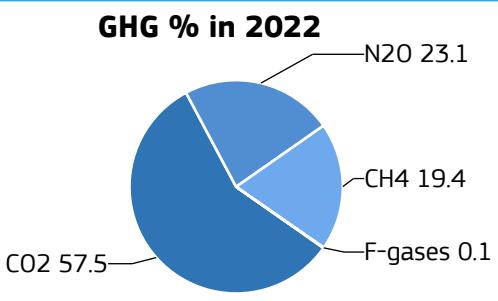
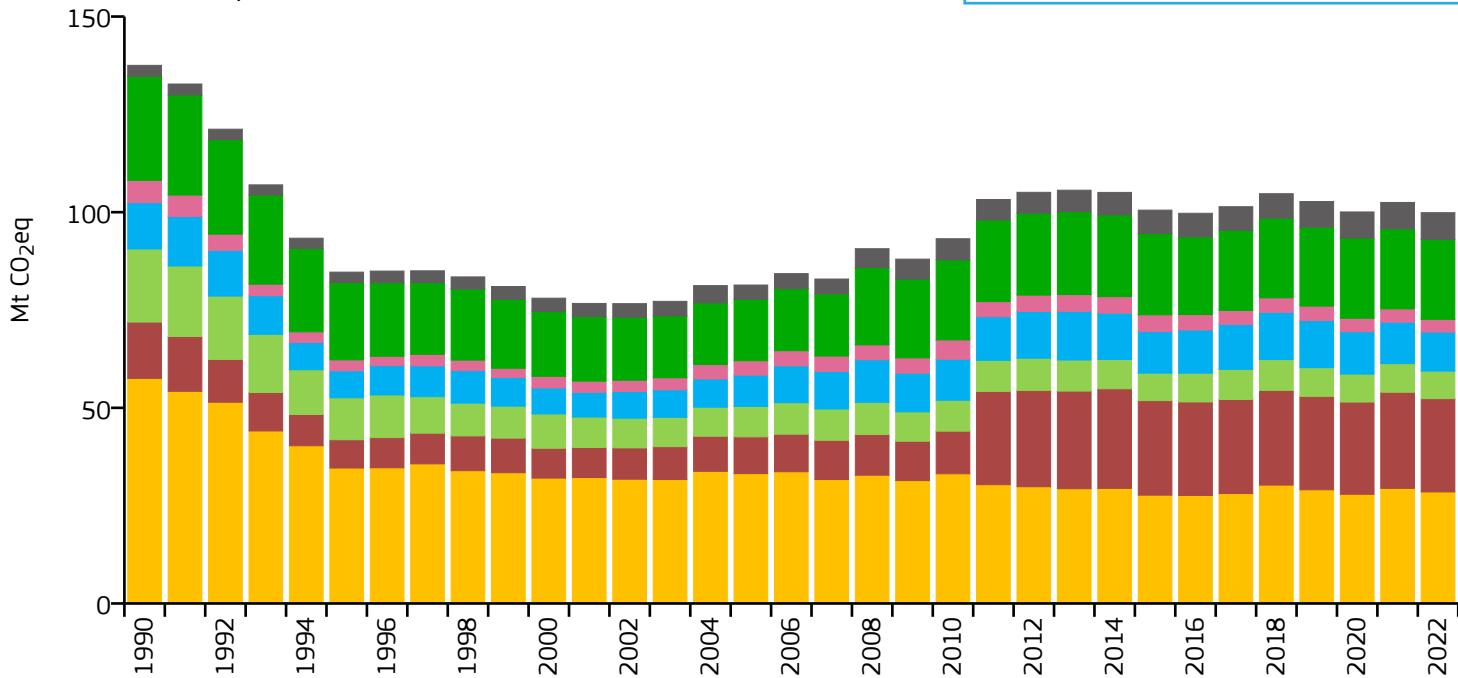
2022 vs 2021



Belarus

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 99.874 | 10.650 | 0.567 | 9.378M |
| 2015 | 100.527 | 10.598 | 0.579 | 9.486M |
| 2005 | 81.382 | 8.458 | 0.705 | 9.622M |
| 1990 | 137.528 | 13.461 | 1.517 | 10.217M |

2022 vs 1990

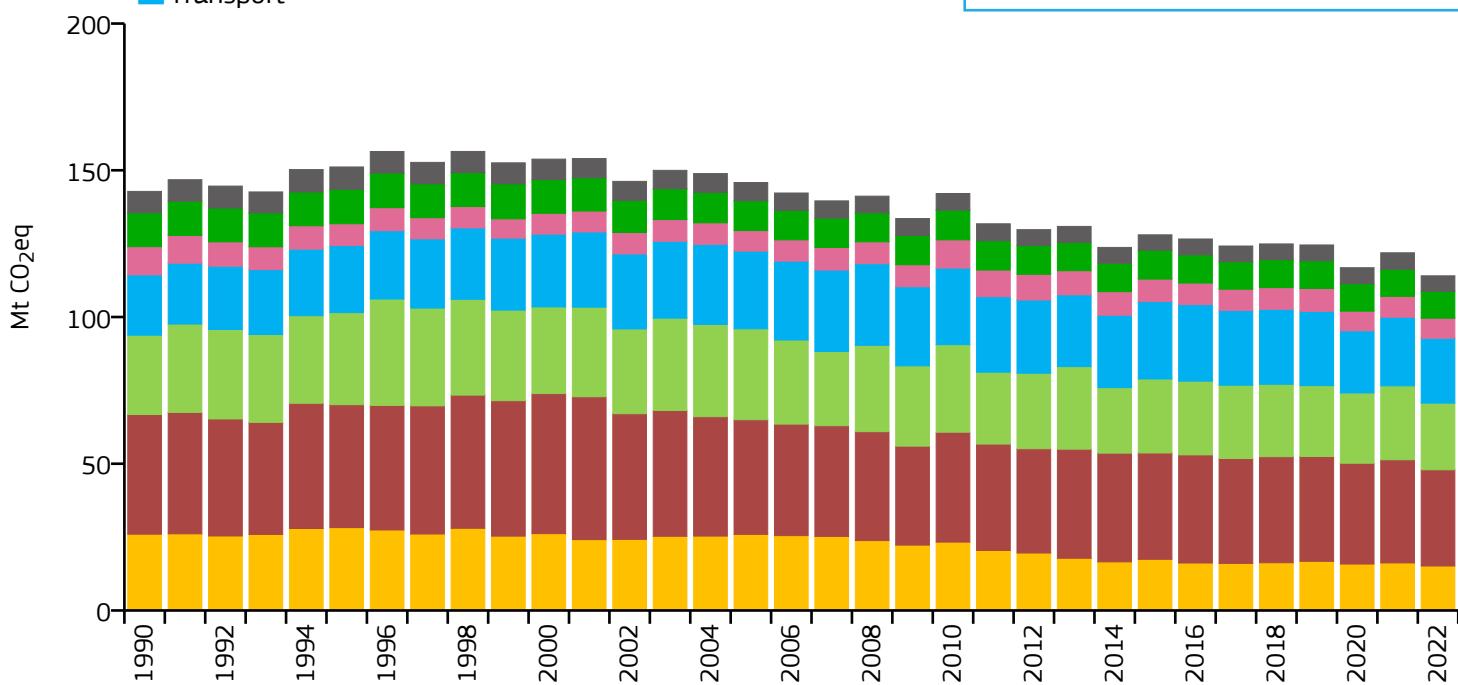
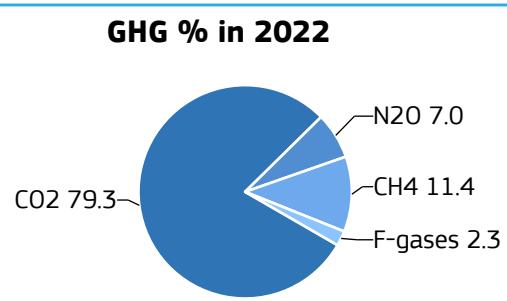
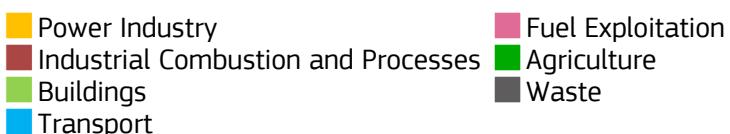
2022 vs 2005

2022 vs 2021



Belgium

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 114.032 | 9.737 | 0.184 | 11.711M |
| 2015 | 127.997 | 11.339 | 0.230 | 11.288M |
| 2005 | 145.835 | 13.827 | 0.300 | 10.547M |
| 1990 | 142.803 | 14.271 | 0.404 | 10.006M |

2022 vs 1990

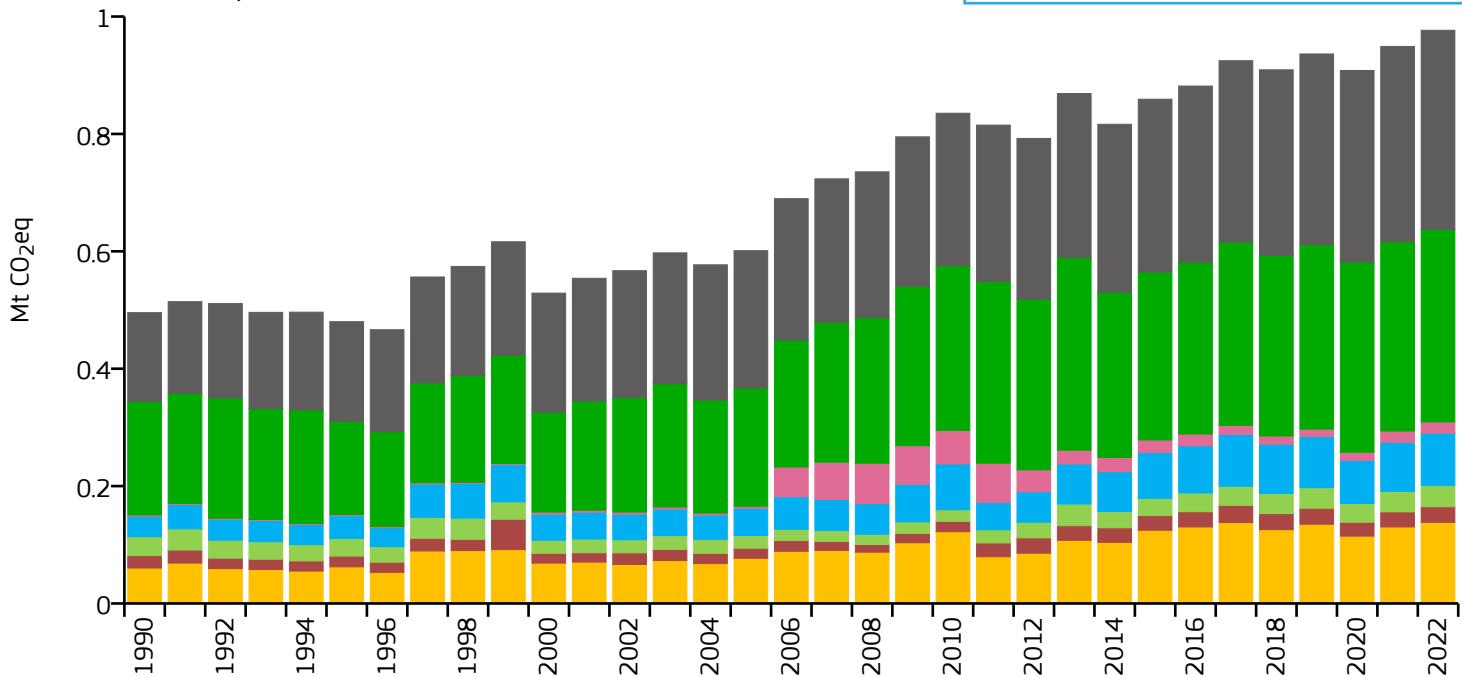
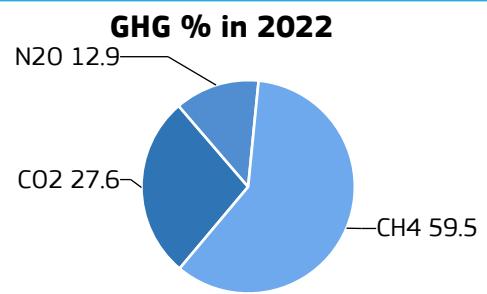
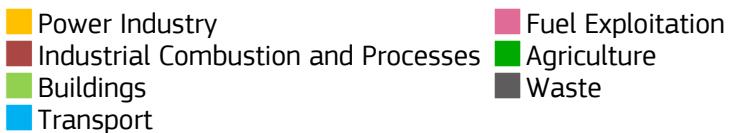
2022 vs 2005

2022 vs 2021



Belize

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.977 | 2.359 | 0.248 | 414.000k |
| 2015 | 0.859 | 2.391 | 0.254 | 359.288k |
| 2005 | 0.601 | 2.122 | 0.223 | 283.277k |
| 1990 | 0.495 | 2.642 | 0.424 | 187.552k |

2022 vs 1990

2022 vs 2005

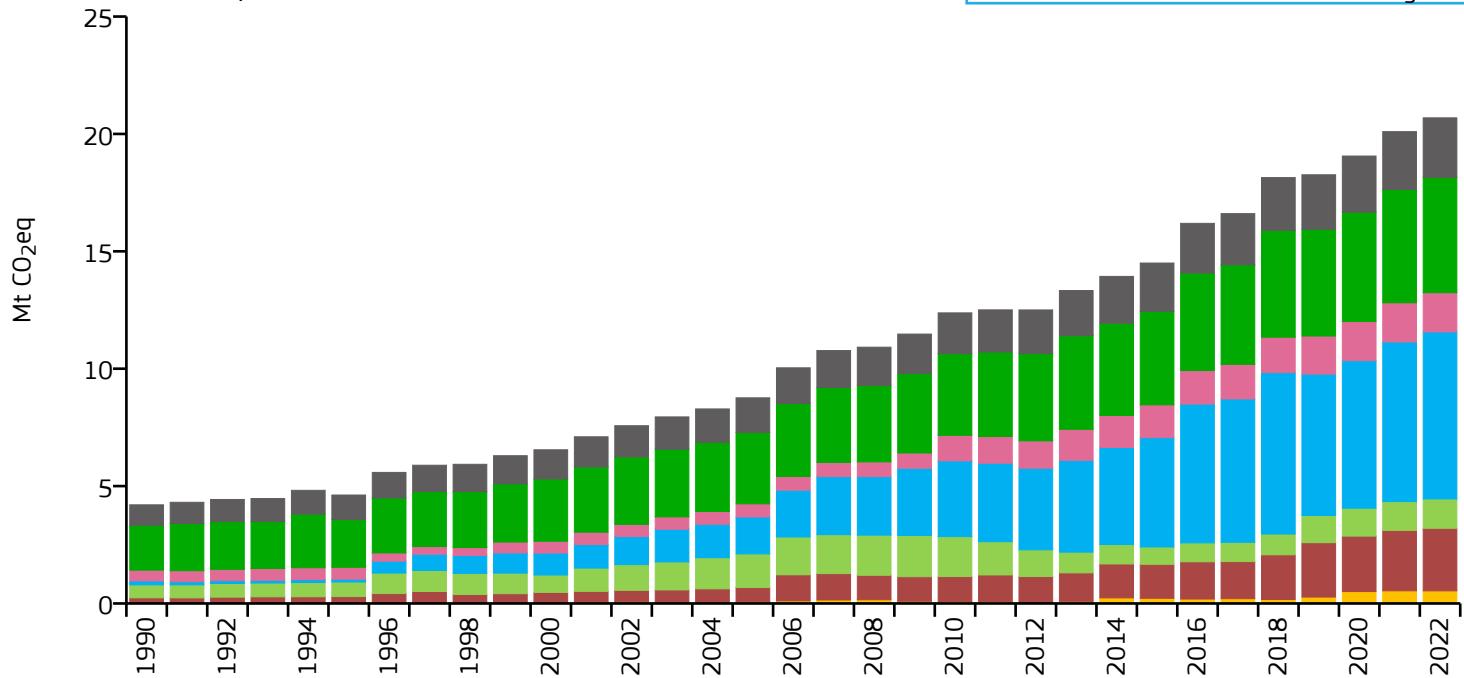
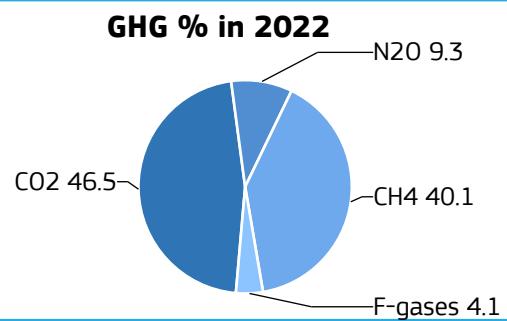
2022 vs 2021



Benin

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 20.685 | 1.618 | 0.451 | 12.781M |
| 2015 | 14.500 | 1.371 | 0.465 | 10.576M |
| 2005 | 8.759 | 1.097 | 0.425 | 7.982M |
| 1990 | 4.202 | 0.844 | 0.388 | 4.979M |

2022 vs 1990

2022 vs 2005

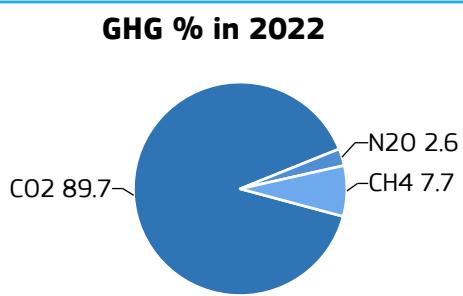
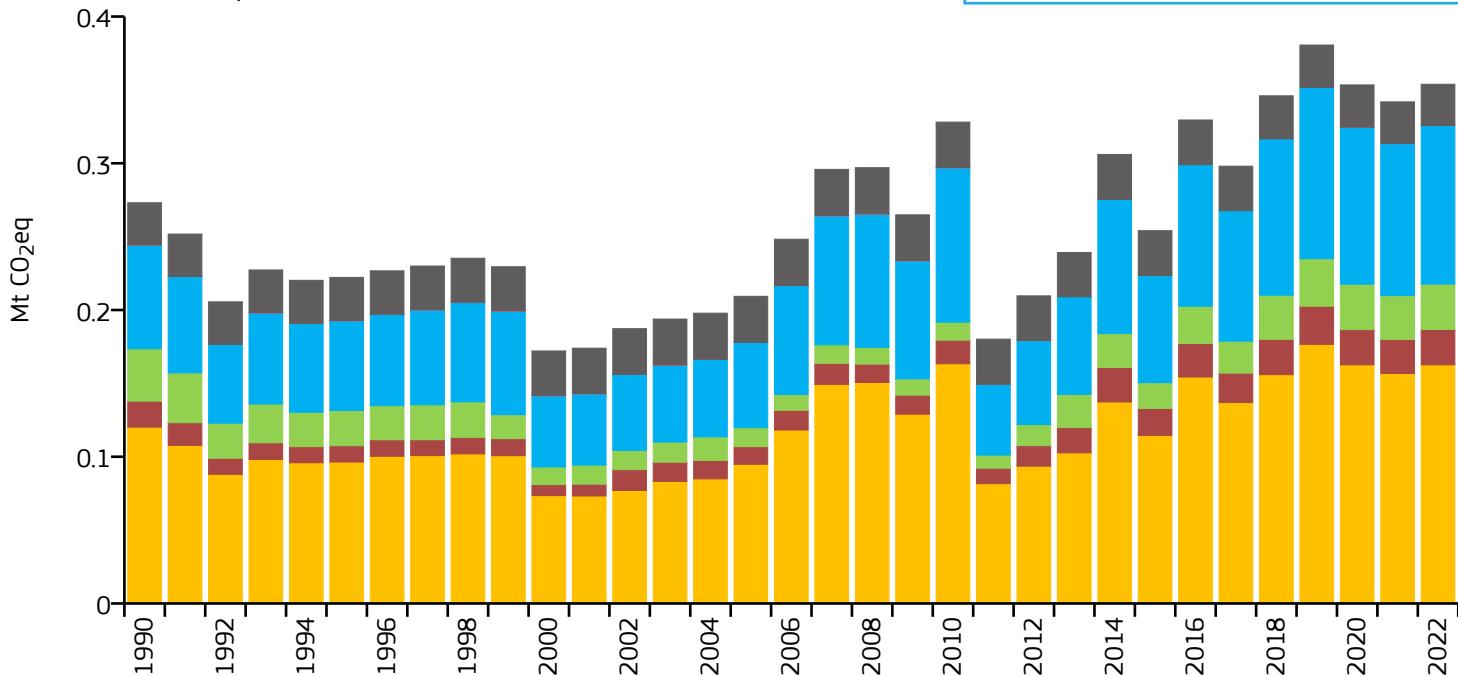
2022 vs 2021



Bermuda

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.354 | 5.898 | 0.069 | 60.000k |
| 2015 | 0.254 | 4.097 | 0.050 | 62.003k |
| 2005 | 0.209 | 3.214 | 0.036 | 65.130k |
| 1990 | 0.273 | 4.482 | 0.070 | 60.930k |

2022 vs 1990

2022 vs 2005

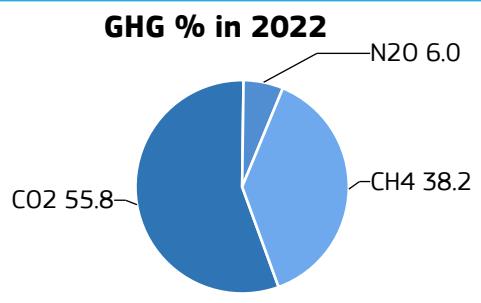
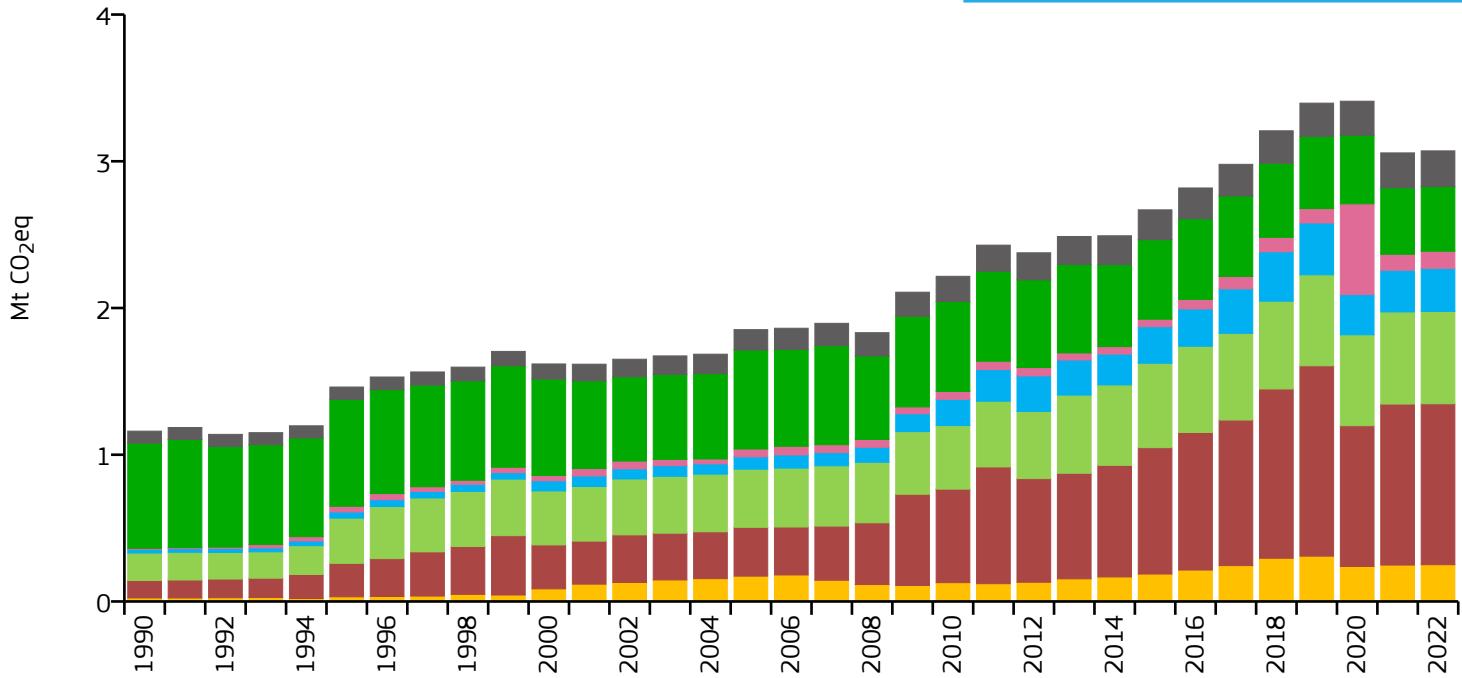
2022 vs 2021



Bhutan

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 3.071 | 3.600 | 0.374 | 853.000k |
| 2015 | 2.669 | 3.390 | 0.364 | 787.386k |
| 2005 | 1.853 | 2.821 | 0.523 | 656.639k |
| 1990 | 1.161 | 2.160 | 0.759 | 537.280k |

2022 vs 1990

2022 vs 2005

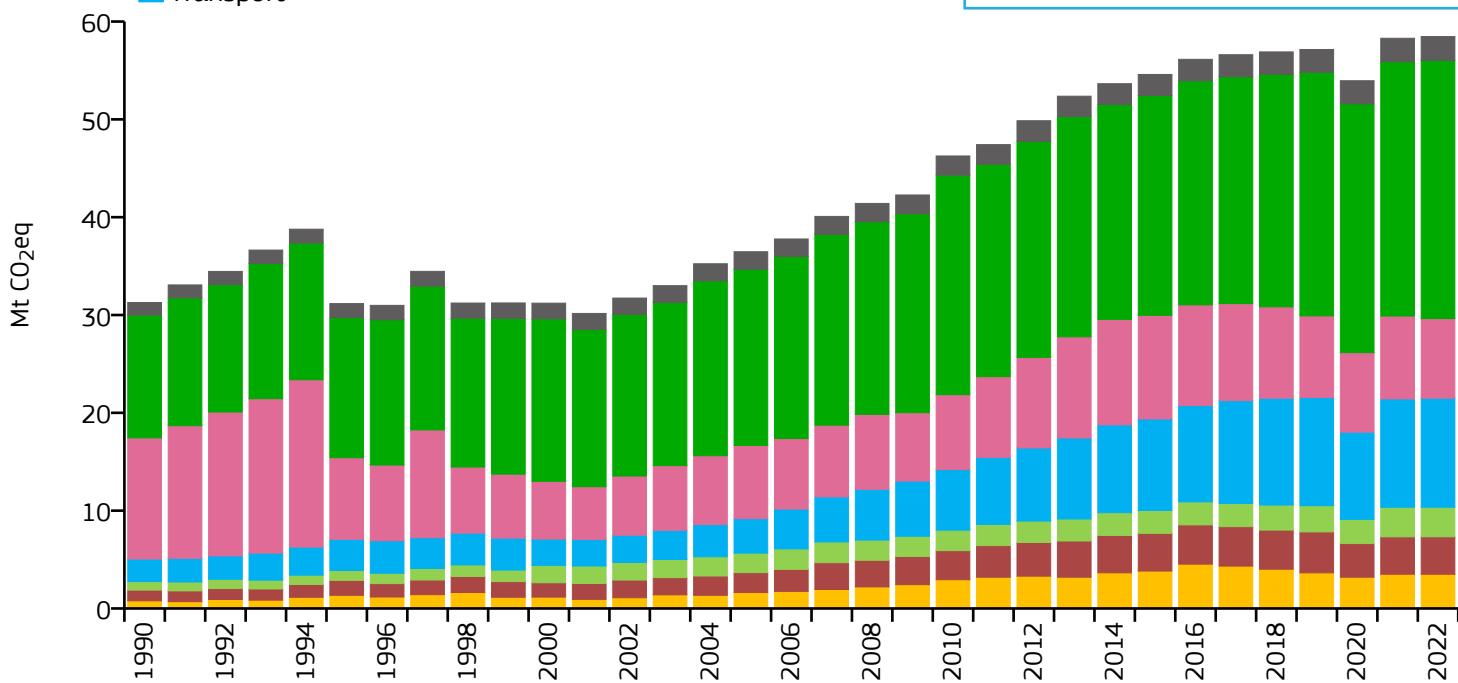
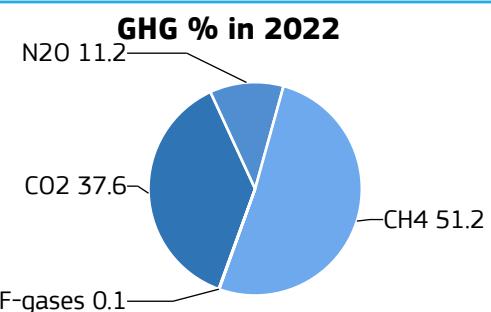
2022 vs 2021



Bolivia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 58.463 | 4.924 | 0.583 | 11.872M |
| 2015 | 54.592 | 5.090 | 0.629 | 10.725M |
| 2005 | 36.468 | 3.996 | 0.687 | 9.125M |
| 1990 | 31.279 | 4.562 | 0.993 | 6.856M |

2022 vs 1990

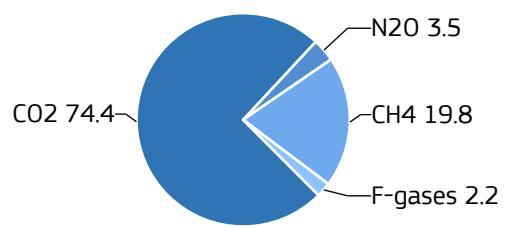
2022 vs 2005

2022 vs 2021

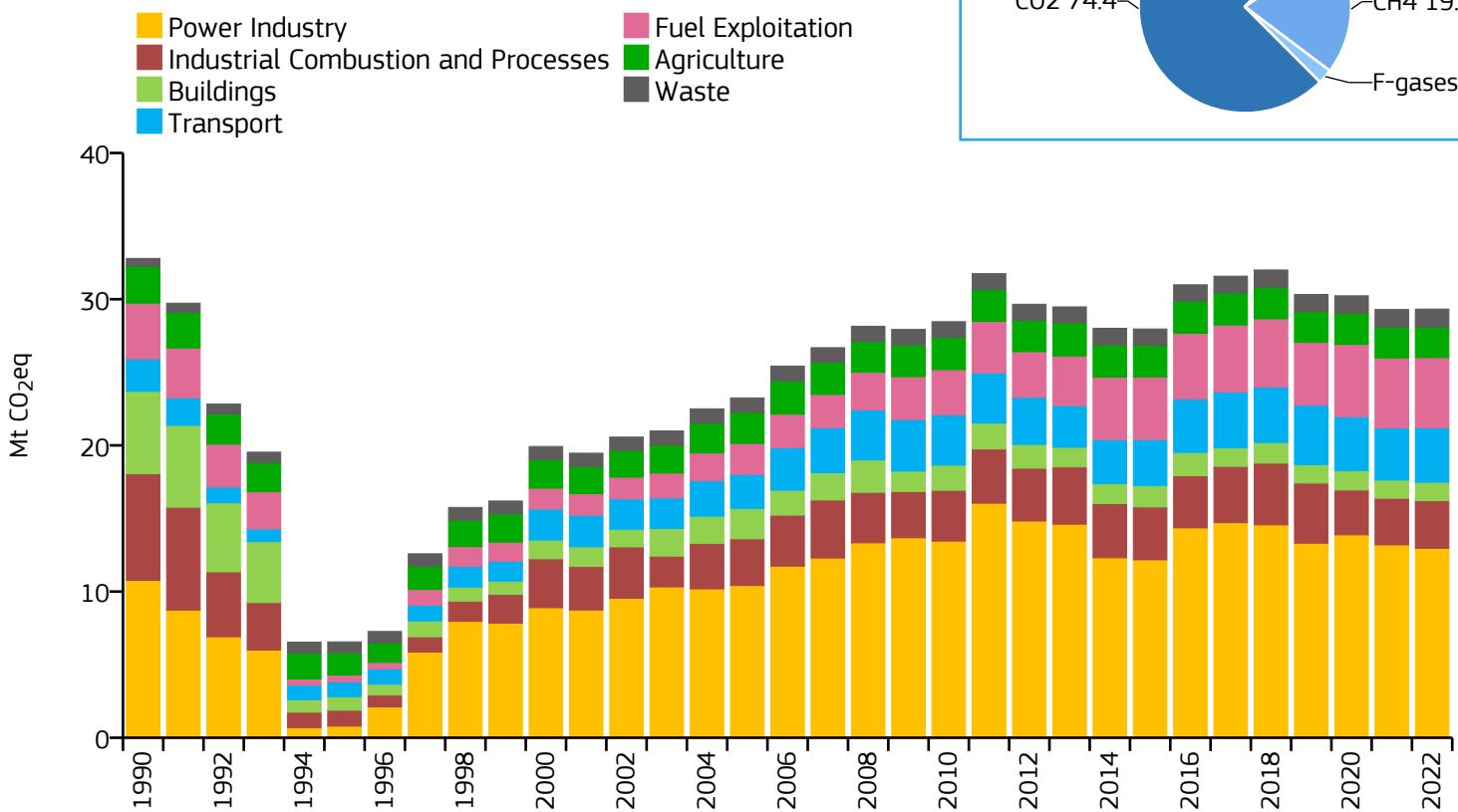


Bosnia and Herzegovina

GHG % in 2022



GHG emissions by sector

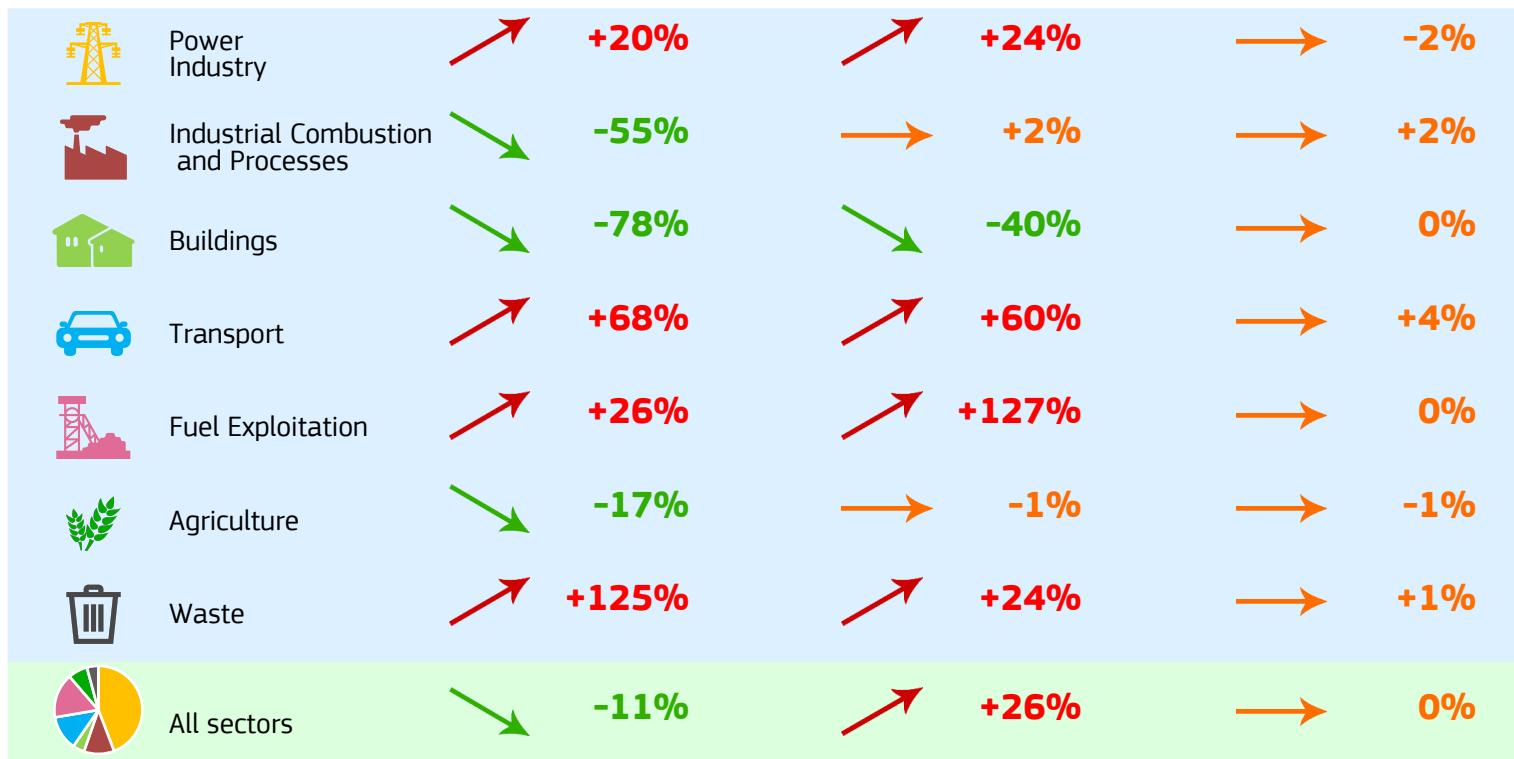


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 29.324 | 8.414 | 0.543 | 3.485M |
| 2015 | 27.962 | 7.908 | 0.638 | 3.536M |
| 2005 | 23.248 | 6.148 | 0.660 | 3.782M |
| 1990 | 32.790 | 7.346 | 3.991 | 4.463M |

2022 vs 1990

2022 vs 2005

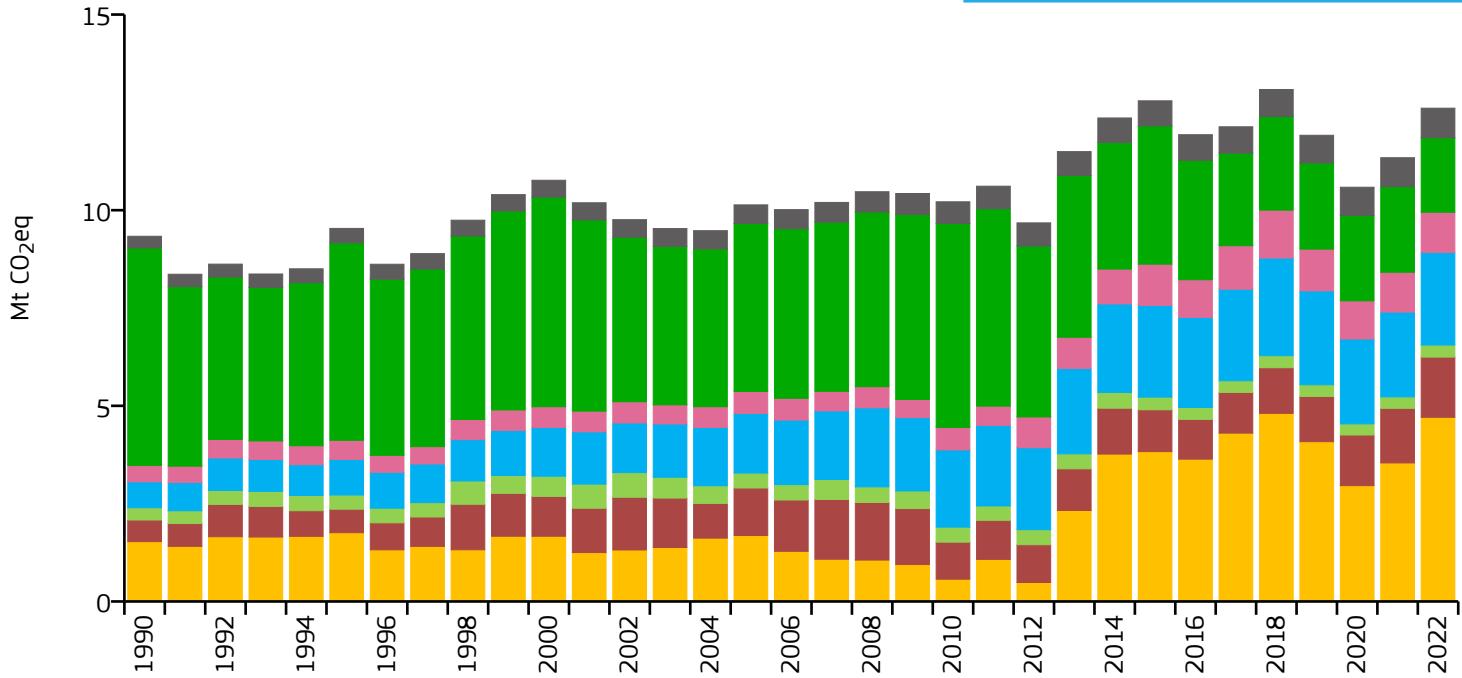
2022 vs 2021



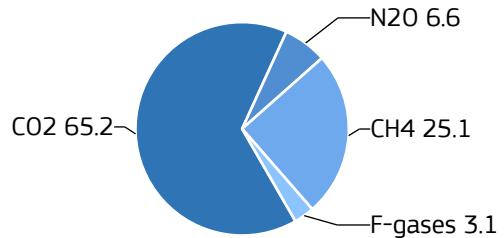
Botswana

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 12.607 | 5.051 | 0.309 | 2.496M |
| 2015 | 12.795 | 5.792 | 0.406 | 2.209M |
| 2005 | 10.136 | 5.462 | 0.429 | 1.856M |
| 1990 | 9.334 | 6.774 | 0.759 | 1.378M |

2022 vs 1990

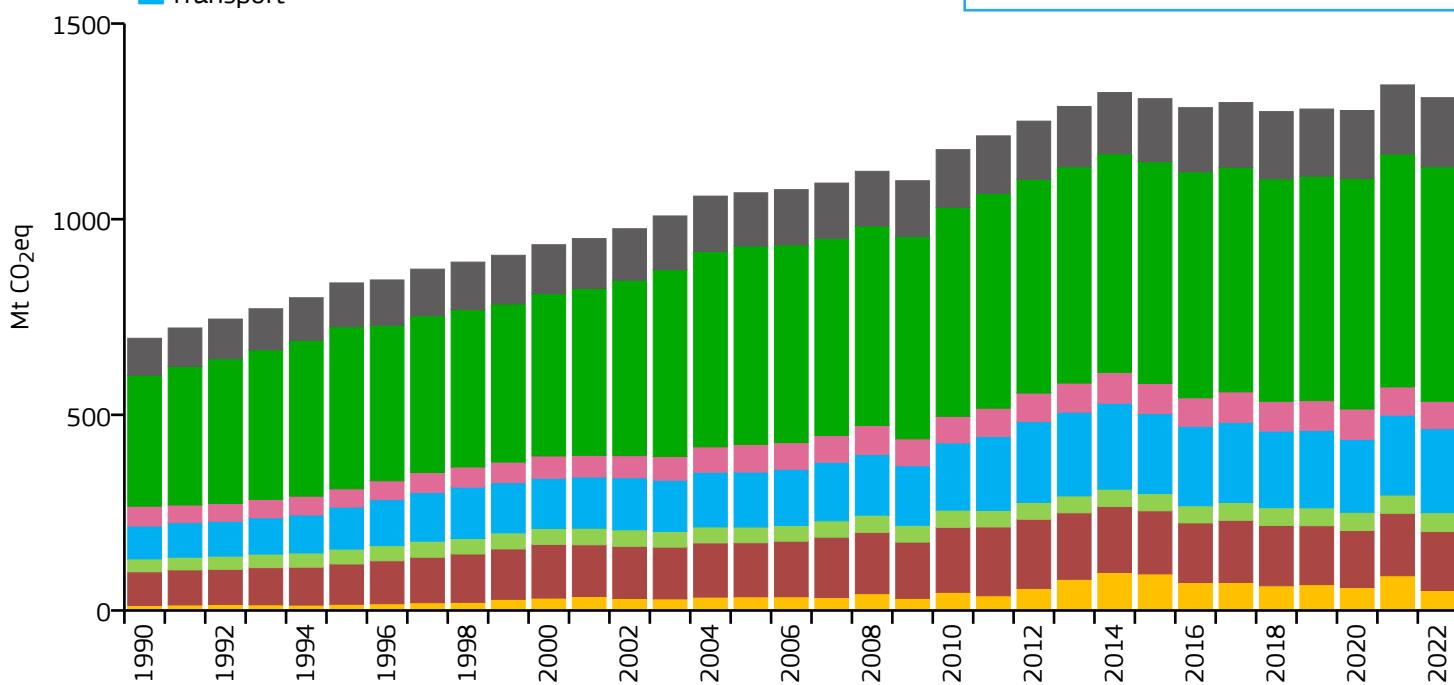
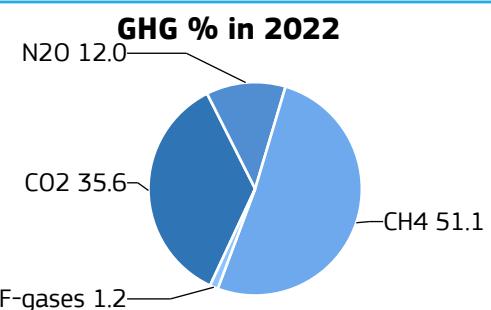
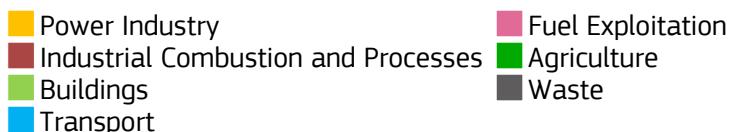
2022 vs 2005

2022 vs 2021



Brazil

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1310.499 | 6.049 | 0.403 | 216.636M |
| 2015 | 1307.969 | 6.351 | 0.425 | 205.962M |
| 2005 | 1067.459 | 5.711 | 0.456 | 186.917M |
| 1990 | 695.638 | 4.658 | 0.444 | 149.352M |

2022 vs 1990

2022 vs 2005

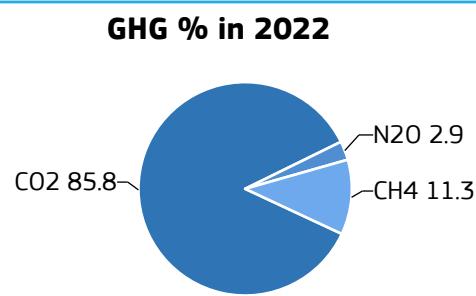
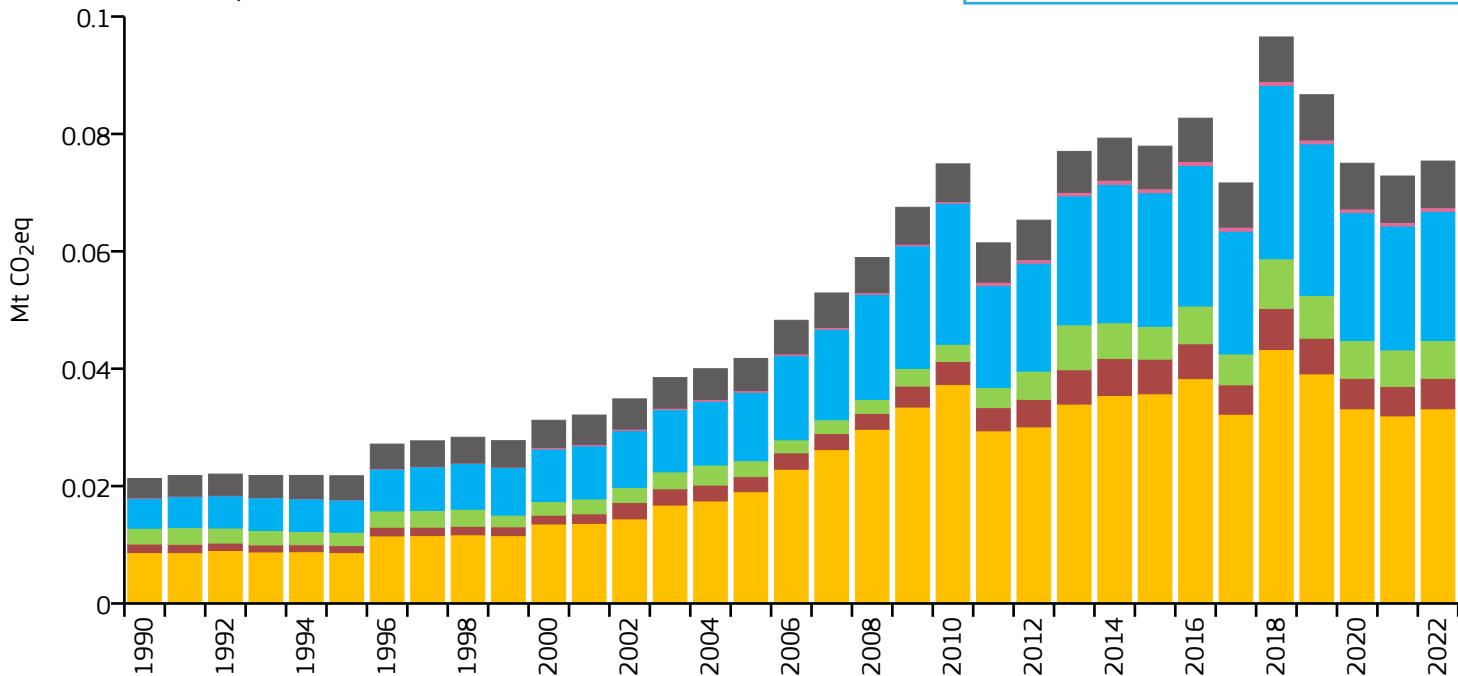
2022 vs 2021



British Virgin Islands

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.075 | 2.284 | 0.061 | 33.000k |
| 2015 | 0.078 | 2.587 | 0.076 | 30.113k |
| 2005 | 0.042 | 1.802 | 0.040 | 23.168k |
| 1990 | 0.021 | 1.293 | 0.106 | 16.461k |

2022 vs 1990

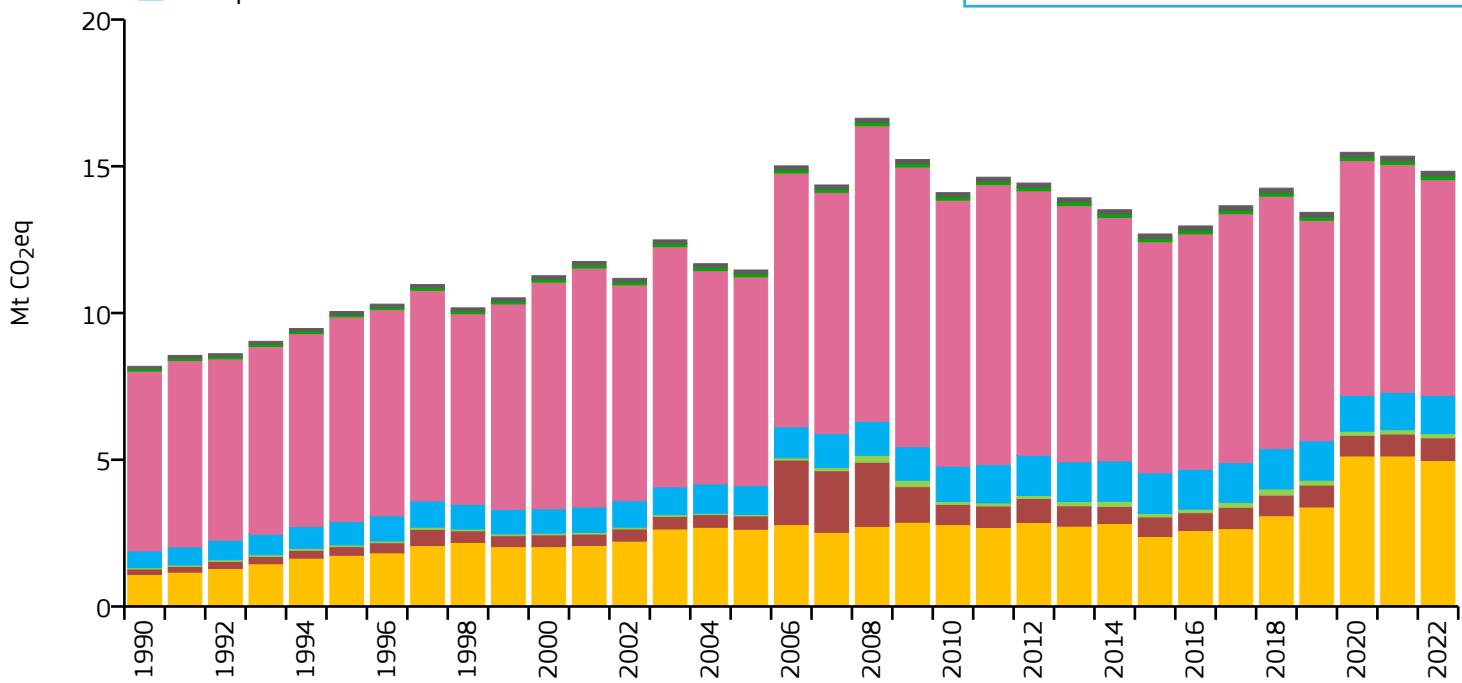
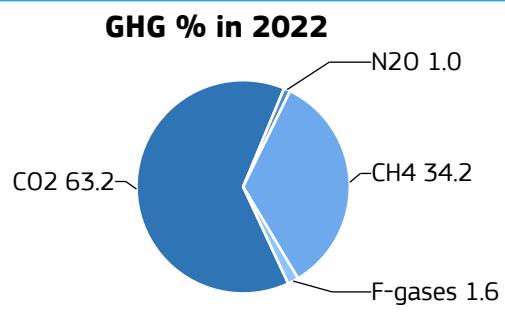
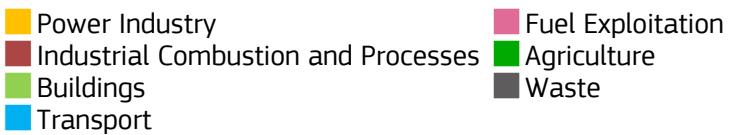
2022 vs 2005

2022 vs 2021



Brunei

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 14.829 | 32.664 | 0.563 | 454.000k |
| 2015 | 12.693 | 30.399 | 0.484 | 417.542k |
| 2005 | 11.465 | 31.398 | 0.450 | 365.158k |
| 1990 | 8.183 | 31.619 | 0.444 | 258.785k |

2022 vs 1990

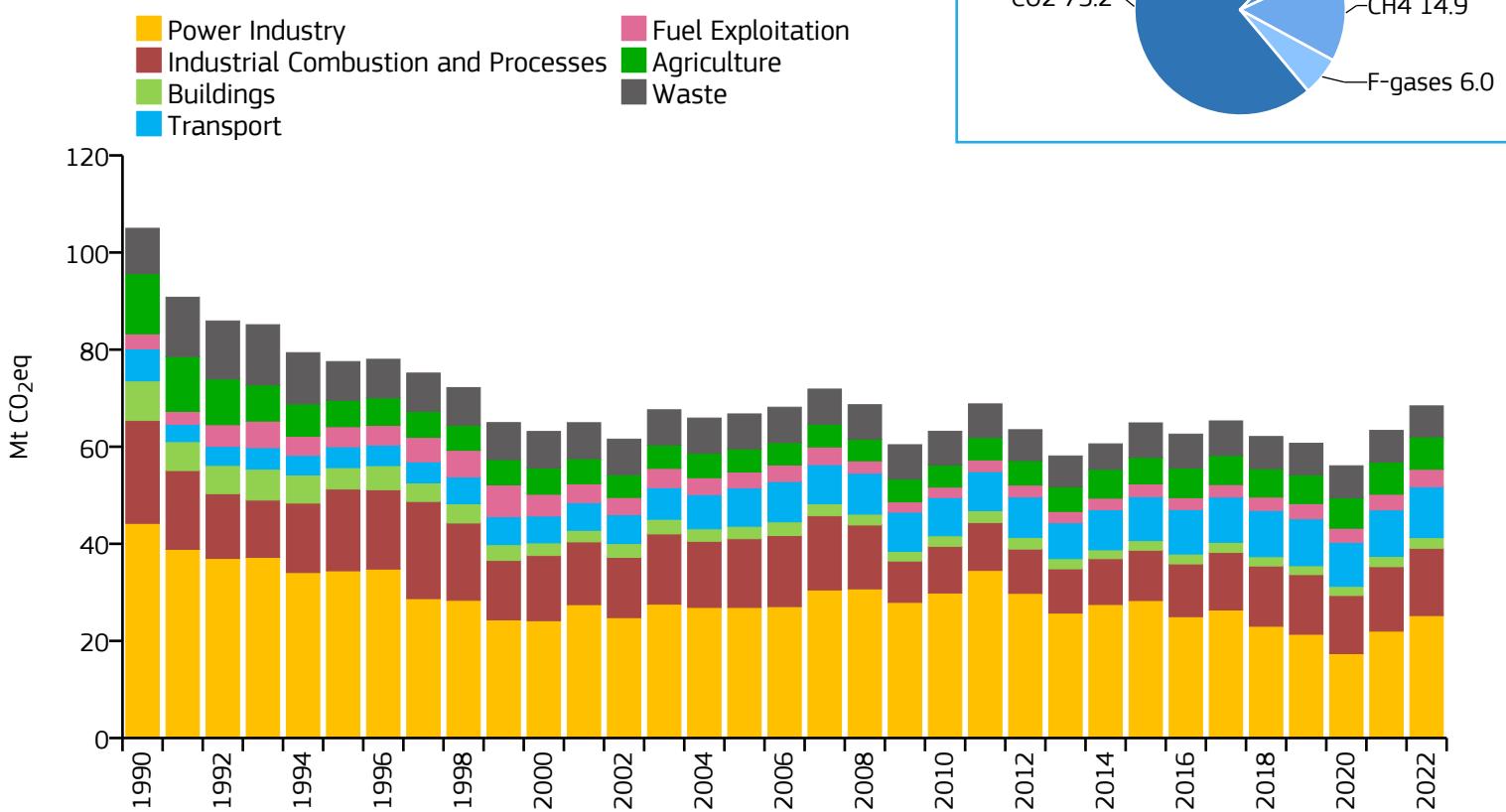
2022 vs 2005

2022 vs 2021



Bulgaria

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 68.414 | 9.996 | 0.395 | 6.844M |
| 2015 | 64.906 | 9.043 | 0.452 | 7.177M |
| 2005 | 66.755 | 8.688 | 0.590 | 7.684M |
| 1990 | 104.986 | 11.874 | 0.963 | 8.841M |

2022 vs 1990

2022 vs 2005

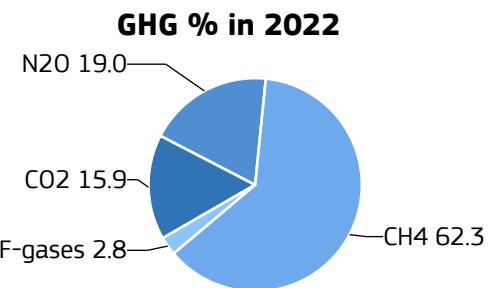
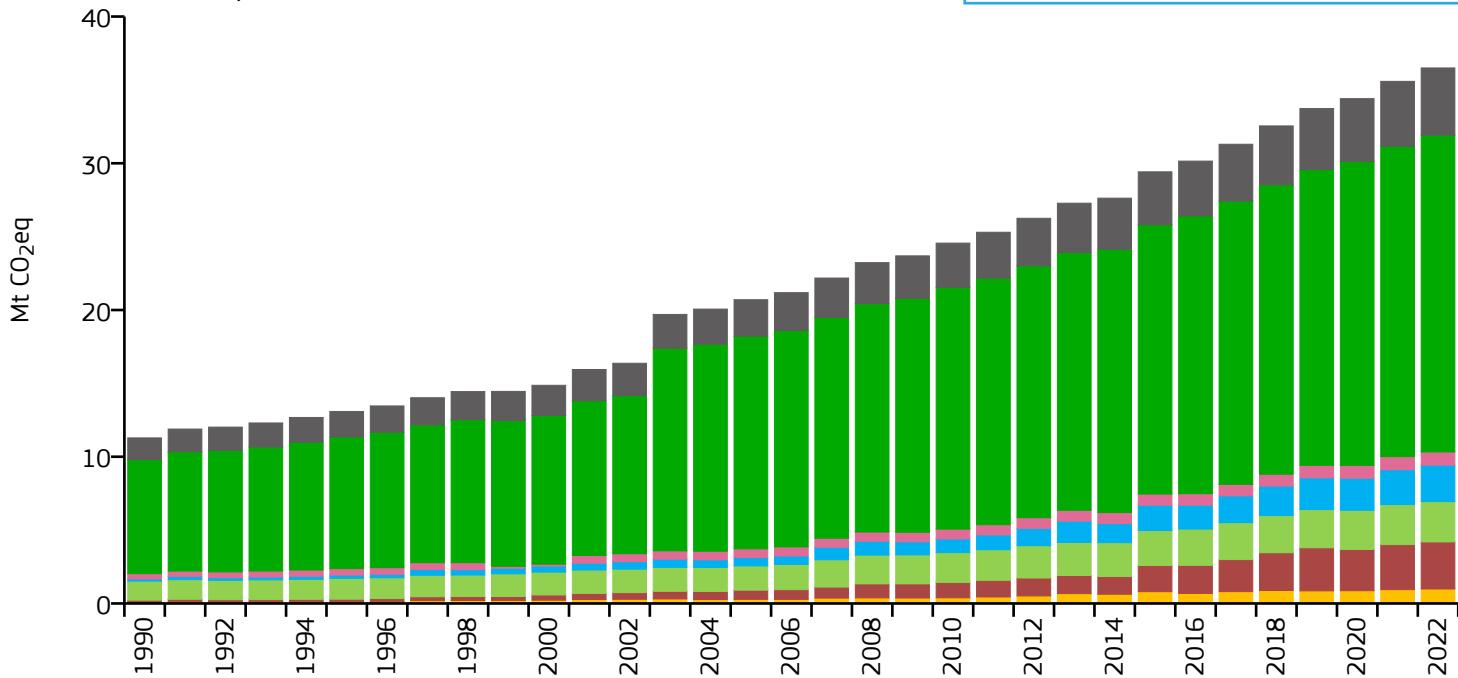
2022 vs 2021



Burkina Faso

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 36.497 | 1.651 | 0.747 | 22.103M |
| 2015 | 29.417 | 1.624 | 0.844 | 18.111M |
| 2005 | 20.701 | 1.542 | 1.010 | 13.422M |
| 1990 | 11.283 | 1.281 | 1.259 | 8.811M |

2022 vs 1990

2022 vs 2005

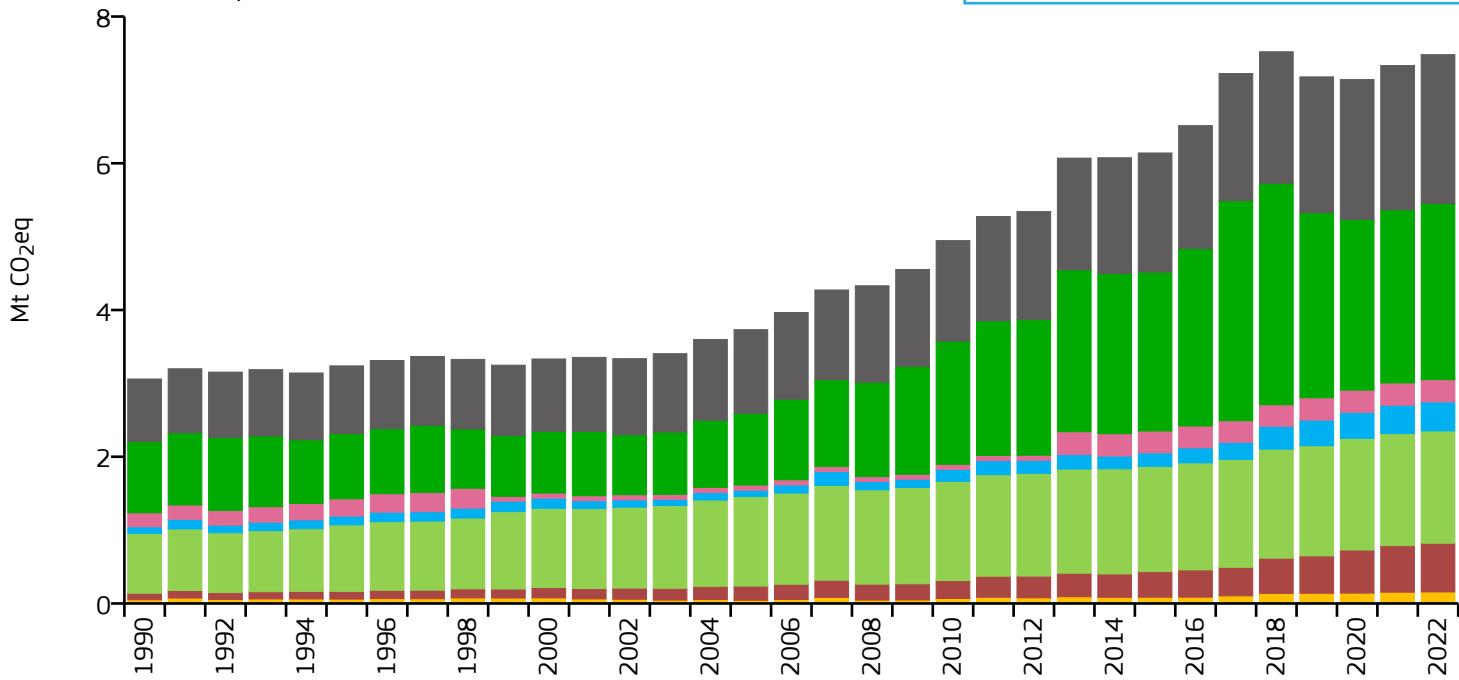
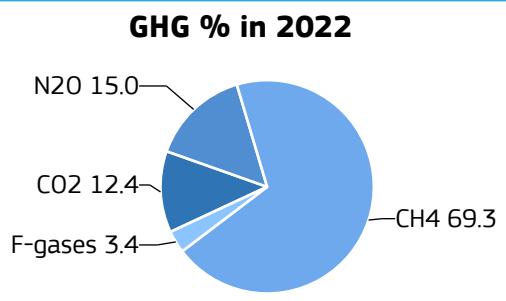
2022 vs 2021



Burundi

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 7.480 | 0.590 | 0.819 | 12.675M |
| 2015 | 6.140 | 0.602 | 0.732 | 10.199M |
| 2005 | 3.732 | 0.503 | 0.634 | 7.423M |
| 1990 | 3.059 | 0.565 | 0.475 | 5.415M |

2022 vs 1990

2022 vs 2005

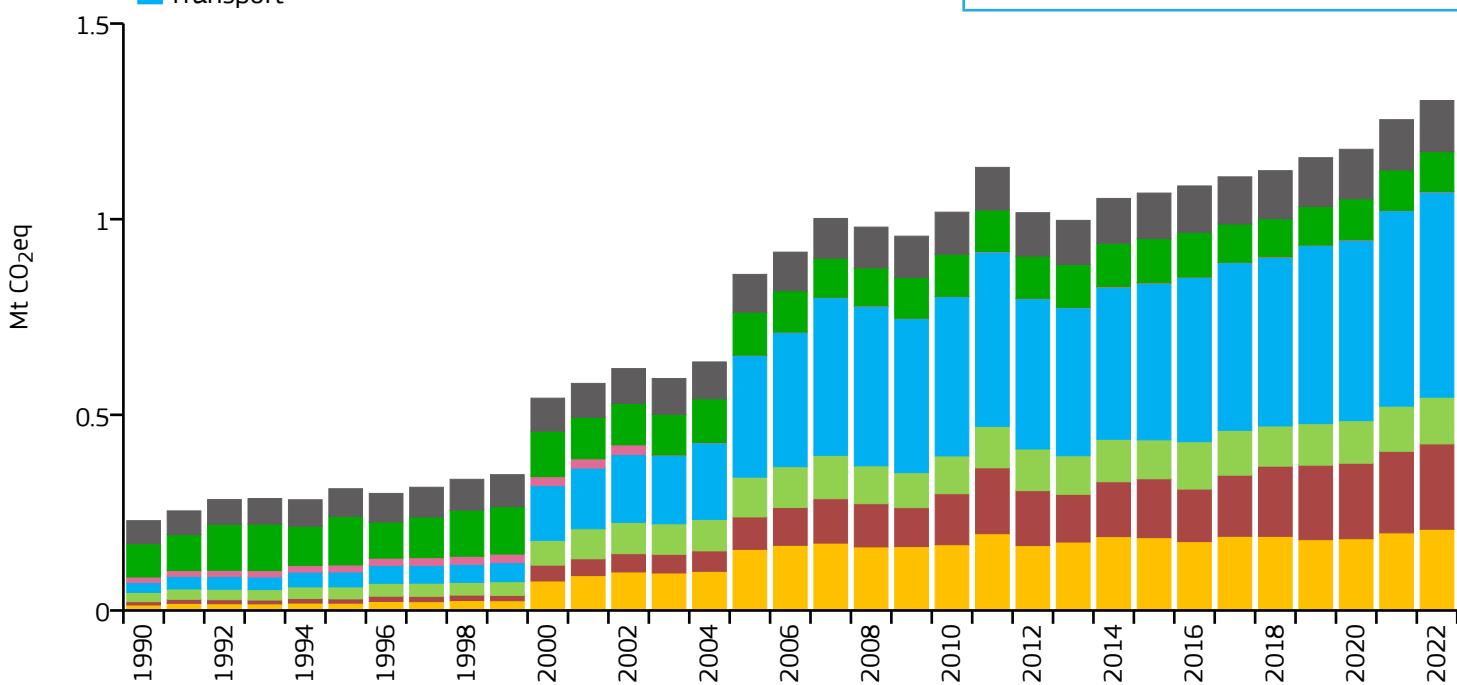
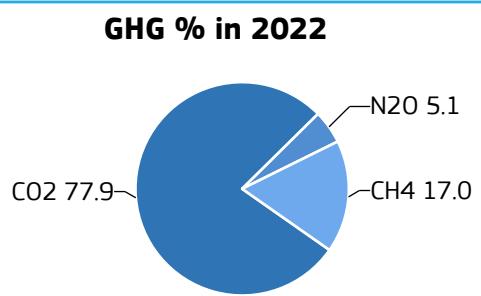
2022 vs 2021



Cabo Verde

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1.303 | 2.239 | 0.286 | 582.000k |
| 2015 | 1.067 | 2.002 | 0.289 | 532.913k |
| 2005 | 0.859 | 1.810 | 0.334 | 474.567k |
| 1990 | 0.229 | 0.671 | 0.347 | 341.883k |

2022 vs 1990

2022 vs 2005

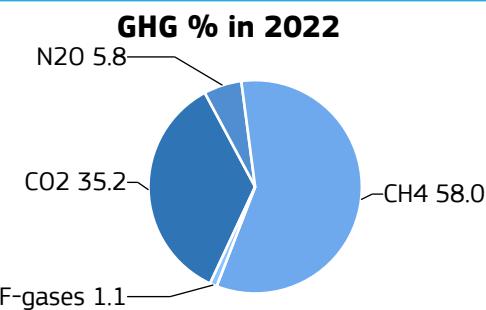
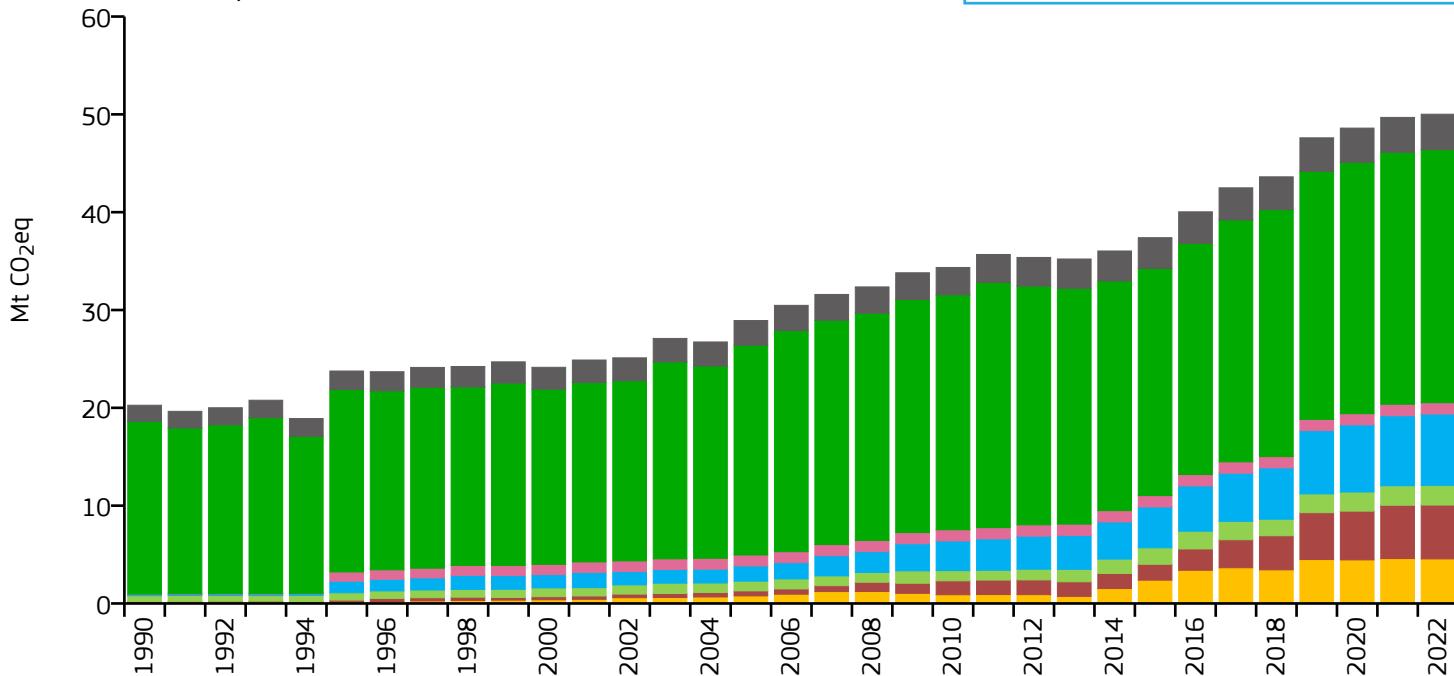
2022 vs 2021



Cambodia

GHG emissions by sector

- | | |
|---|---|
|  |  |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 50.016 | 2.914 | 0.658 | 17.167M |
| 2015 | 37.394 | 2.410 | 0.680 | 15.518M |
| 2005 | 28.924 | 2.180 | 1.028 | 13.270M |
| 1990 | 20.265 | 2.258 | 1.417 | 8.973M |

2022 vs 1990

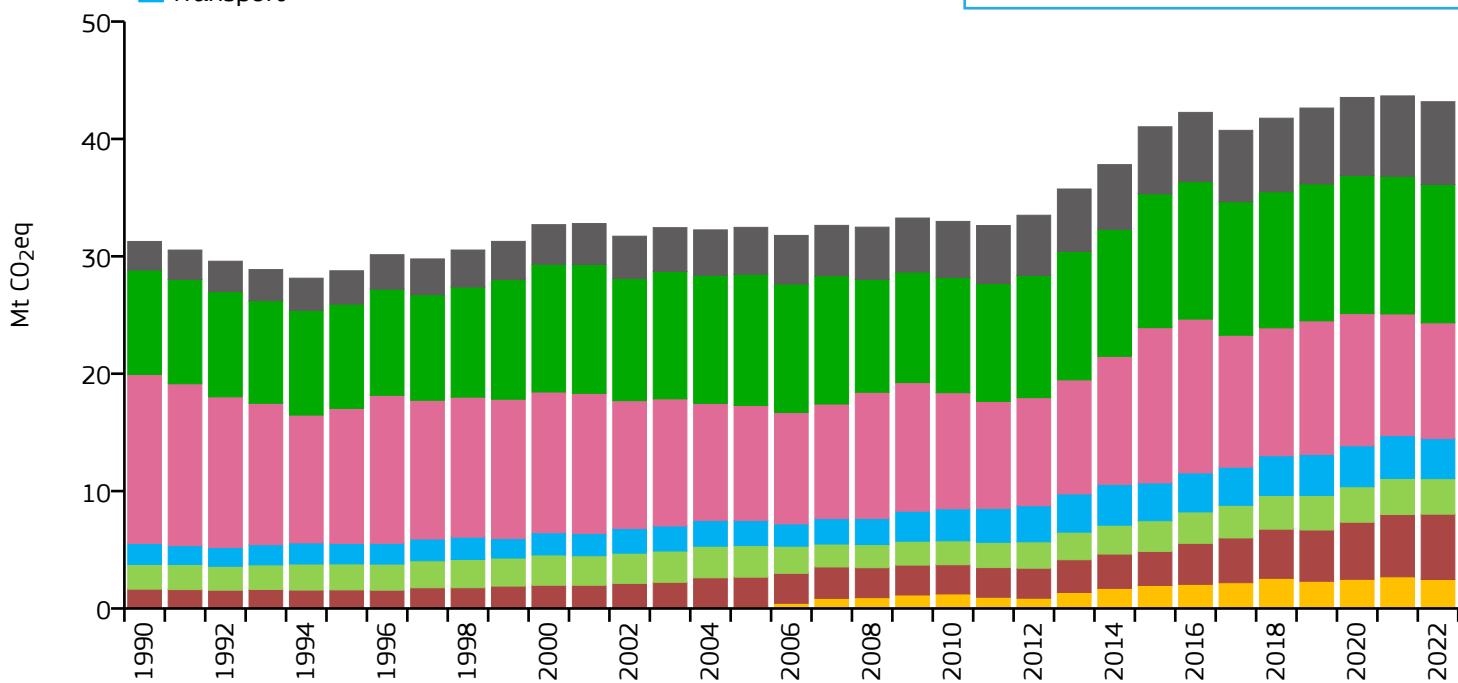
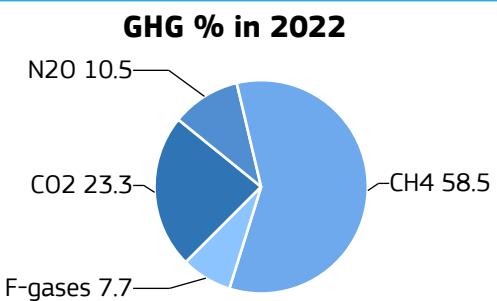
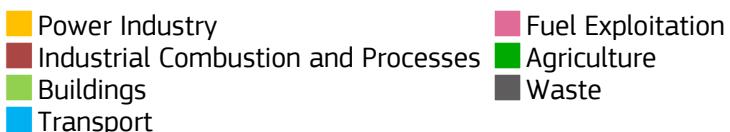
2022 vs 2005

2022 vs 2021



Cameroon

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 43.171 | 1.583 | 0.414 | 27.279M |
| 2015 | 41.035 | 1.797 | 0.493 | 22.834M |
| 2005 | 32.468 | 1.864 | 0.582 | 17.421M |
| 1990 | 31.266 | 2.669 | 0.785 | 11.715M |

2022 vs 1990

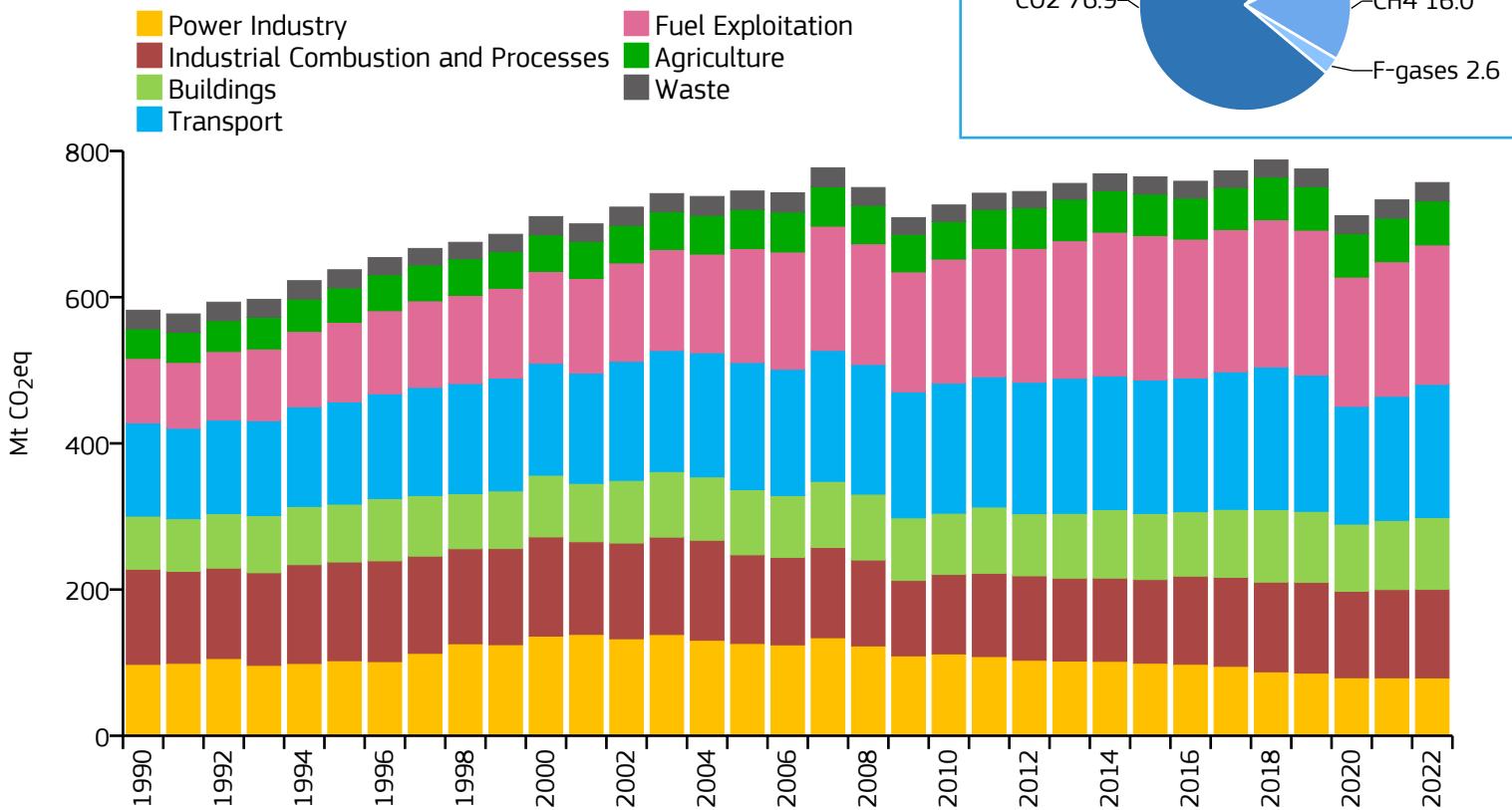
2022 vs 2005

2022 vs 2021



Canada

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 756.810 | 19.790 | 0.397 | 38.242M |
| 2015 | 764.535 | 21.267 | 0.451 | 35.950M |
| 2005 | 745.212 | 23.080 | 0.517 | 32.288M |
| 1990 | 582.165 | 21.022 | 0.608 | 27.693M |

2022 vs 1990

2022 vs 2005

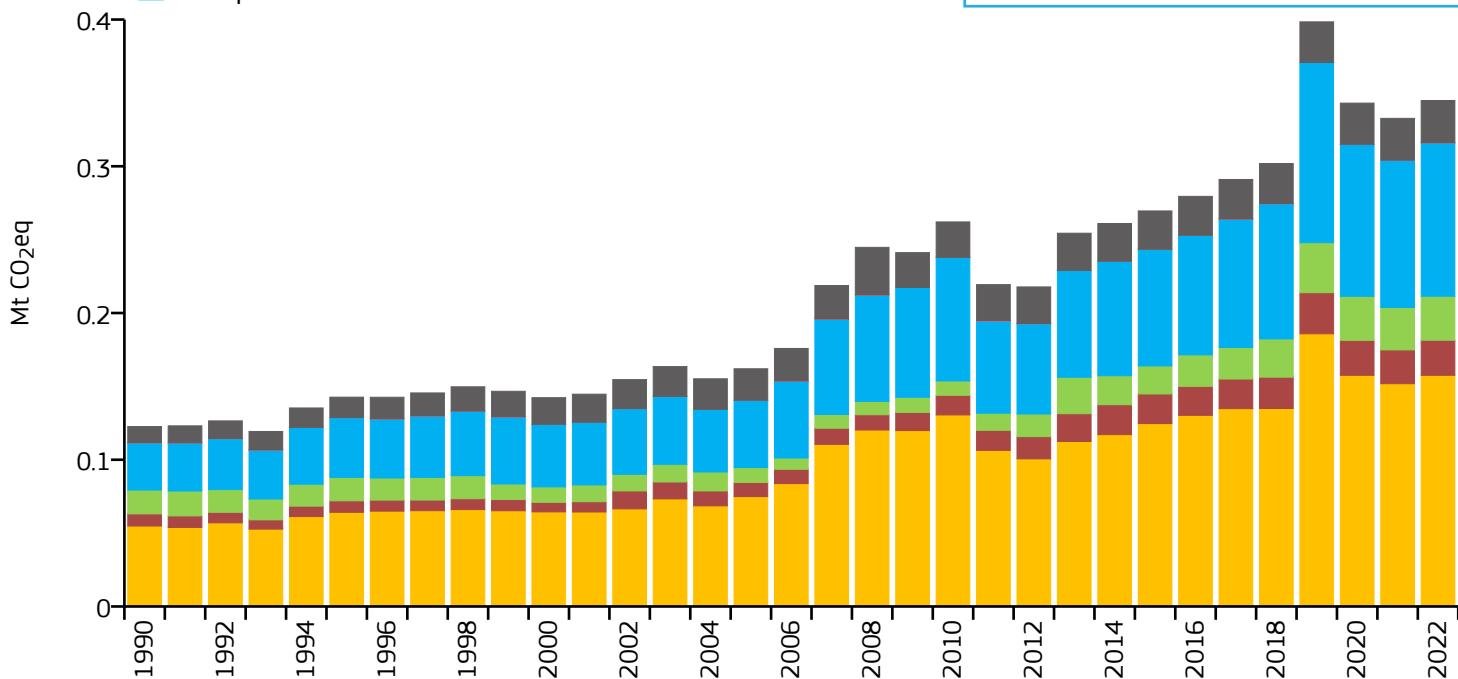
2022 vs 2021



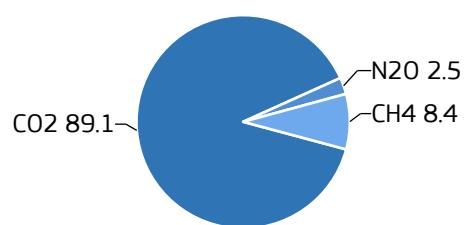
Cayman Islands

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.345 | 5.305 | 0.064 | 65.000k |
| 2015 | 0.270 | 4.495 | 0.065 | 59.963k |
| 2005 | 0.162 | 3.332 | 0.044 | 48.622k |
| 1990 | 0.123 | 4.903 | 0.054 | 25.010k |

2022 vs 1990

2022 vs 2005

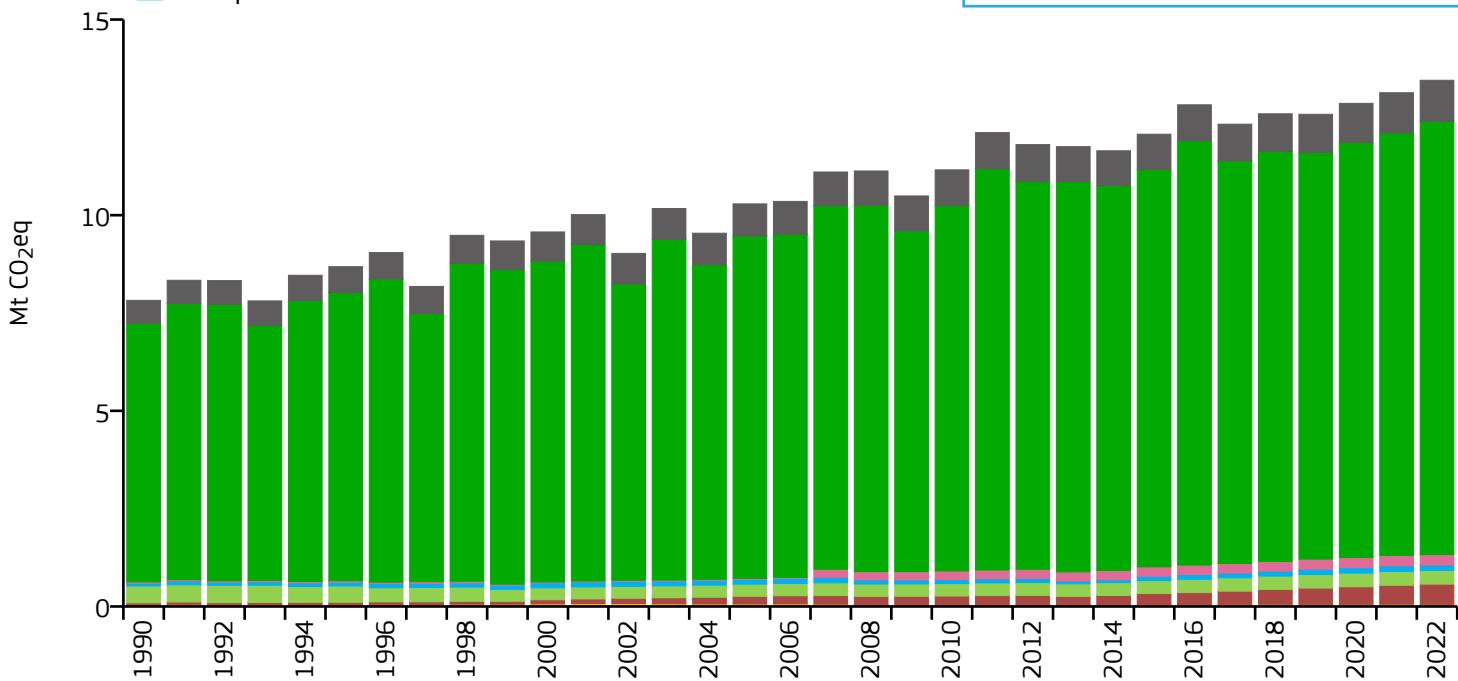
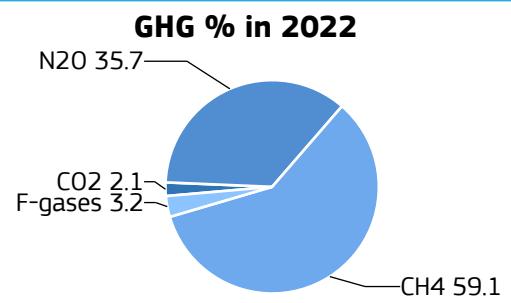
2022 vs 2021



Central African Republic

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 13.448 | 2.620 | 2.942 | 5.132M |
| 2015 | 12.070 | 2.655 | 3.150 | 4.546M |
| 2005 | 10.289 | 2.493 | 2.481 | 4.128M |
| 1990 | 7.824 | 2.661 | 2.320 | 2.940M |

2022 vs 1990

2022 vs 2005

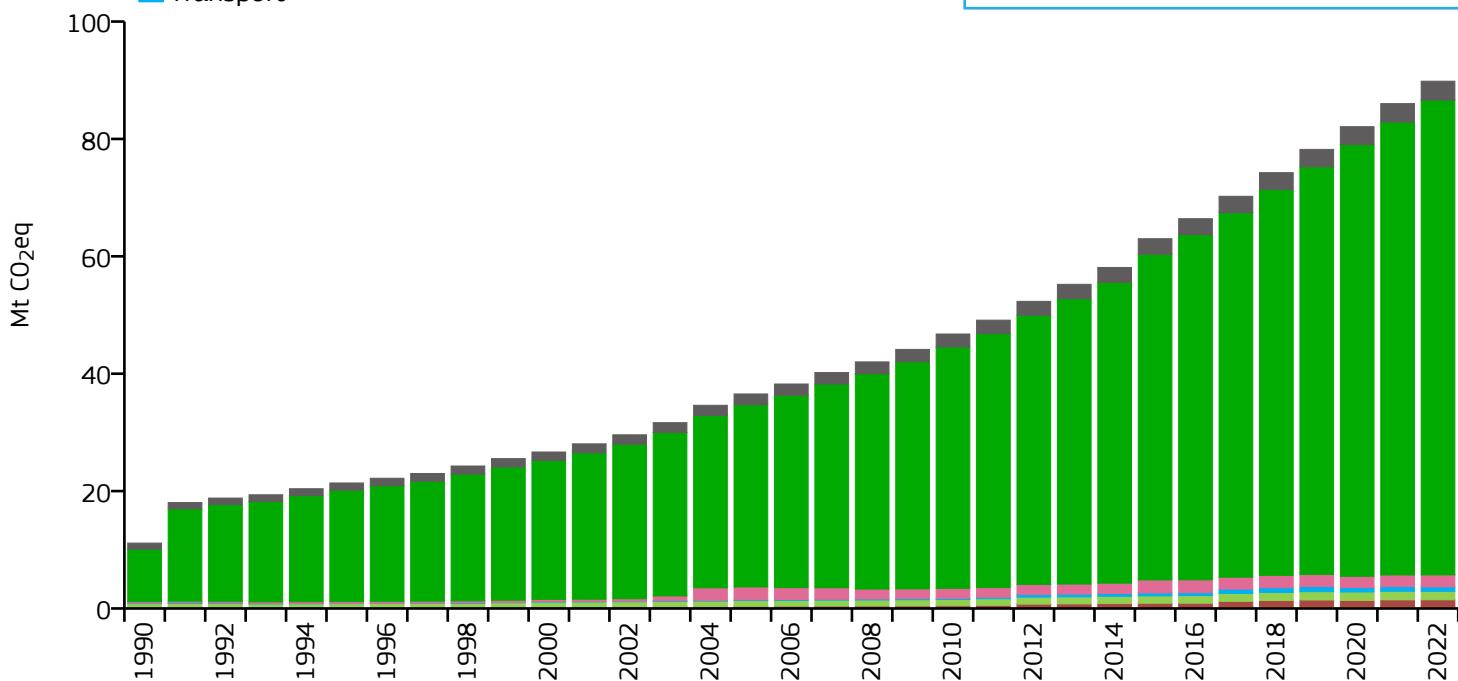
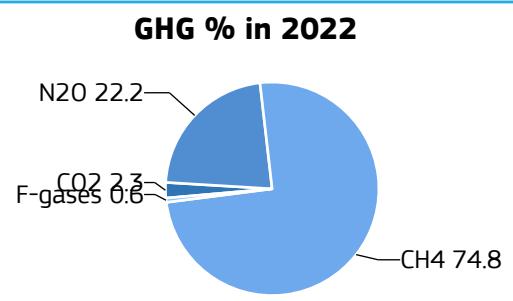
2022 vs 2021



Chad

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 89.837 | 5.206 | 3.588 | 17.255M |
| 2015 | 63.000 | 4.497 | 2.404 | 14.009M |
| 2005 | 36.548 | 3.630 | 2.237 | 10.067M |
| 1990 | 11.136 | 1.870 | 1.860 | 5.957M |

2022 vs 1990

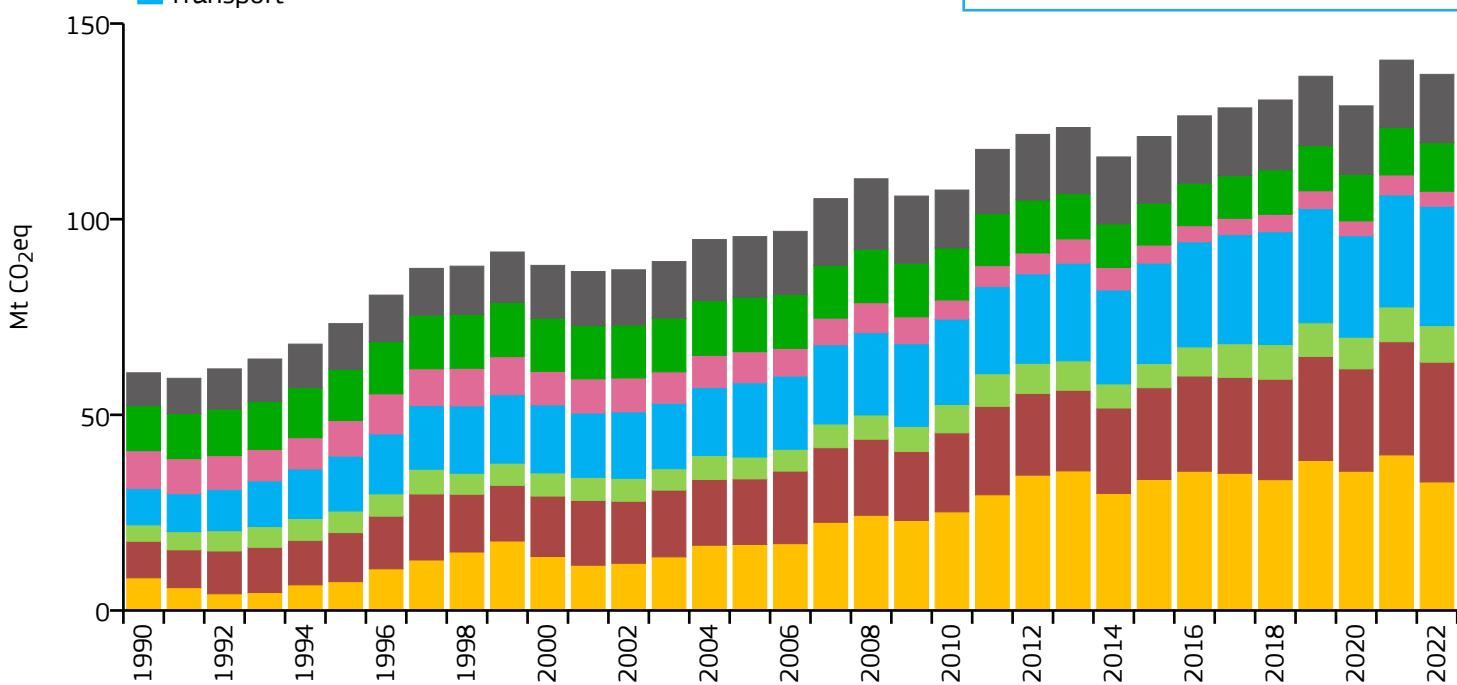
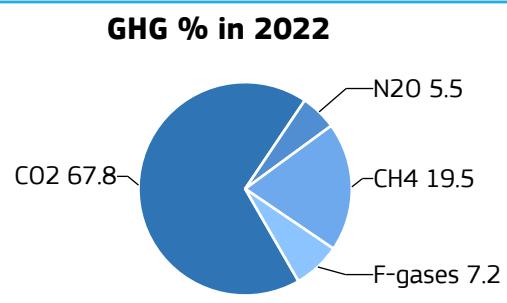
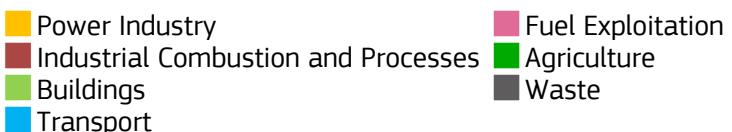
2022 vs 2005

2022 vs 2021



Chile

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 137.011 | 7.314 | 0.270 | 18.734M |
| 2015 | 121.124 | 6.819 | 0.277 | 17.763M |
| 2005 | 95.547 | 5.917 | 0.321 | 16.147M |
| 1990 | 60.743 | 4.587 | 0.469 | 13.242M |

2022 vs 1990

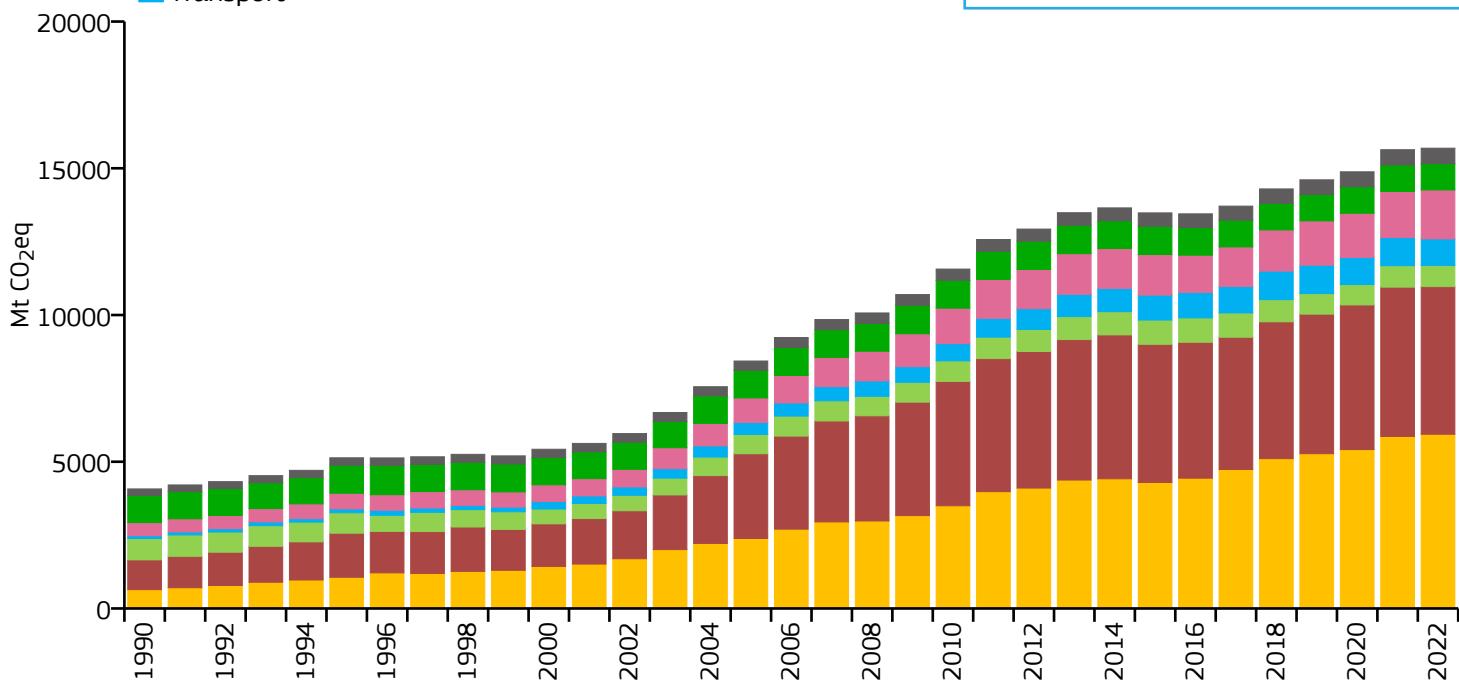
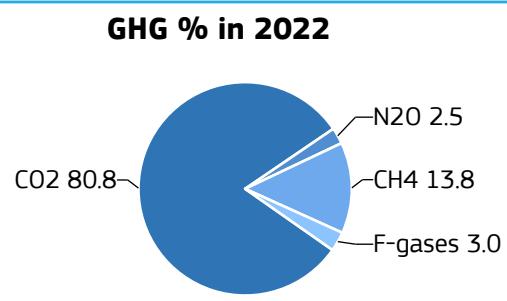
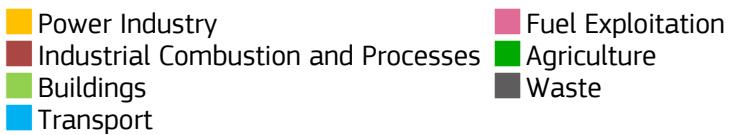
2022 vs 2005

2022 vs 2021



China

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 15684.627 | 10.954 | 0.611 | 1.432G |
| 2015 | 13479.880 | 9.649 | 0.775 | 1.397G |
| 2005 | 8431.922 | 6.380 | 1.212 | 1.322G |
| 1990 | 4073.563 | 3.474 | 2.520 | 1.172G |

2022 vs 1990

2022 vs 2005

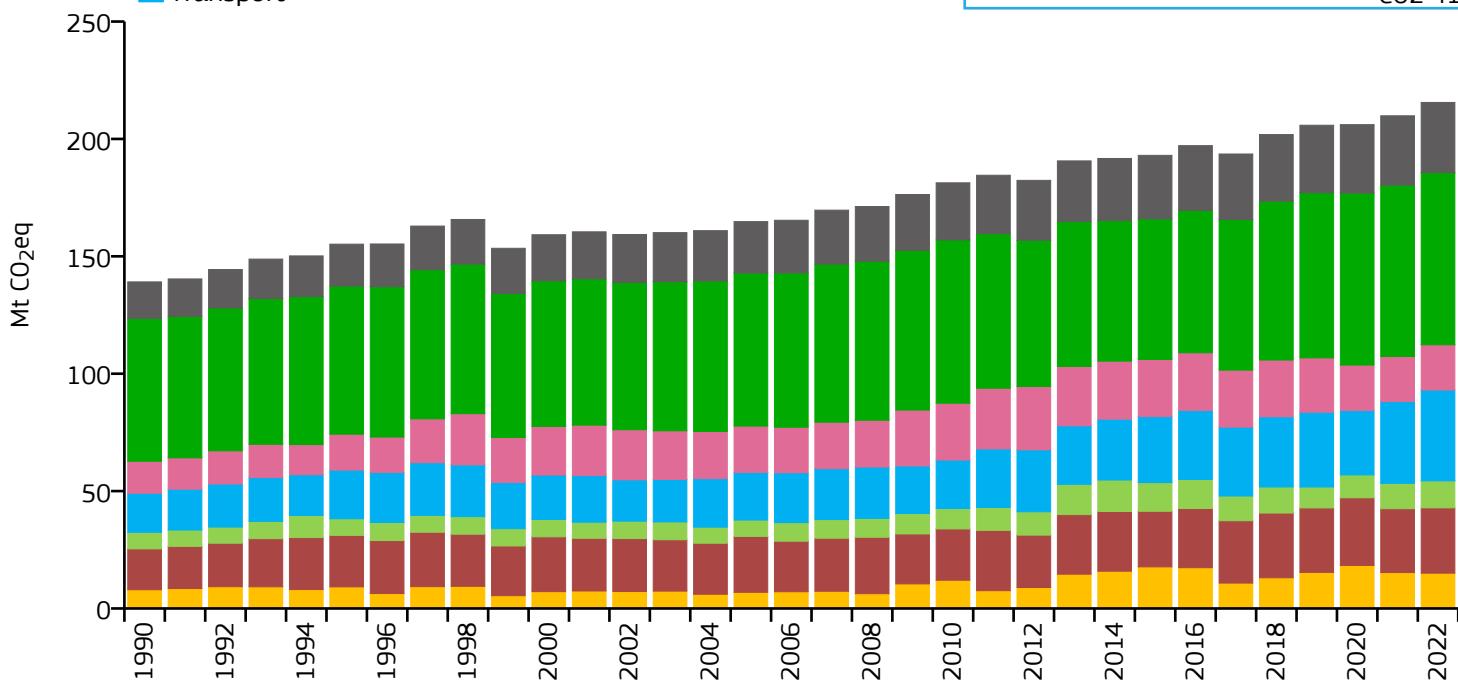
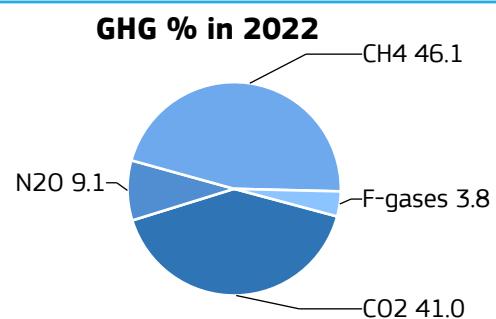
2022 vs 2021



Colombia

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 215.537 | 4.233 | 0.265 | 50.918M |
| 2015 | 193.010 | 4.002 | 0.288 | 48.229M |
| 2005 | 164.780 | 3.807 | 0.384 | 43.286M |
| 1990 | 139.104 | 4.059 | 0.506 | 34.272M |

2022 vs 1990

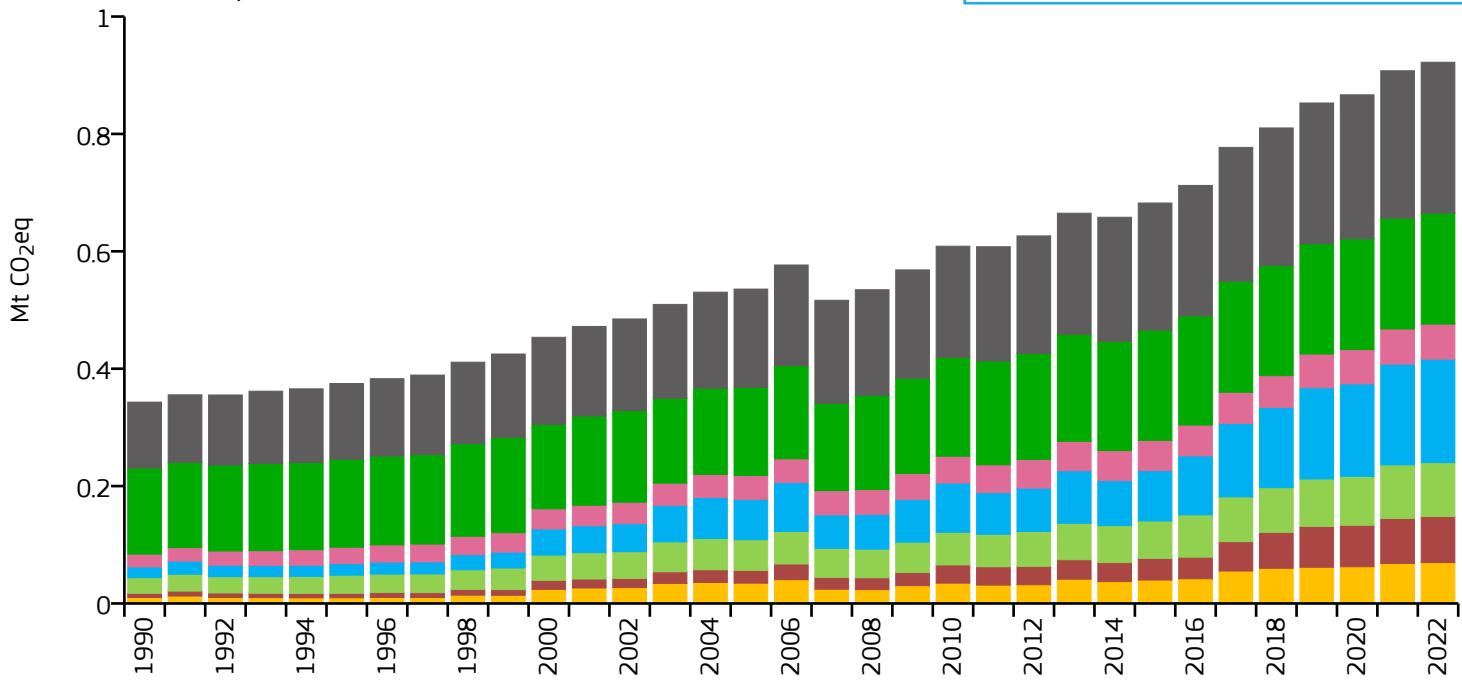
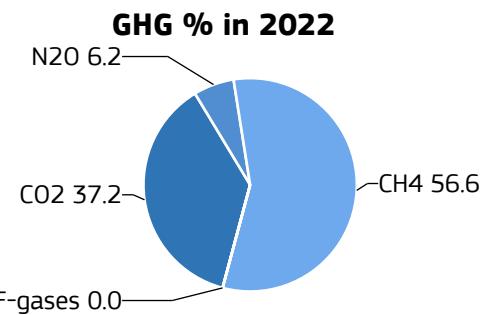
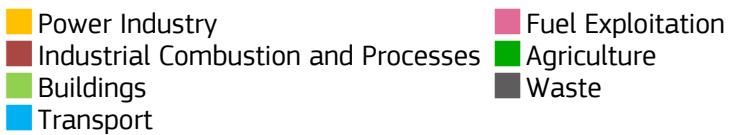
2022 vs 2005

2022 vs 2021



Comoros

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.922 | 1.017 | 0.340 | 907.000k |
| 2015 | 0.682 | 0.878 | 0.297 | 777.424k |
| 2005 | 0.536 | 0.876 | 0.311 | 611.627k |
| 1990 | 0.343 | 0.834 | 0.272 | 411.594k |

2022 vs 1990

2022 vs 2005

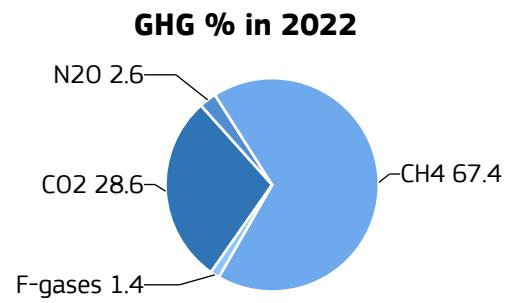
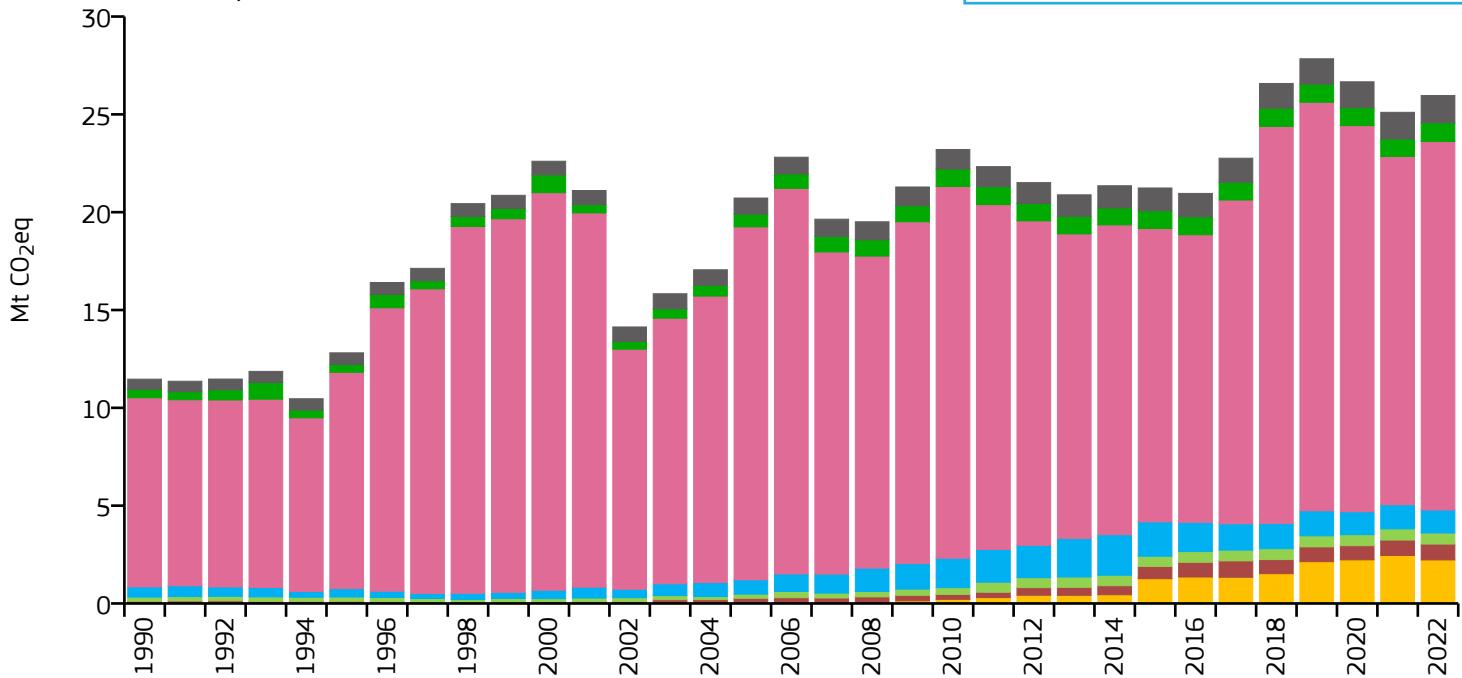
2022 vs 2021



Congo

GHG emissions by sector

- | | |
|---|---|
|  |  |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 25.962 | 4.339 | 1.355 | 5.984M |
| 2015 | 21.237 | 4.251 | 0.837 | 4.996M |
| 2005 | 20.723 | 5.573 | 1.234 | 3.718M |
| 1990 | 11.466 | 4.698 | 0.960 | 2.440M |

2022 vs 1990

2022 vs 2005

2022 vs 2021

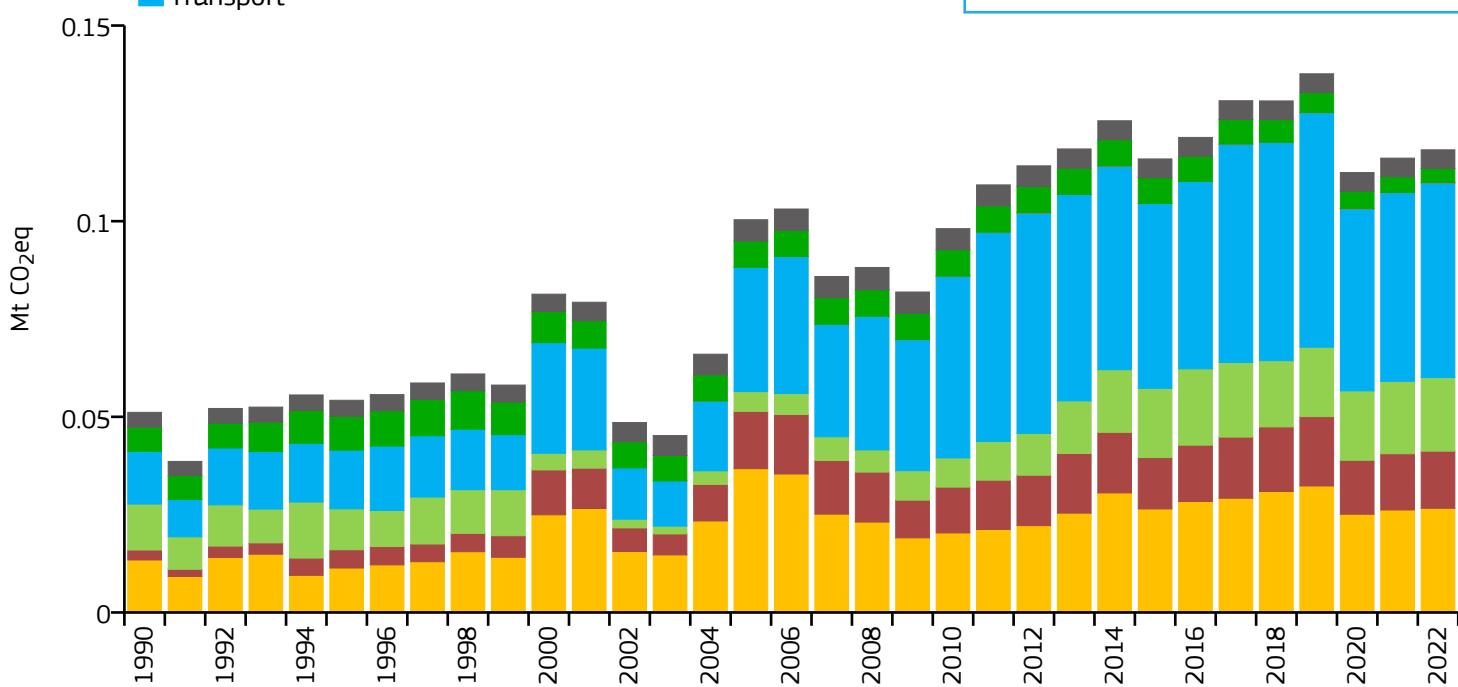
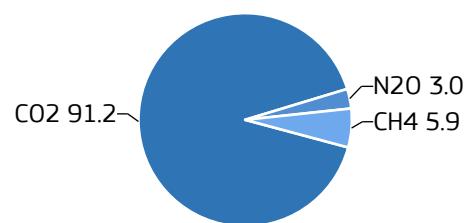


Cook Islands

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.118 | 6.955 | n/a | 17.000k |
| 2015 | 0.116 | 6.643 | n/a | 17.449k |
| 2005 | 0.100 | 5.092 | n/a | 19.710k |
| 1990 | 0.051 | 2.787 | n/a | 18.356k |

2022 vs 1990

2022 vs 2005

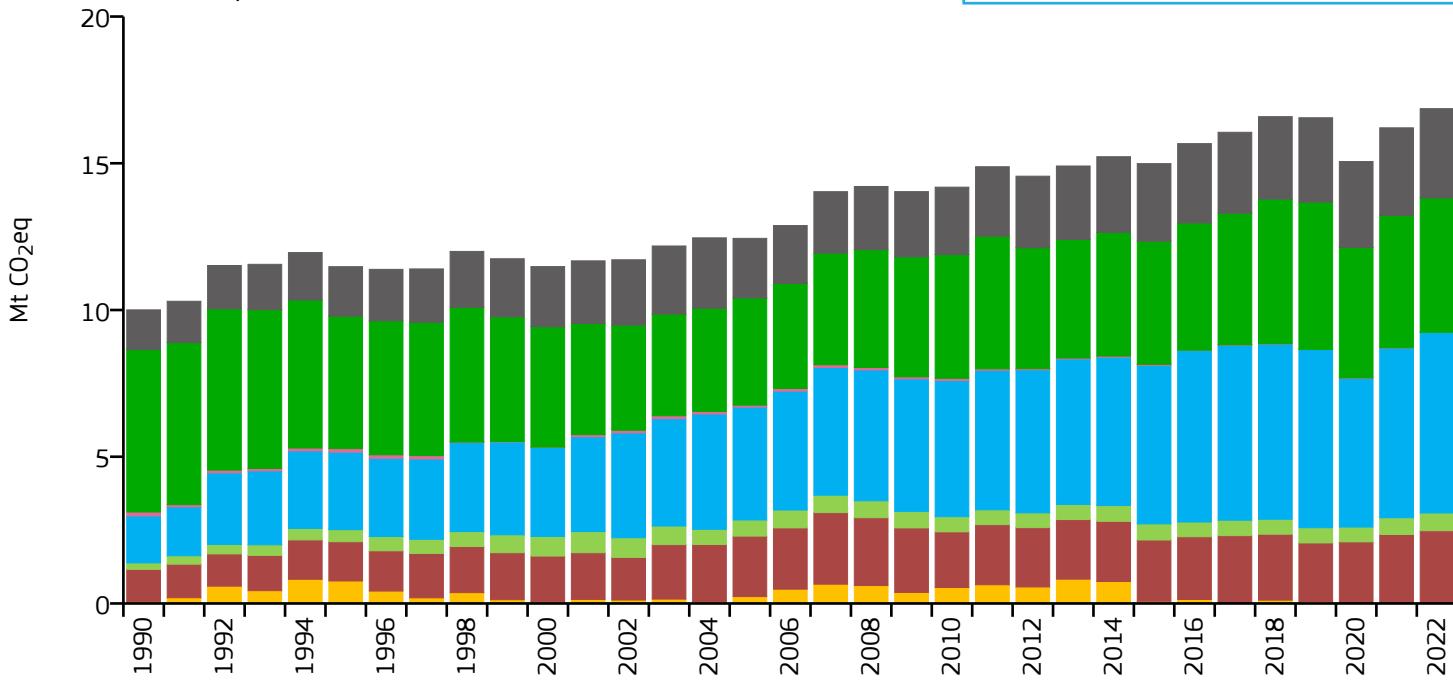
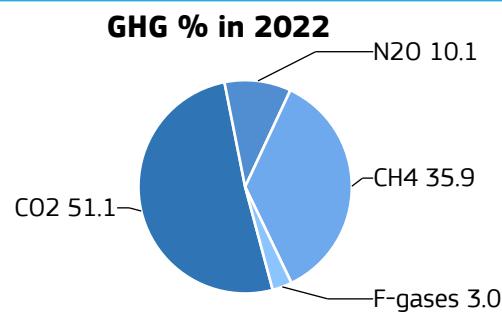
2022 vs 2021



Costa Rica

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 16.861 | 3.287 | 0.148 | 5.129M |
| 2015 | 14.989 | 3.118 | 0.162 | 4.808M |
| 2005 | 12.441 | 2.929 | 0.205 | 4.248M |
| 1990 | 10.005 | 3.231 | 0.323 | 3.096M |

2022 vs 1990

2022 vs 2005

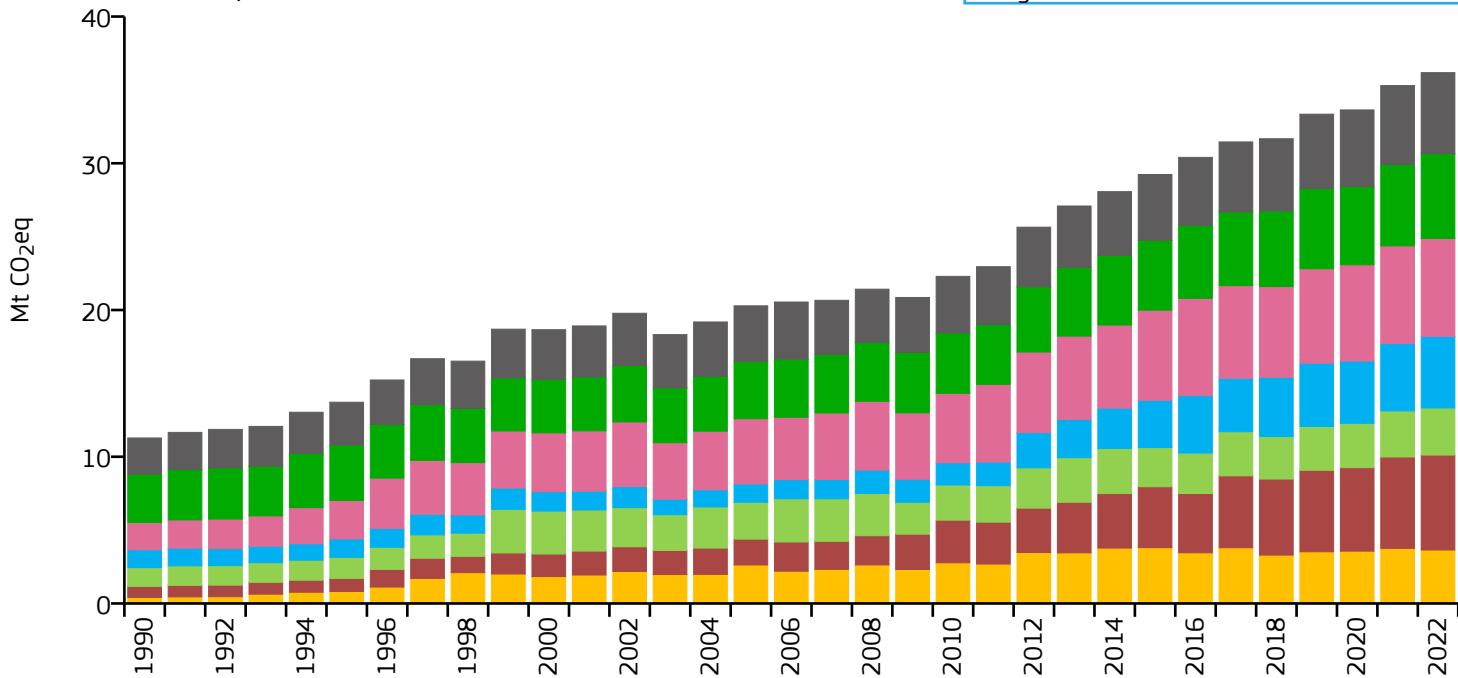
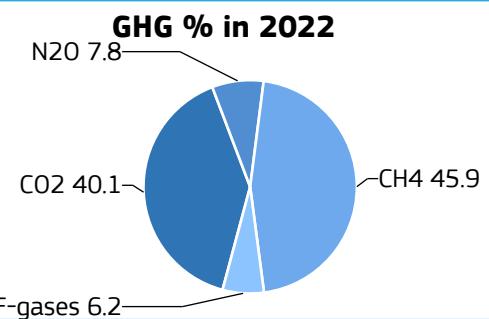
2022 vs 2021



Côte d'Ivoire

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 36.177 | 1.316 | 0.232 | 27.498M |
| 2015 | 29.236 | 1.265 | 0.280 | 23.108M |
| 2005 | 20.284 | 1.106 | 0.310 | 18.336M |
| 1990 | 11.278 | 0.919 | 0.218 | 12.268M |

2022 vs 1990

2022 vs 2005

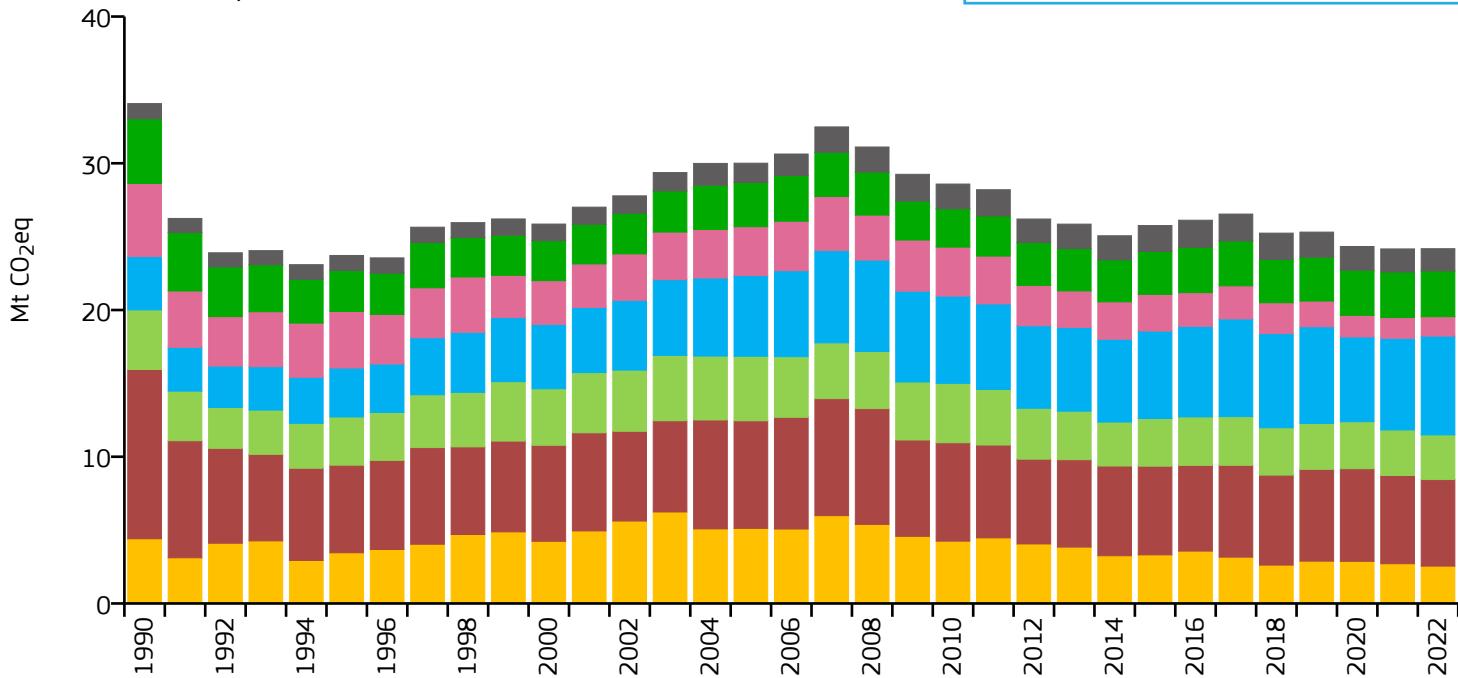
2022 vs 2021



Croatia

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 24.178 | 5.942 | 0.184 | 4.069M |
| 2015 | 25.756 | 6.080 | 0.246 | 4.236M |
| 2005 | 30.006 | 6.854 | 0.293 | 4.378M |
| 1990 | 34.068 | 7.133 | 0.402 | 4.776M |

2022 vs 1990

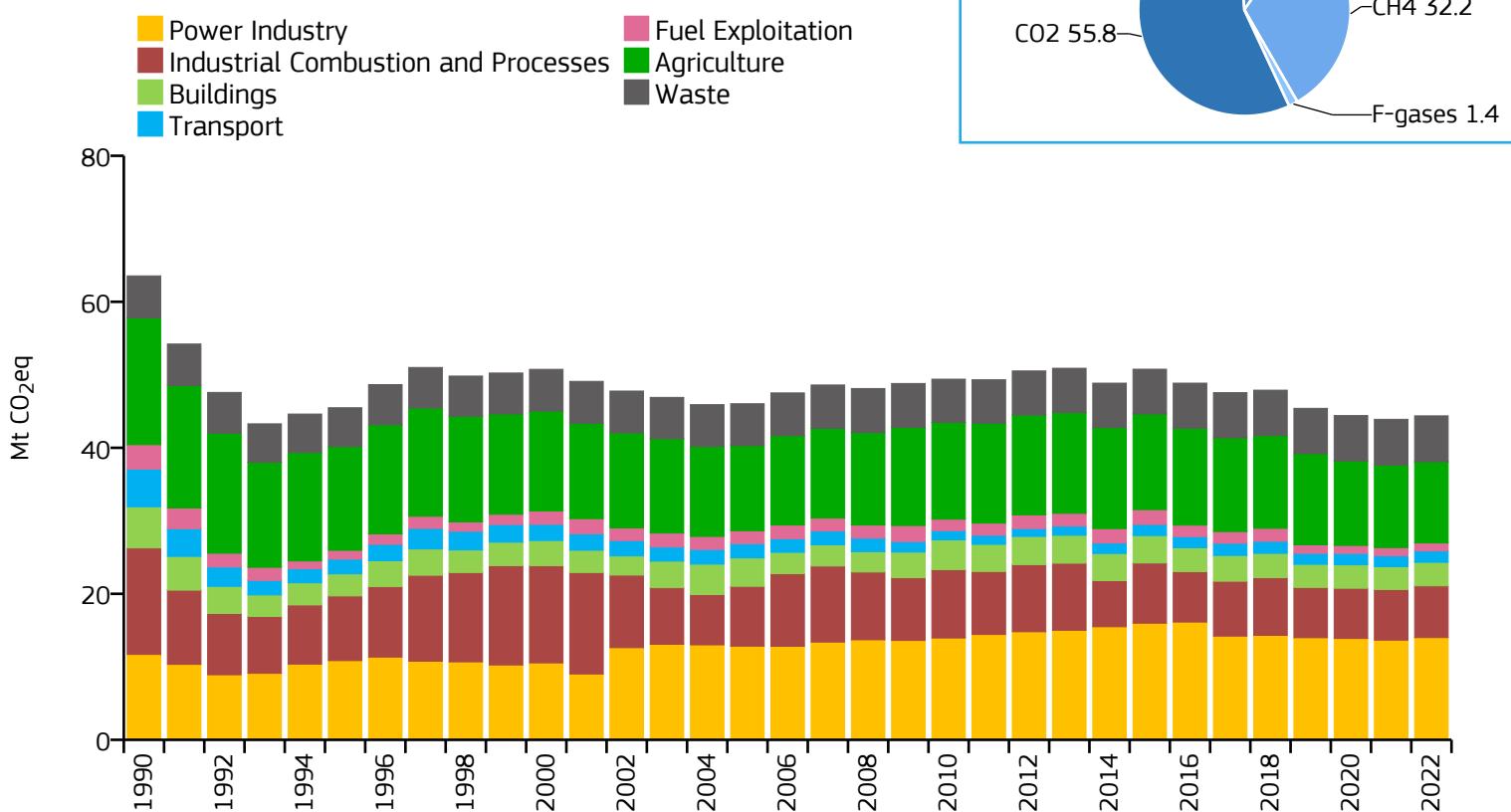
2022 vs 2005

2022 vs 2021

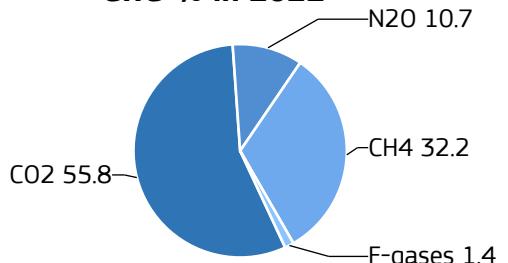


Cuba

GHG emissions by sector



GHG % in 2022

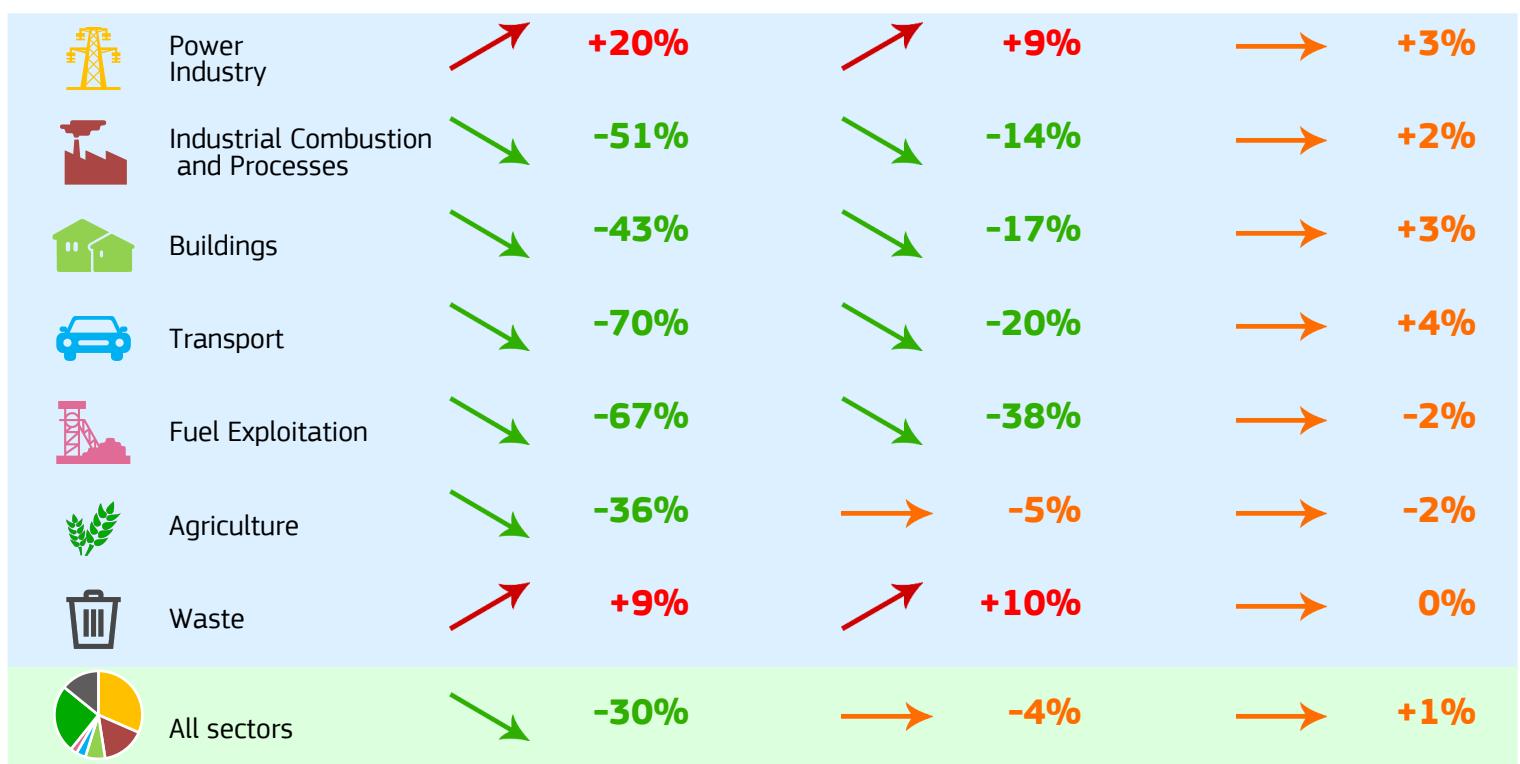


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 44.377 | 3.857 | 0.157 | 11.504M |
| 2015 | 50.765 | 4.429 | 0.188 | 11.461M |
| 2005 | 46.033 | 4.079 | 0.254 | 11.284M |
| 1990 | 63.547 | 6.005 | 0.388 | 10.582M |

2022 vs 1990

2022 vs 2005

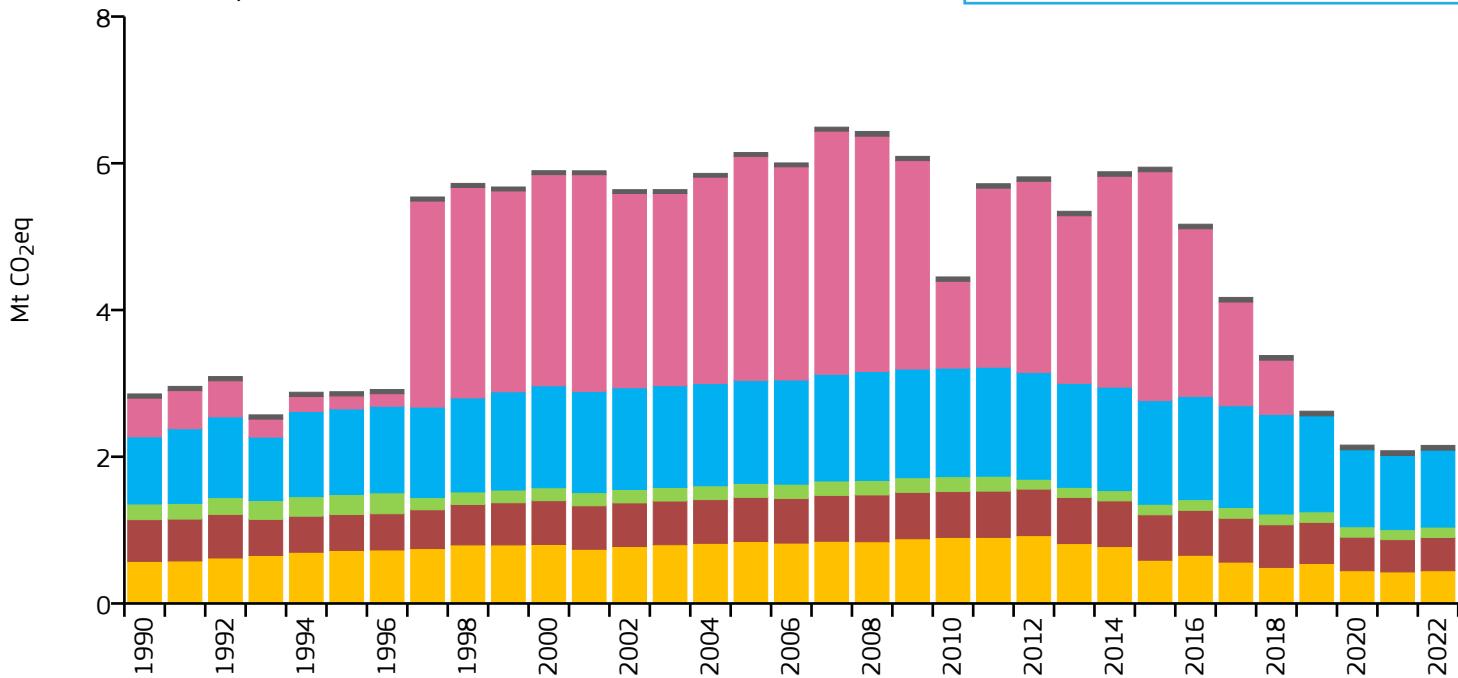
2022 vs 2021



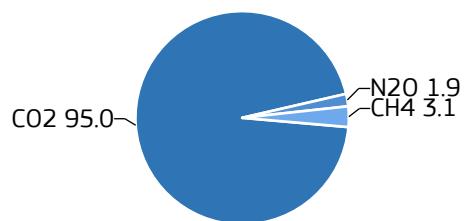
Curaçao

GHG emissions by sector

- █ Power Industry
- █ Industrial Combustion and Processes
- █ Buildings
- █ Transport
- █ Fuel Exploitation
- █ Agriculture
- █ Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 2.154 | 13.057 | 0.600 | 165.000k |
| 2015 | 5.947 | 37.635 | 1.470 | 158.010k |
| 2005 | 6.146 | 47.500 | 1.591 | 129.394k |
| 1990 | 2.856 | 19.472 | 1.006 | 146.671k |

2022 vs 1990

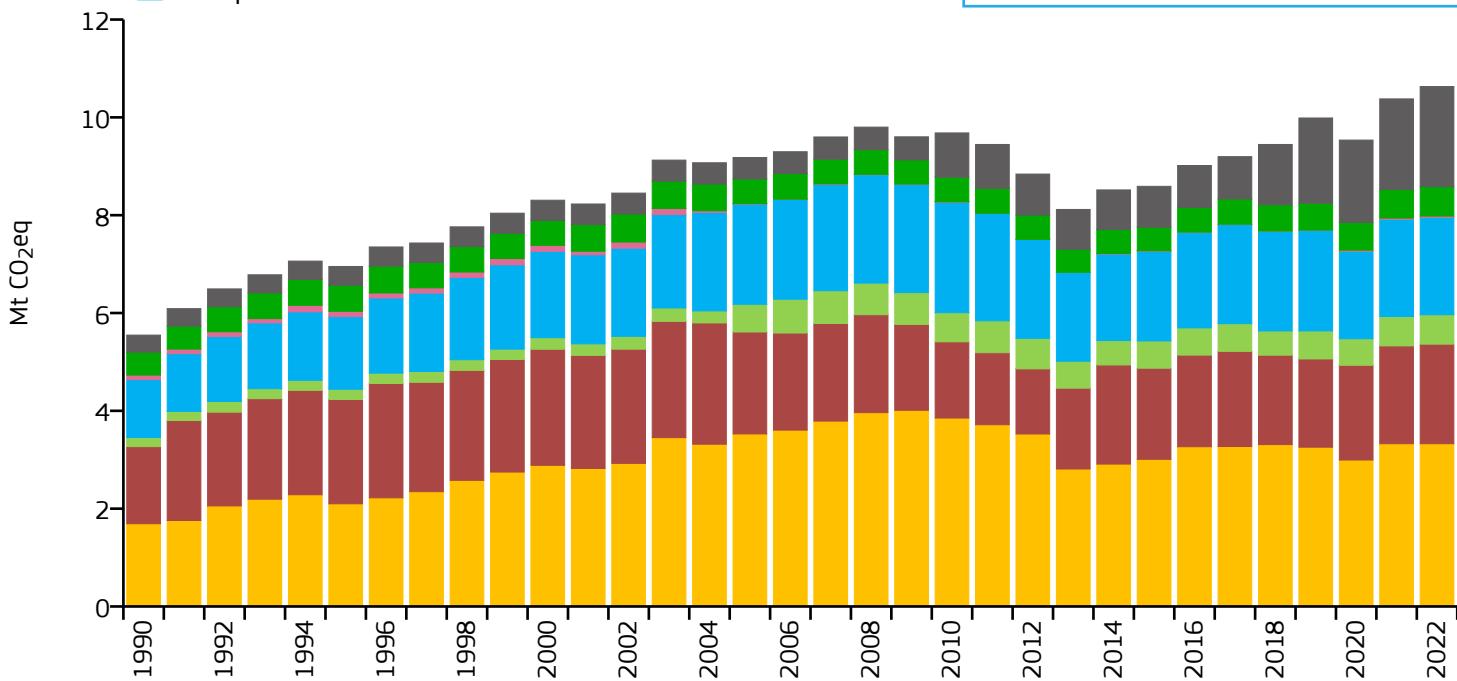
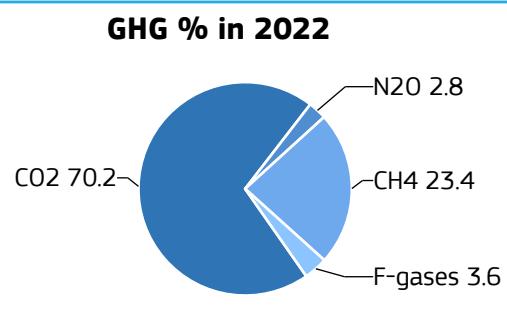
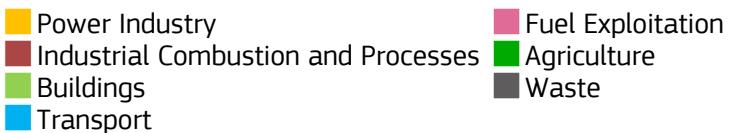
2022 vs 2005

2022 vs 2021



Cyprus

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 10.630 | 8.685 | 0.268 | 1.224M |
| 2015 | 8.590 | 7.399 | 0.293 | 1.161M |
| 2005 | 9.179 | 8.932 | 0.329 | 1.028M |
| 1990 | 5.548 | 7.237 | 0.379 | 766.614k |

2022 vs 1990

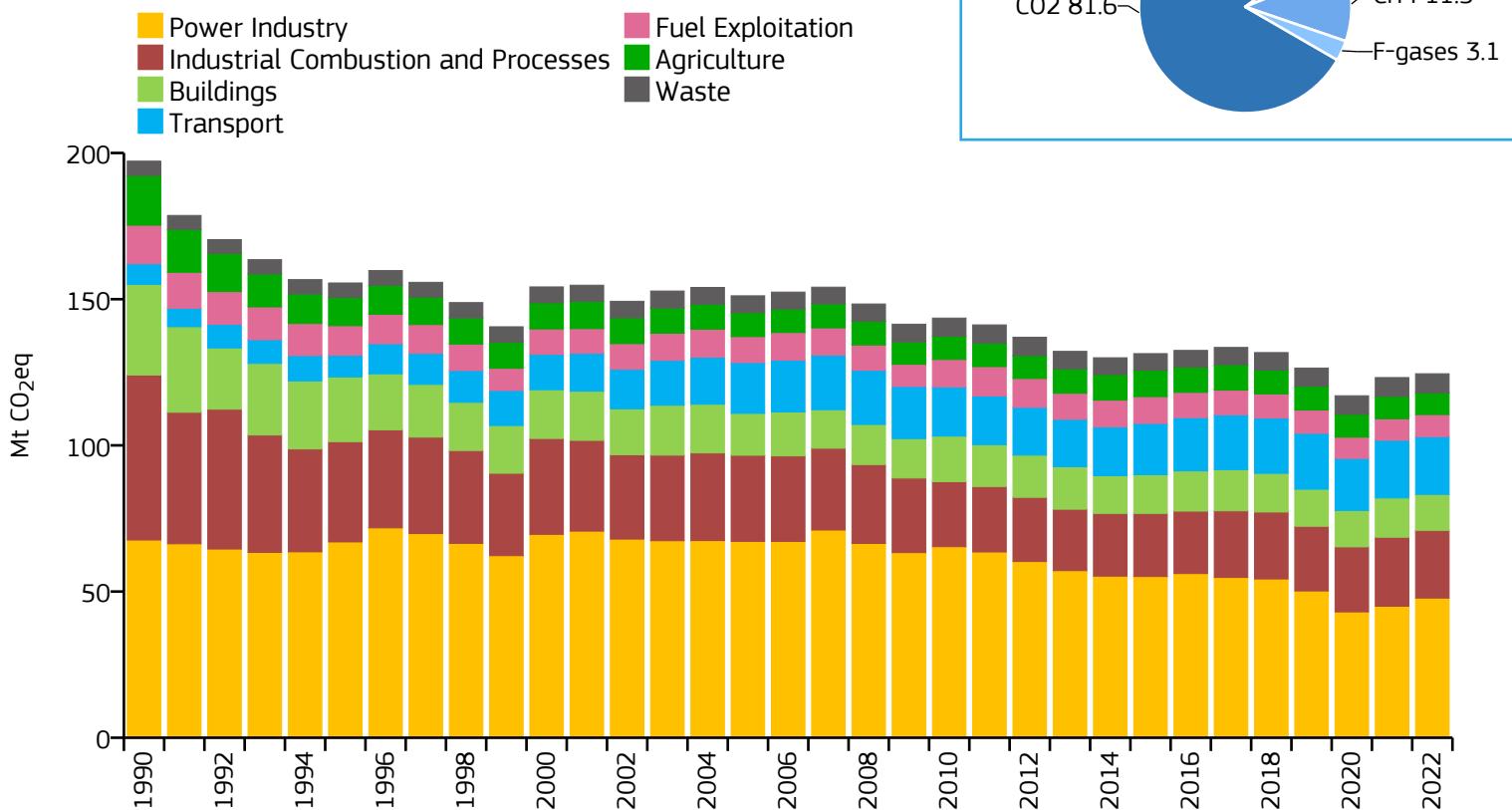
2022 vs 2005

2022 vs 2021



Czechia

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 124.495 | 11.709 | 0.284 | 10.632M |
| 2015 | 131.370 | 12.389 | 0.344 | 10.604M |
| 2005 | 151.151 | 14.735 | 0.487 | 10.258M |
| 1990 | 197.202 | 19.070 | 0.809 | 10.341M |

2022 vs 1990

2022 vs 2005

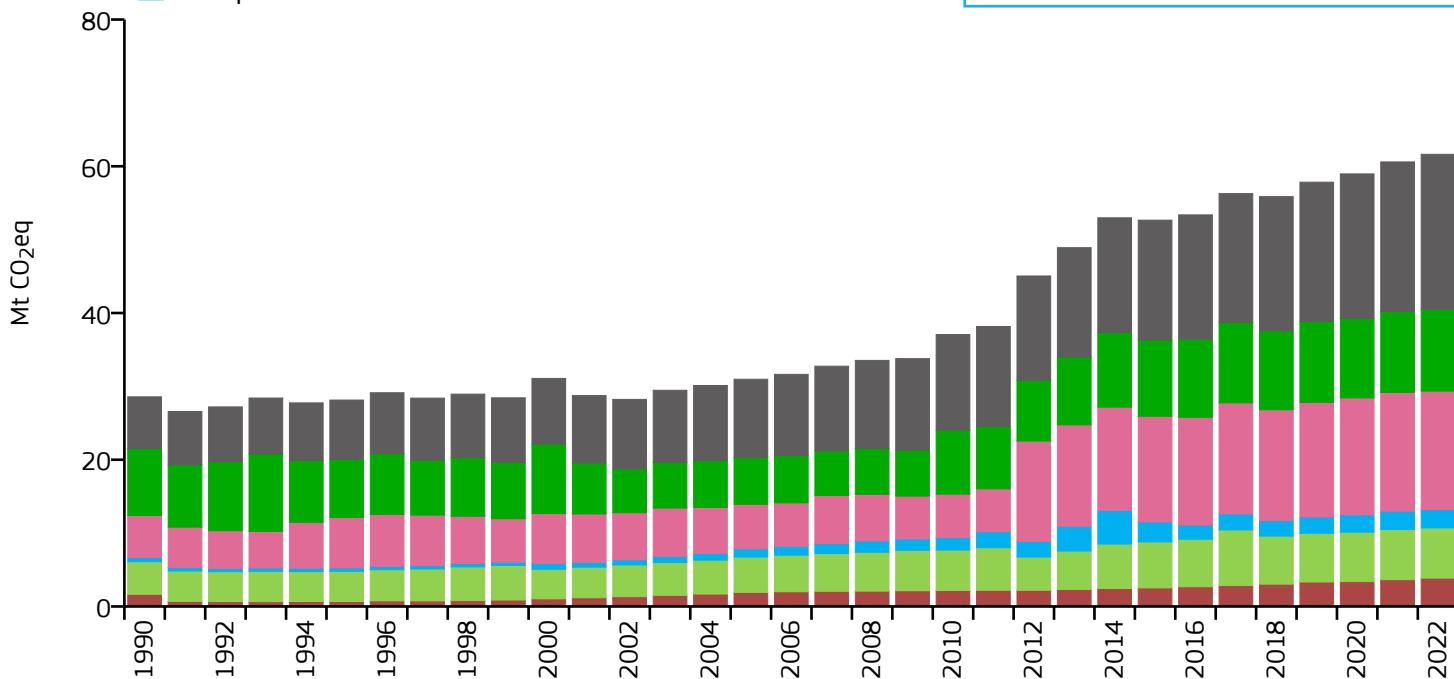
2022 vs 2021



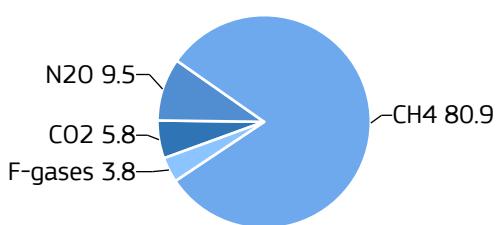
Democratic Republic of the Congo

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 61.635 | 0.647 | 0.550 | 95.221M |
| 2015 | 52.656 | 0.691 | 0.648 | 76.197M |
| 2005 | 30.971 | 0.566 | 0.726 | 54.752M |
| 1990 | 28.576 | 0.826 | 0.454 | 34.615M |

2022 vs 1990

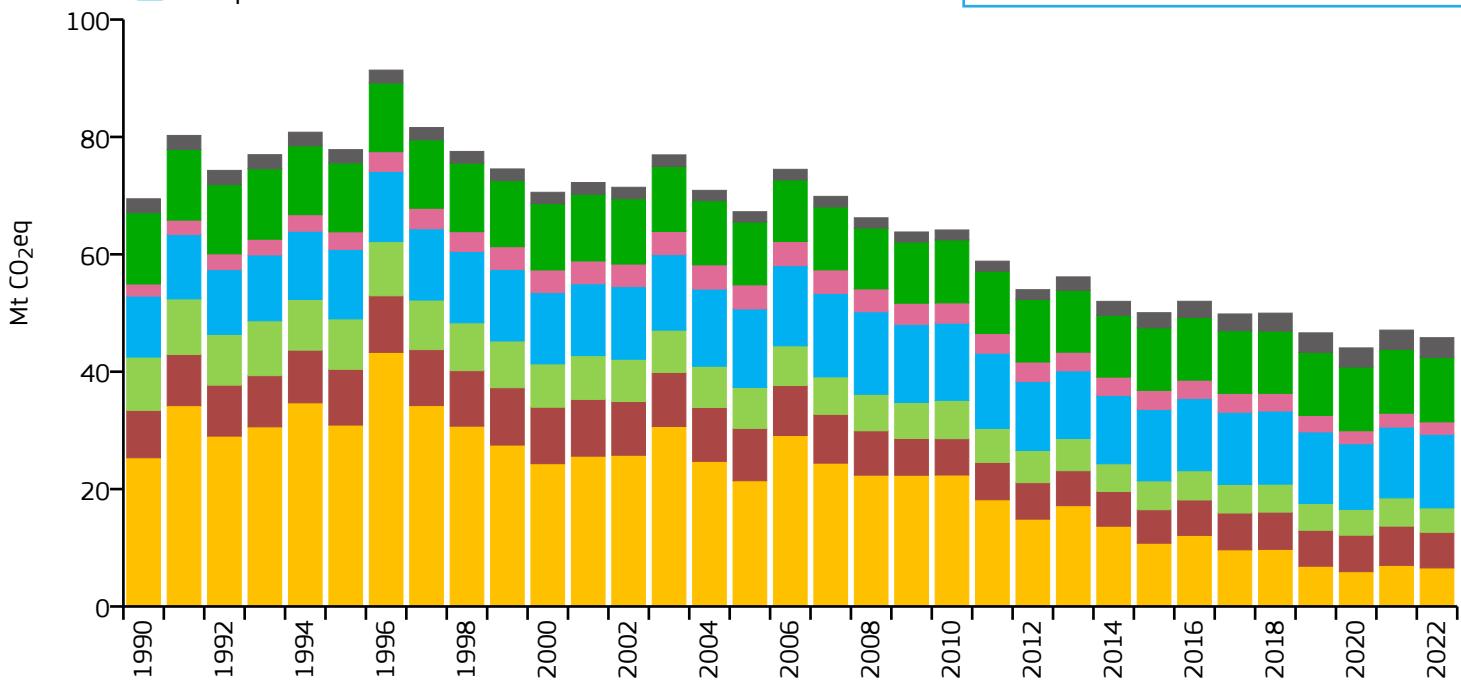
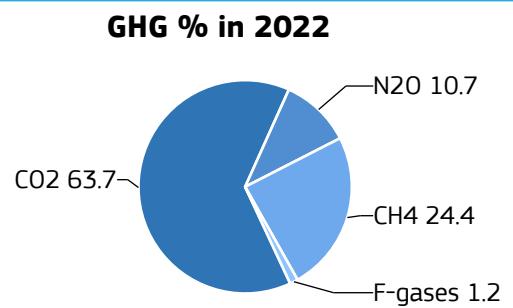
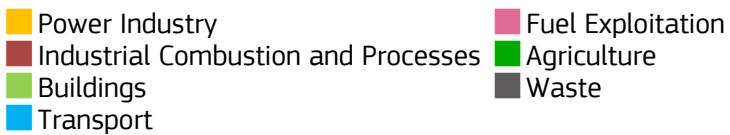
2022 vs 2005

2022 vs 2021



Denmark

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 45.795 | 7.838 | 0.130 | 5.843M |
| 2015 | 50.052 | 8.799 | 0.167 | 5.689M |
| 2005 | 67.257 | 12.405 | 0.241 | 5.422M |
| 1990 | 69.458 | 13.510 | 0.346 | 5.141M |

2022 vs 1990

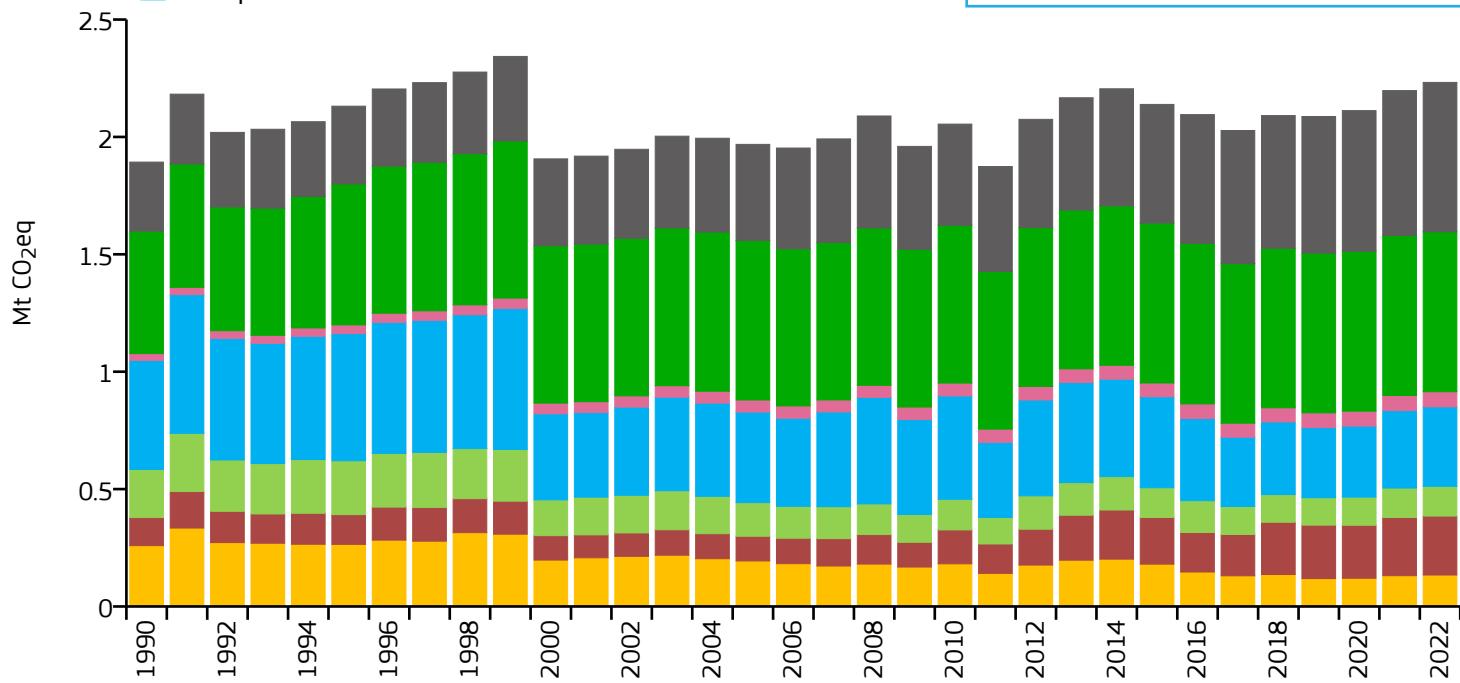
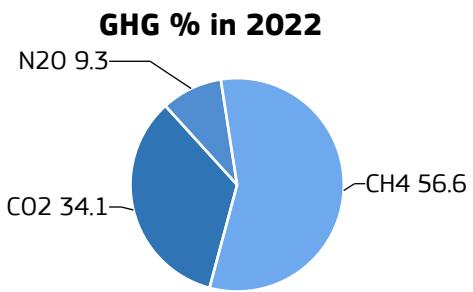
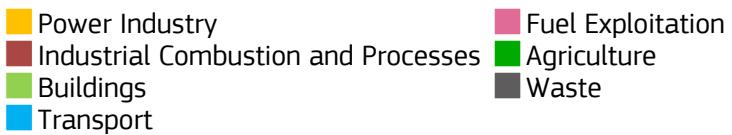
2022 vs 2005

2022 vs 2021



Djibouti

GHG emissions by sector

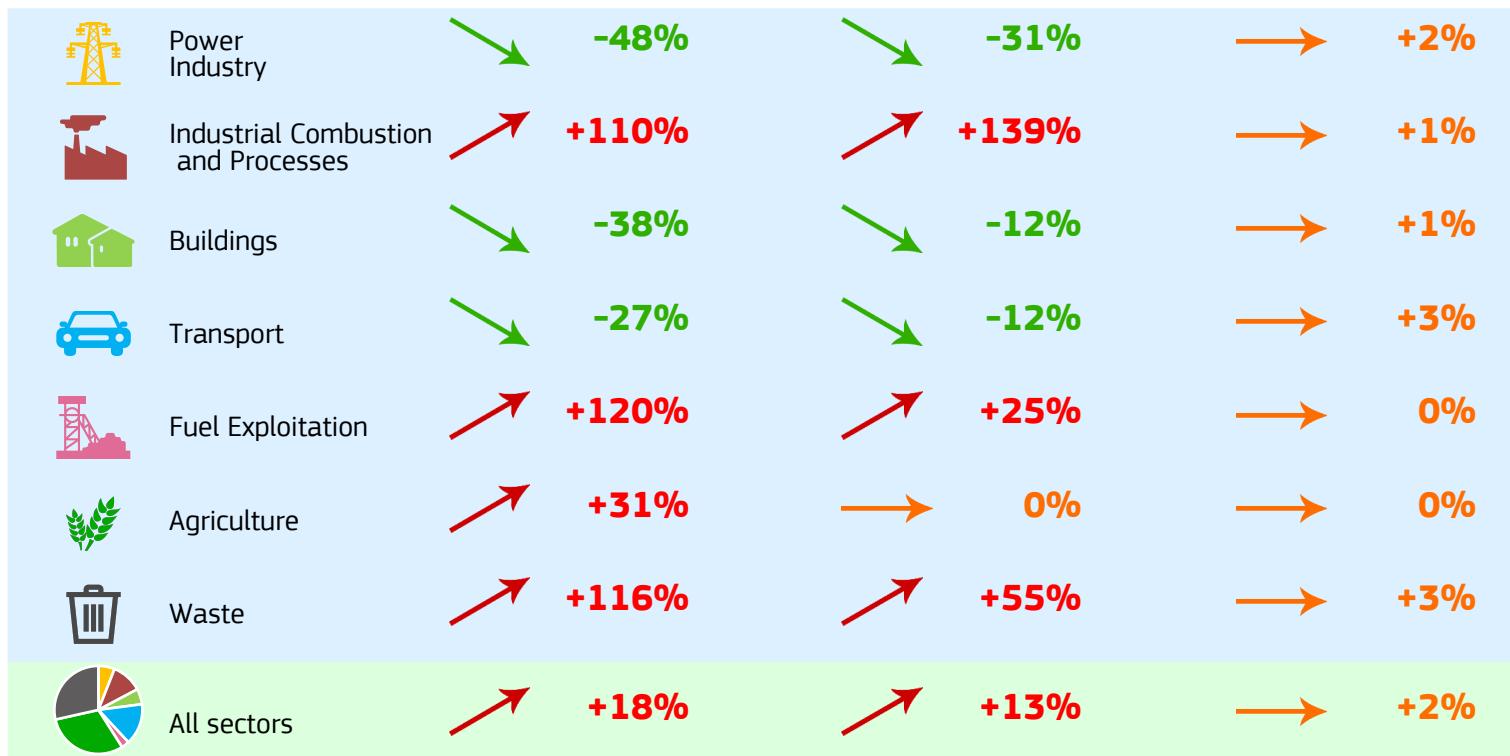


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 2.232 | 2.171 | 0.399 | 1.028M |
| 2015 | 2.138 | 2.306 | 0.522 | 927.414k |
| 2005 | 1.968 | 2.513 | 0.653 | 783.254k |
| 1990 | 1.893 | 3.206 | 0.936 | 590.398k |

2022 vs 1990

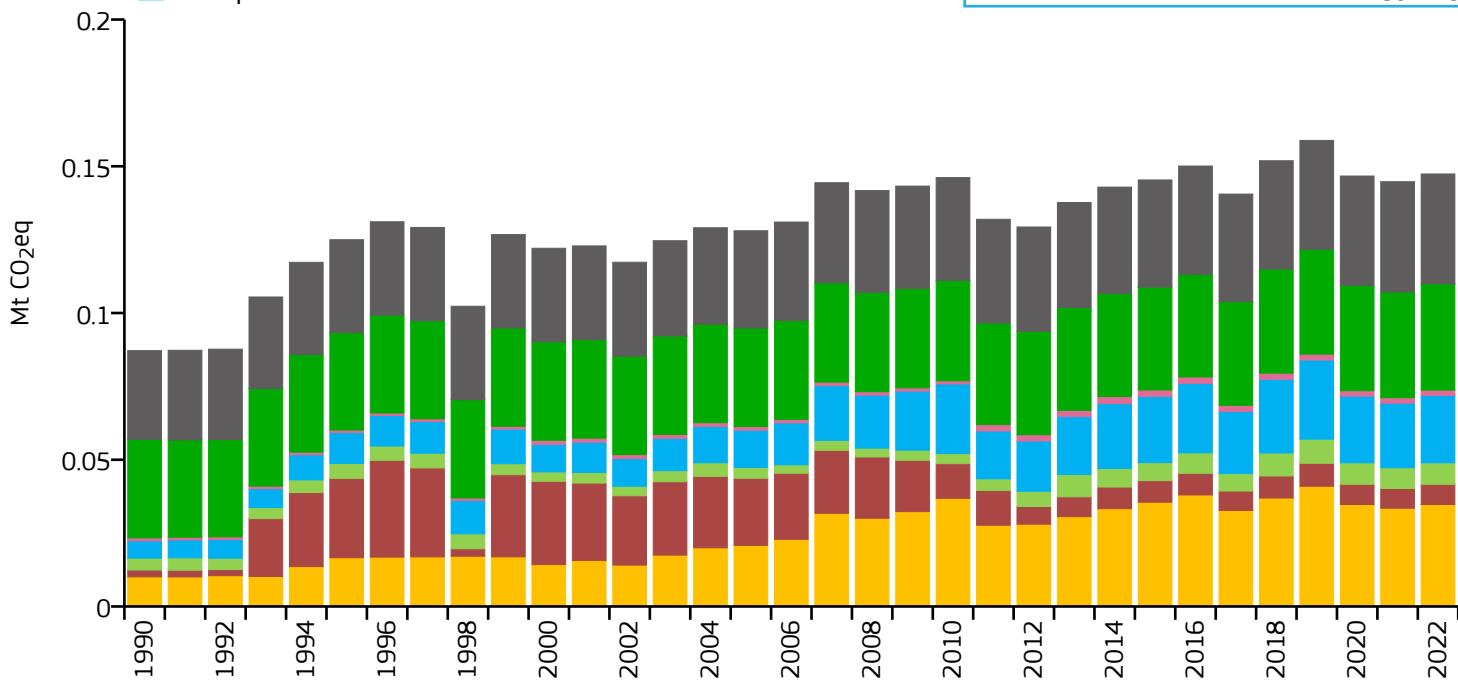
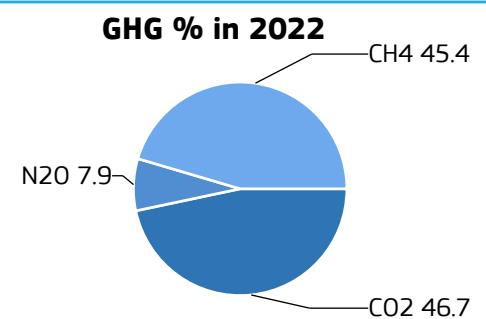
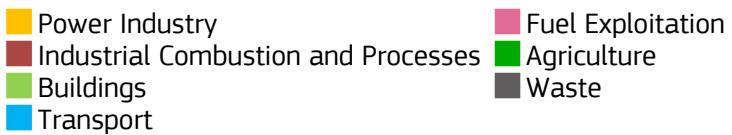
2022 vs 2005

2022 vs 2021



Dominica

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.147 | 1.965 | 0.176 | 75.000k |
| 2015 | 0.145 | 1.987 | 0.172 | 73.162k |
| 2005 | 0.128 | 1.813 | 0.179 | 70.627k |
| 1990 | 0.087 | 1.229 | 0.160 | 70.926k |

2022 vs 1990

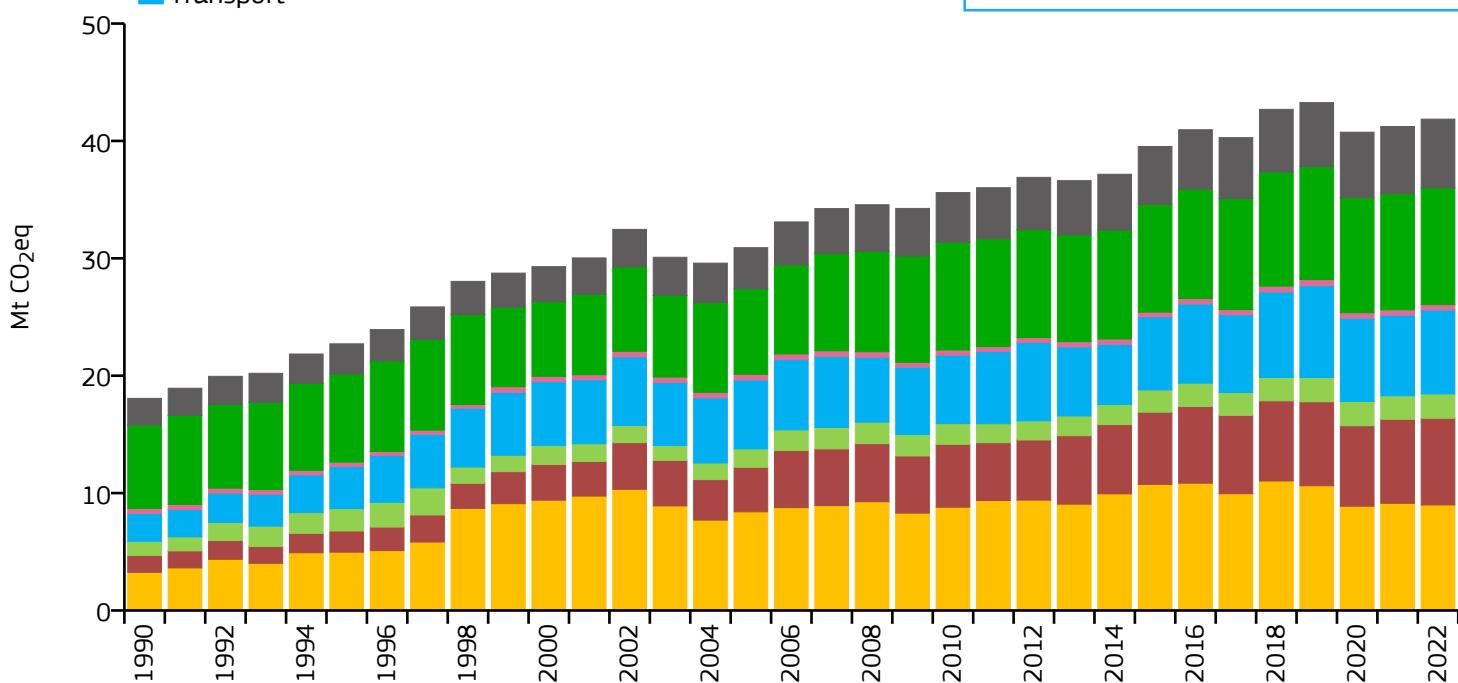
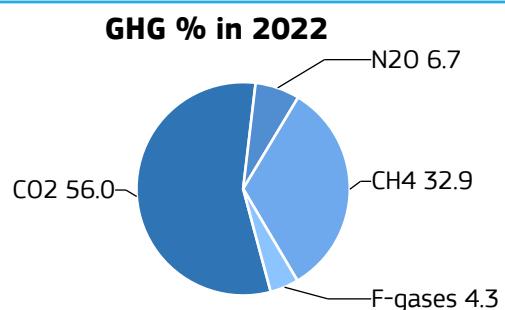
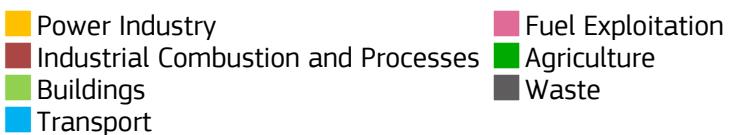
2022 vs 2005

2022 vs 2021



Dominican Republic

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 41.858 | 3.696 | 0.193 | 11.324M |
| 2015 | 39.528 | 3.754 | 0.251 | 10.528M |
| 2005 | 30.906 | 3.346 | 0.330 | 9.238M |
| 1990 | 18.067 | 2.515 | 0.408 | 7.184M |

2022 vs 1990

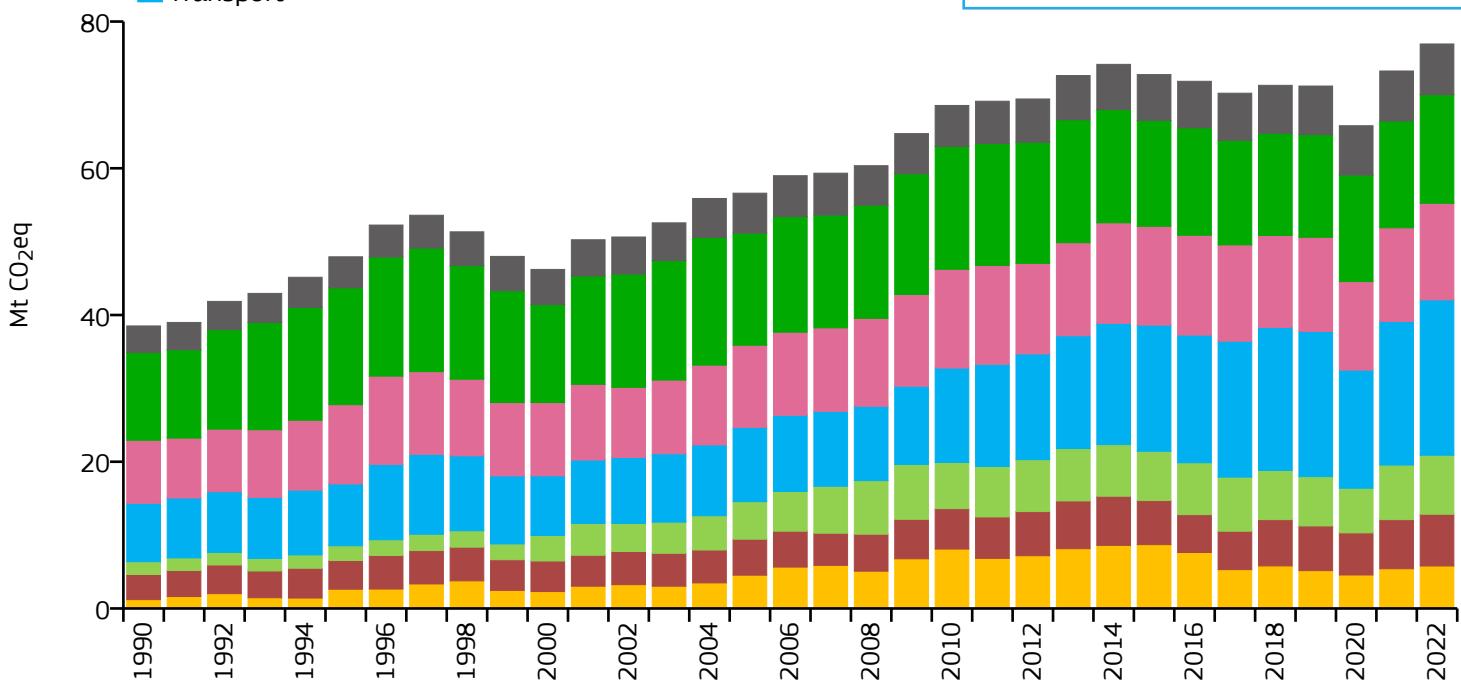
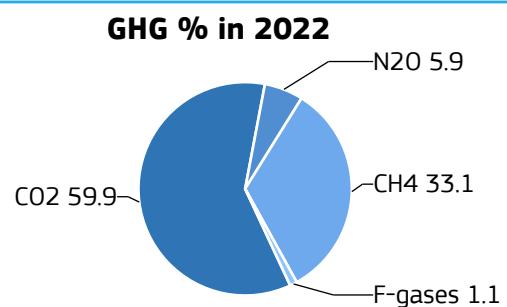
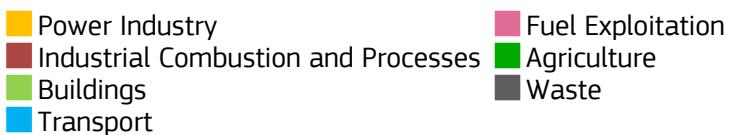
2022 vs 2005

2022 vs 2021



Ecuador

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 76.944 | 4.323 | 0.394 | 17.800M |
| 2015 | 72.770 | 4.507 | 0.377 | 16.144M |
| 2005 | 56.605 | 4.121 | 0.431 | 13.735M |
| 1990 | 38.509 | 3.769 | 0.454 | 10.218M |

2022 vs 1990

2022 vs 2005

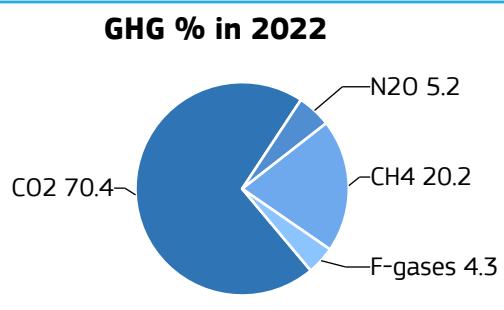
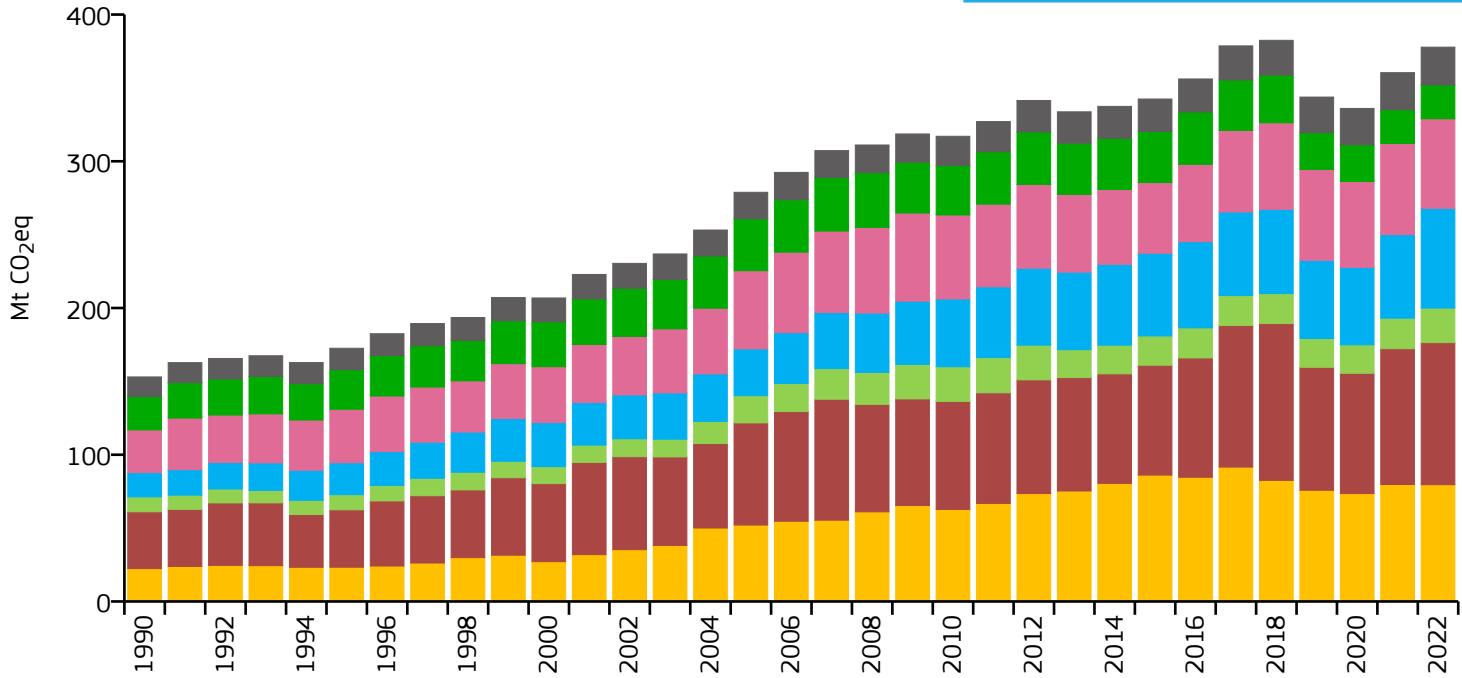
2022 vs 2021



Egypt

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 377.780 | 3.550 | 0.266 | 106.416M |
| 2015 | 342.429 | 3.651 | 0.333 | 93.778M |
| 2005 | 278.860 | 3.632 | 0.417 | 76.778M |
| 1990 | 153.021 | 2.665 | 0.425 | 57.412M |

2022 vs 1990

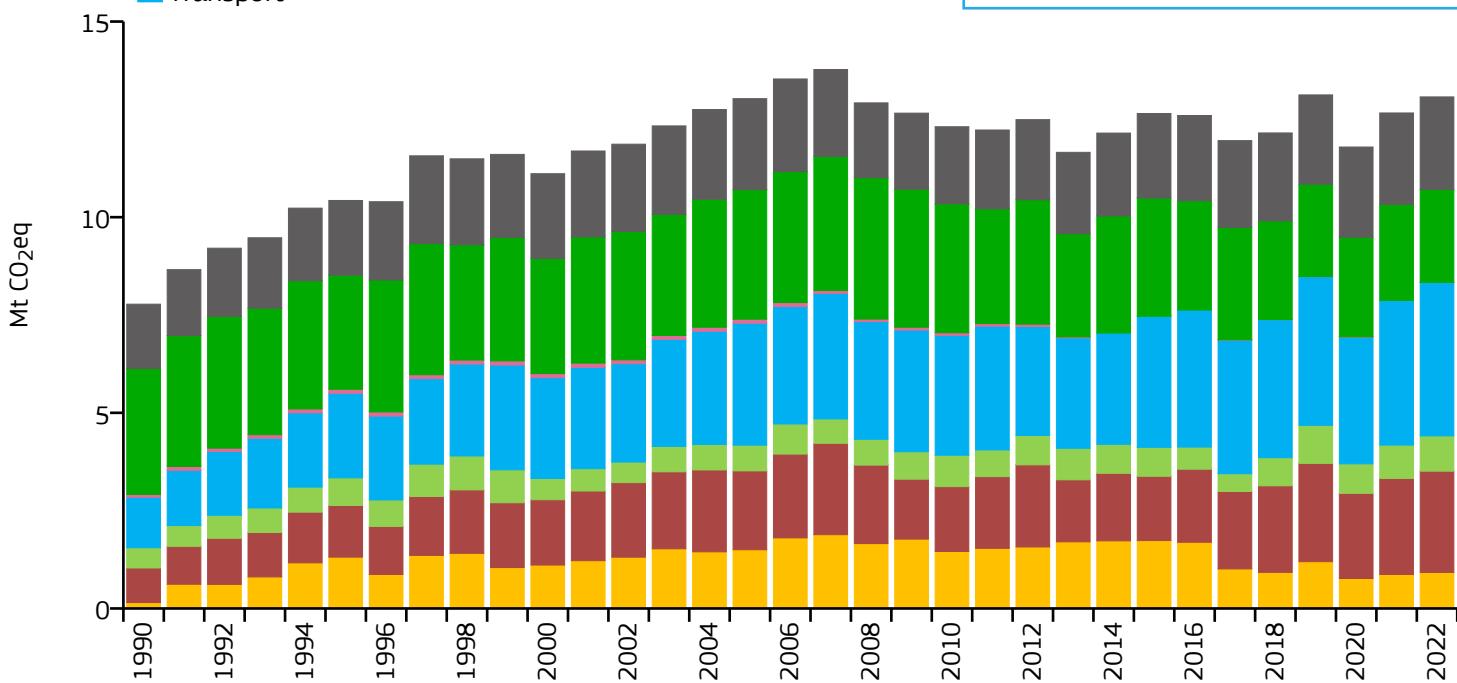
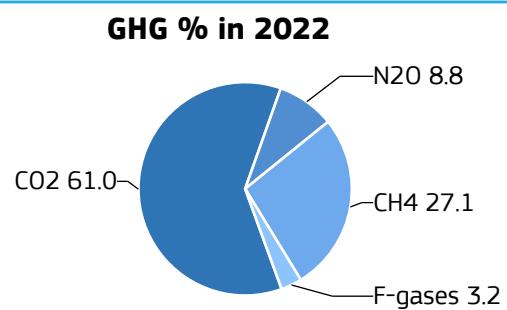
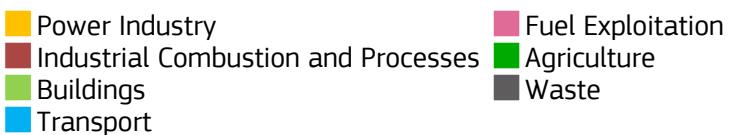
2022 vs 2005

2022 vs 2021



El Salvador

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 13.074 | 1.997 | 0.220 | 6.546M |
| 2015 | 12.649 | 2.004 | 0.246 | 6.312M |
| 2005 | 13.029 | 2.161 | 0.312 | 6.029M |
| 1990 | 7.777 | 1.480 | 0.279 | 5.255M |

2022 vs 1990

2022 vs 2005

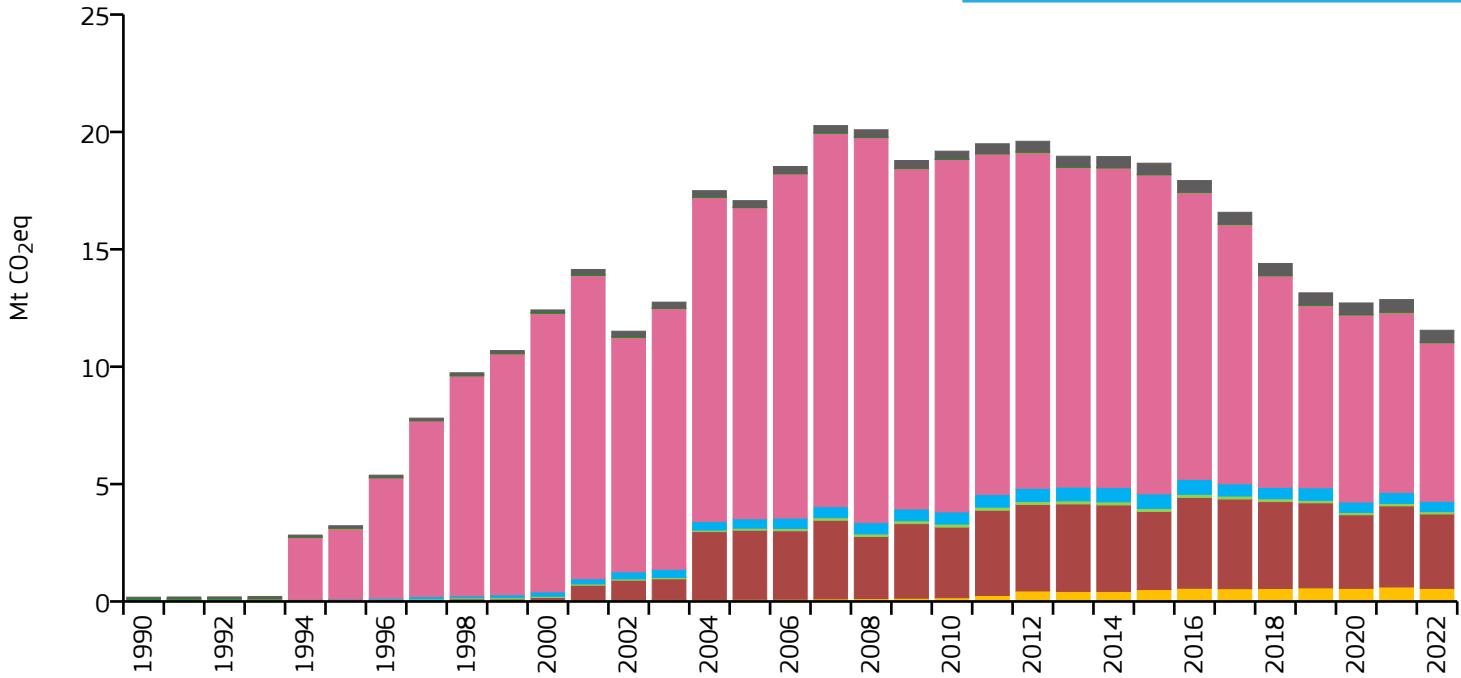
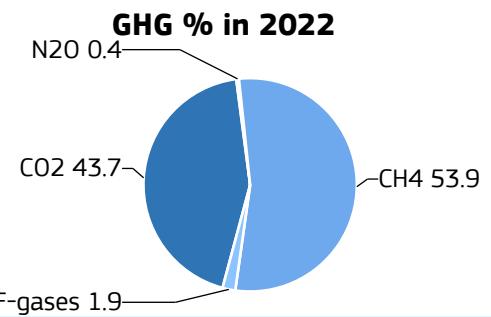
2022 vs 2021



Equatorial Guinea

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 11.552 | 7.712 | 0.468 | 1.498M |
| 2015 | 18.668 | 15.883 | 0.564 | 1.175M |
| 2005 | 17.073 | 22.544 | 0.703 | 757.317k |
| 1990 | 0.182 | 0.427 | 0.418 | 426.846k |

2022 vs 1990

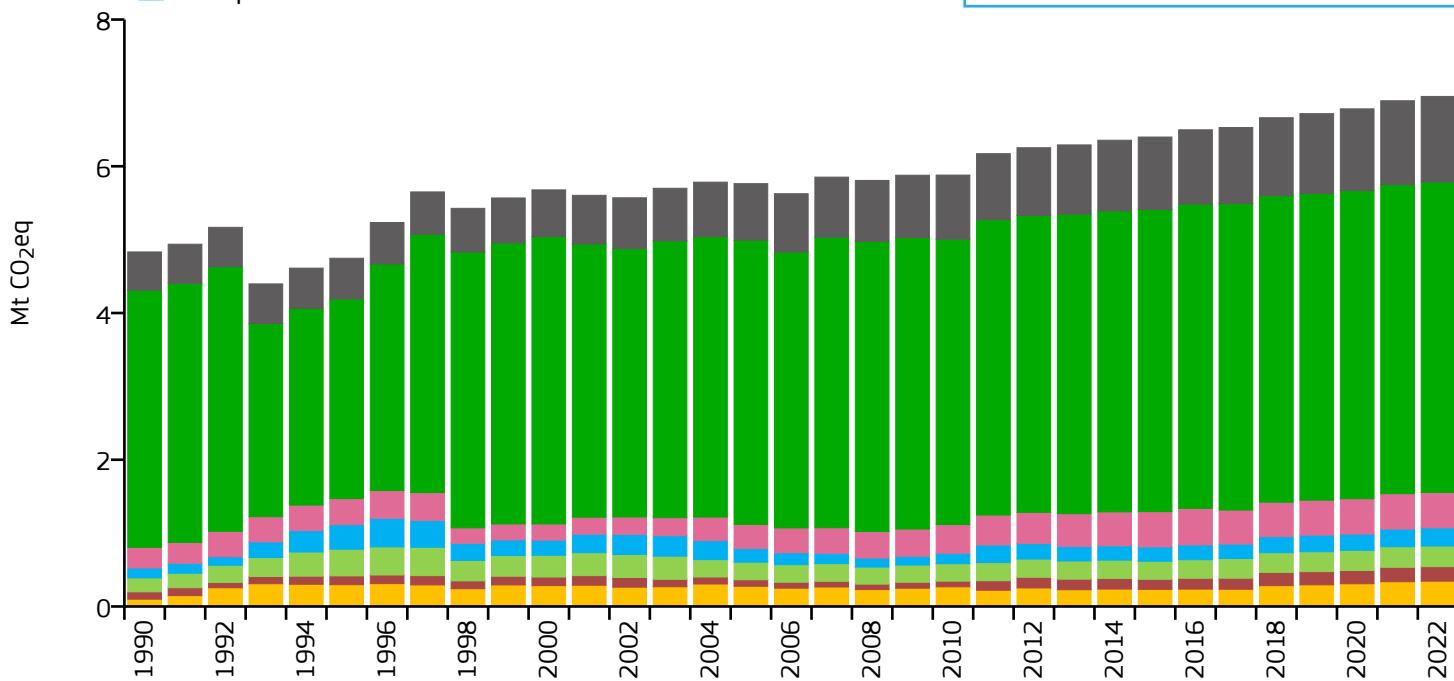
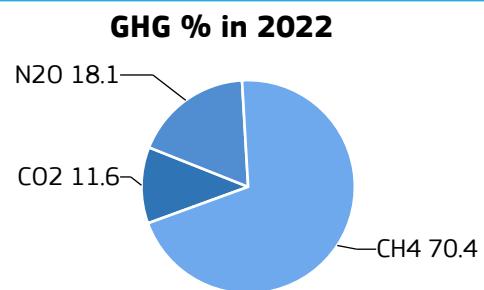
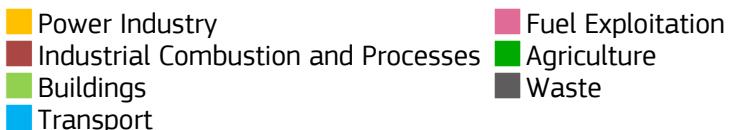
2022 vs 2005

2022 vs 2021



Eritrea

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 6.952 | 1.224 | 0.437 | 5.679M |
| 2015 | 6.399 | 1.320 | 0.556 | 4.847M |
| 2005 | 5.763 | 1.452 | 0.740 | 3.969M |
| 1990 | 4.832 | 1.552 | 1.242 | 3.113M |

2022 vs 1990

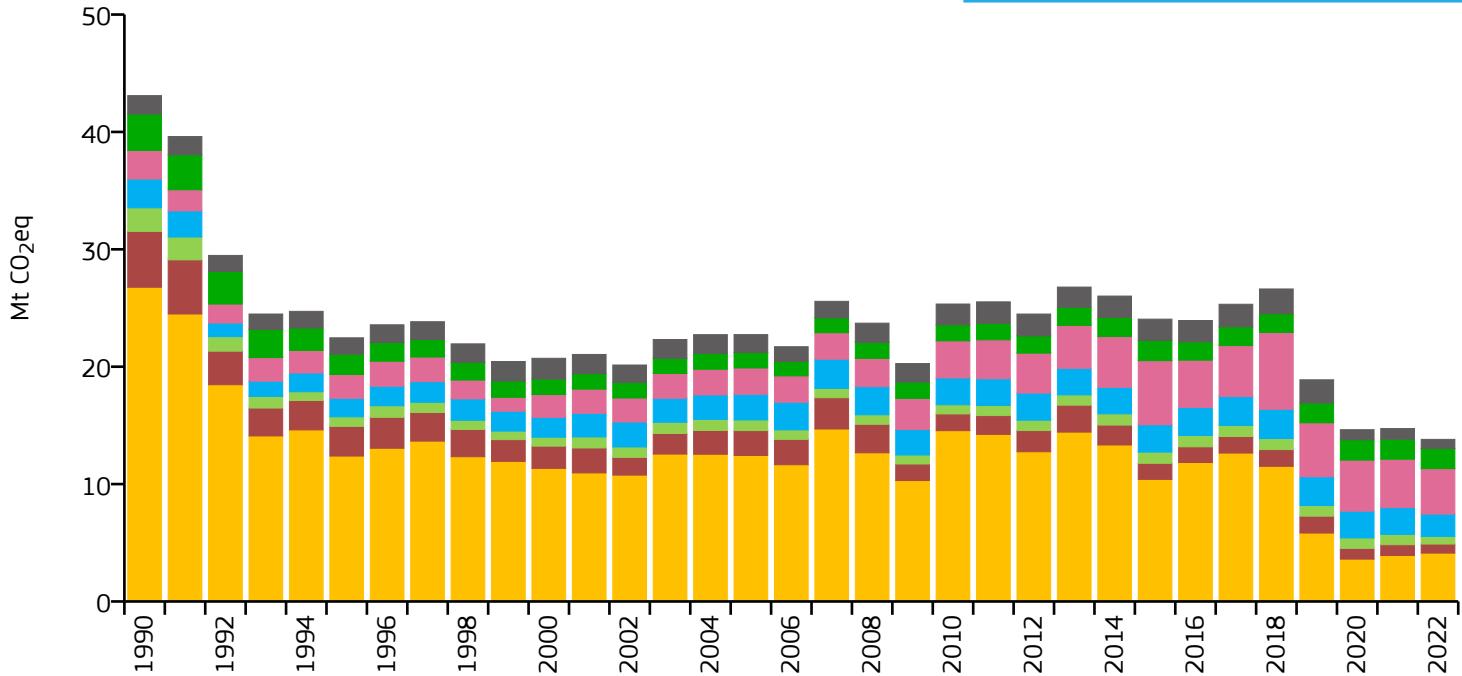
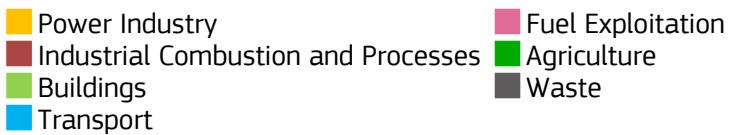
2022 vs 2005

2022 vs 2021

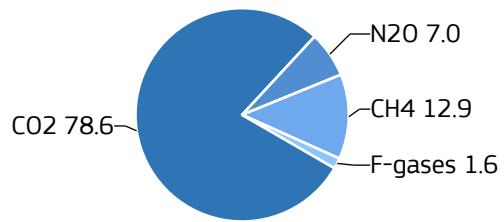


Estonia

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 13.809 | 10.680 | 0.271 | 1.293M |
| 2015 | 24.051 | 18.285 | 0.589 | 1.315M |
| 2005 | 22.734 | 16.769 | 0.643 | 1.356M |
| 1990 | 43.093 | 27.531 | 1.634 | 1.565M |

2022 vs 1990

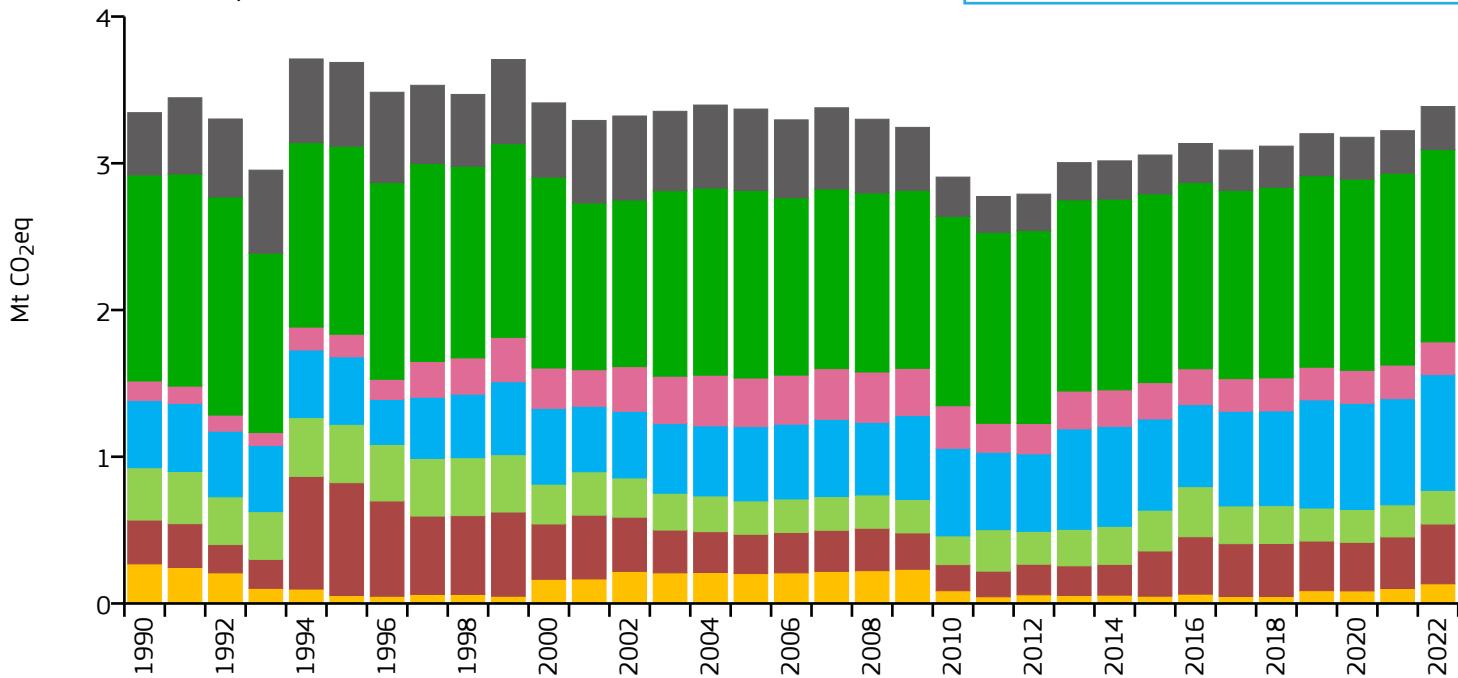
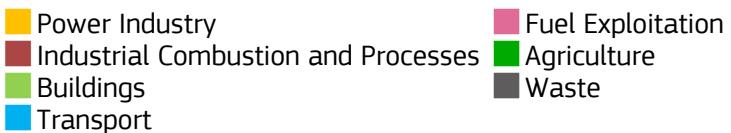
2022 vs 2005

2022 vs 2021

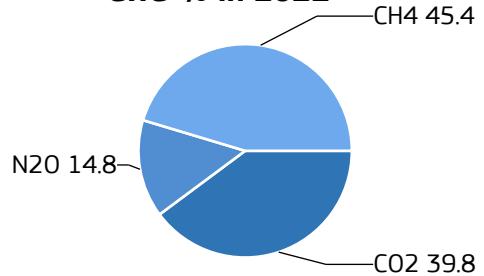


Eswatini

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO2eq/yr | GHG emissions per capita t CO2eq/cap/yr | GHG emissions per unit of GDP PPP t CO2eq/kUSD/yr | Population |
|------|------------------------------|--|--|------------|
| 2022 | 3.387 | 2.279 | 0.309 | 1.486M |
| 2015 | 3.056 | 2.317 | 0.333 | 1.319M |
| 2005 | 3.369 | 3.047 | 0.499 | 1.106M |
| 1990 | 3.345 | 3.883 | 0.798 | 861.373k |

2022 vs 1990

2022 vs 2005

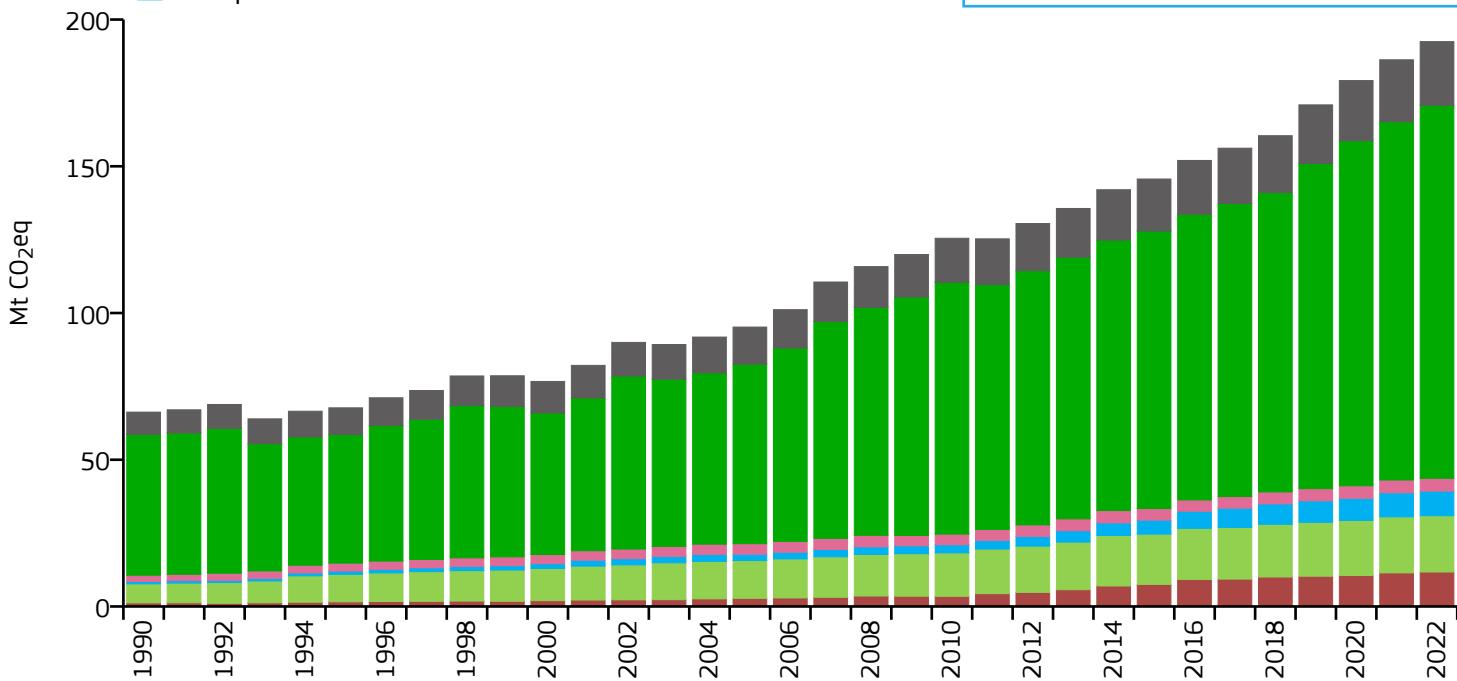
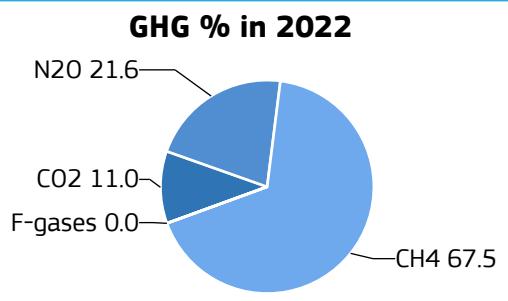
2022 vs 2021



Ethiopia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 192.474 | 1.630 | 0.655 | 118.065M |
| 2015 | 145.655 | 1.458 | 0.812 | 99.873M |
| 2005 | 95.212 | 1.241 | 1.446 | 76.727M |
| 1990 | 66.228 | 1.377 | 1.803 | 48.087M |

2022 vs 1990

2022 vs 2005

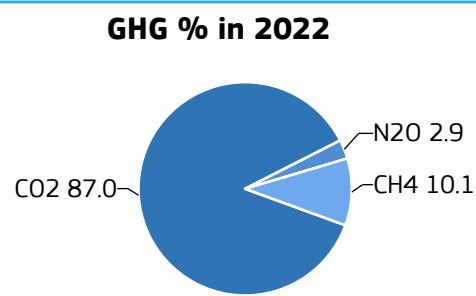
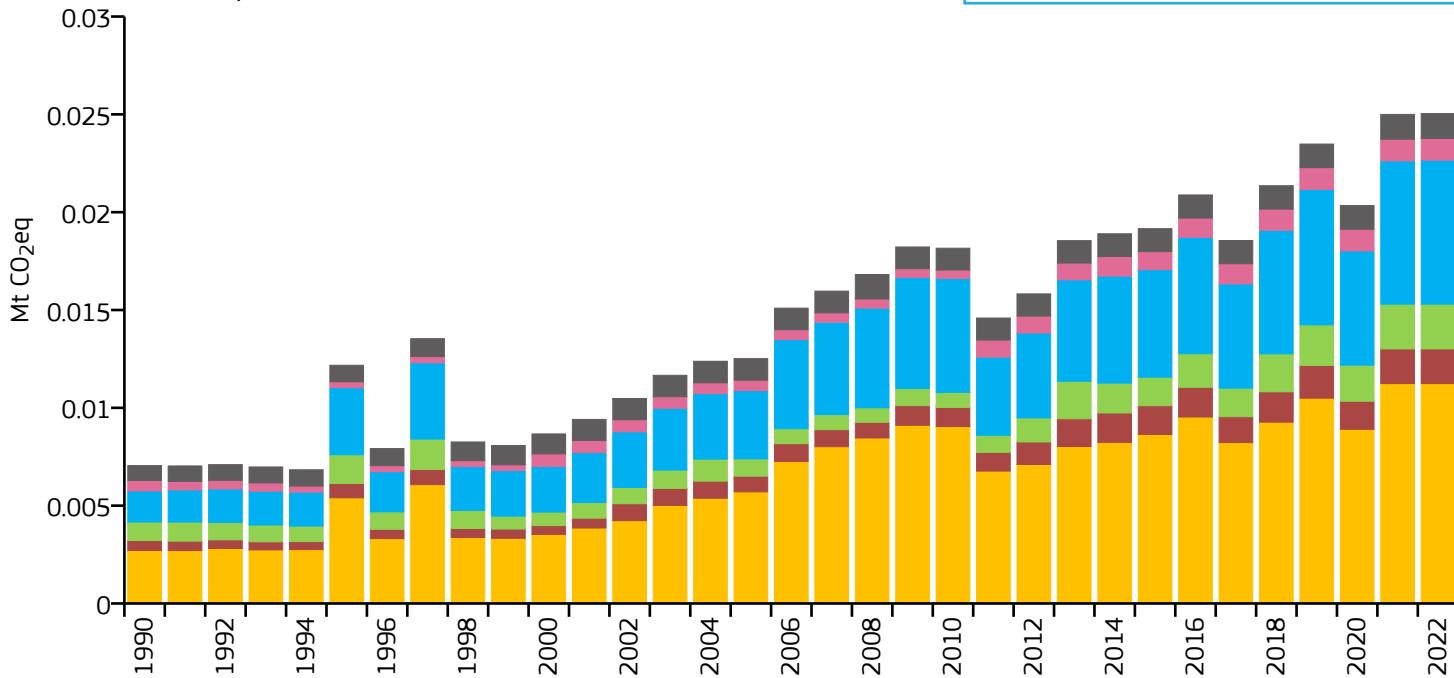
2022 vs 2021



Falkland Islands

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.025 | 8.348 | n/a | 3.000k |
| 2015 | 0.019 | 6.611 | n/a | 2.898k |
| 2005 | 0.013 | 4.258 | n/a | 2.939k |
| 1990 | 0.007 | 3.544 | n/a | 1.989k |

2022 vs 1990

2022 vs 2005

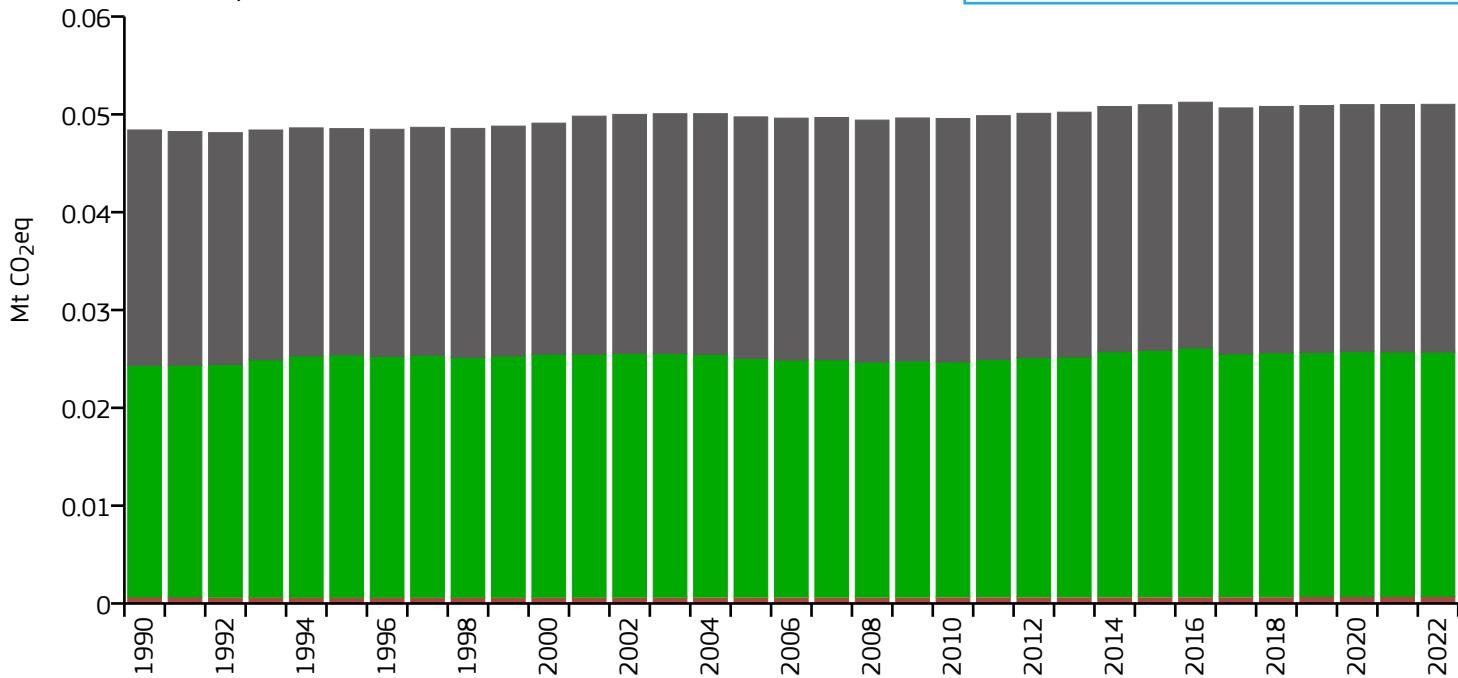
2022 vs 2021



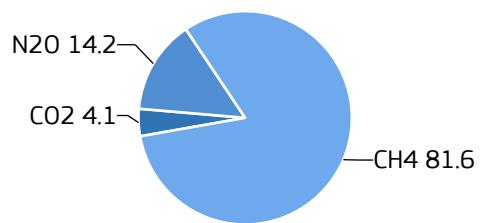
Faroës

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022

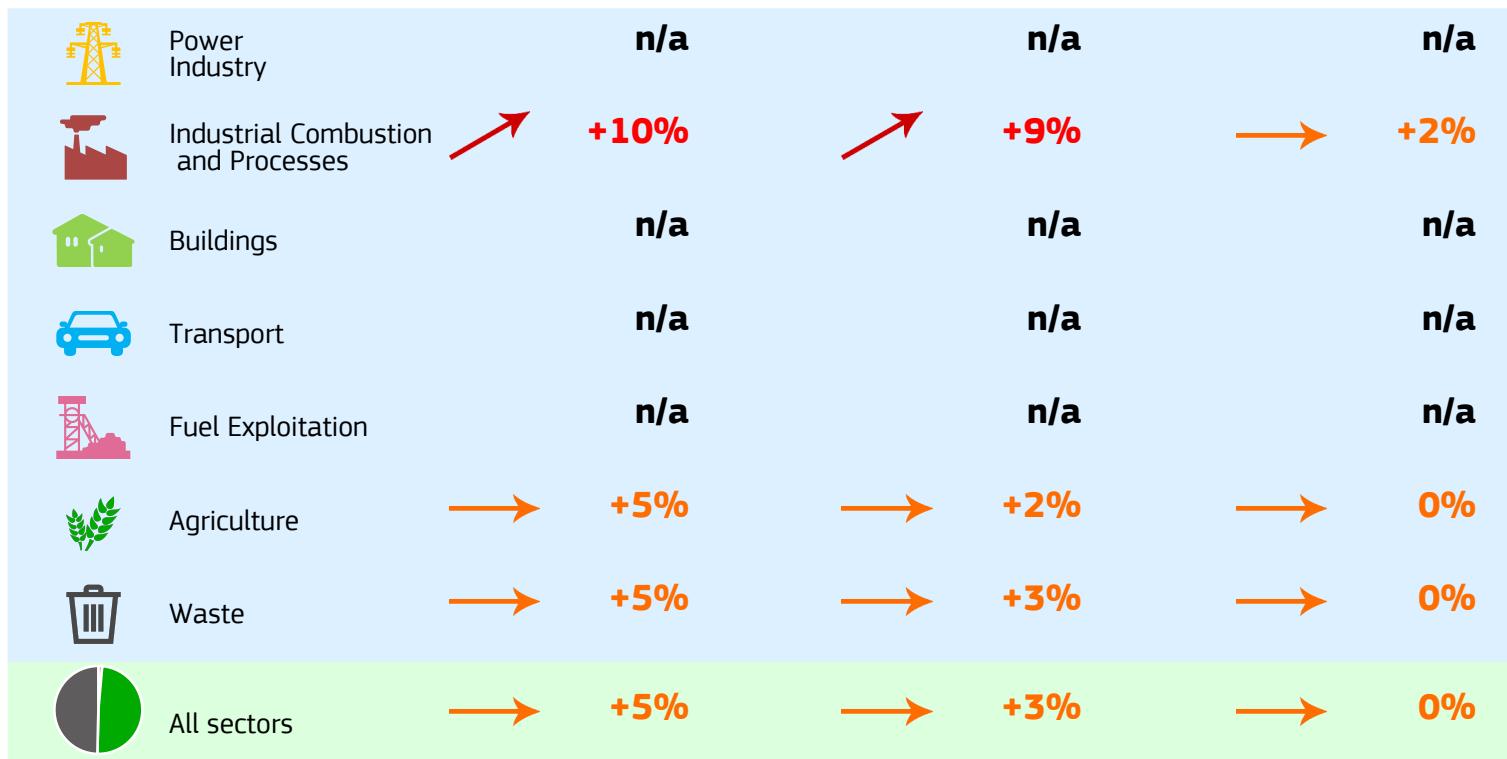


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.051 | 1.001 | n/a | 51.000k |
| 2015 | 0.051 | 1.041 | n/a | 48.965k |
| 2005 | 0.050 | 1.030 | n/a | 48.285k |
| 1990 | 0.048 | 1.017 | n/a | 47.594k |

2022 vs 1990

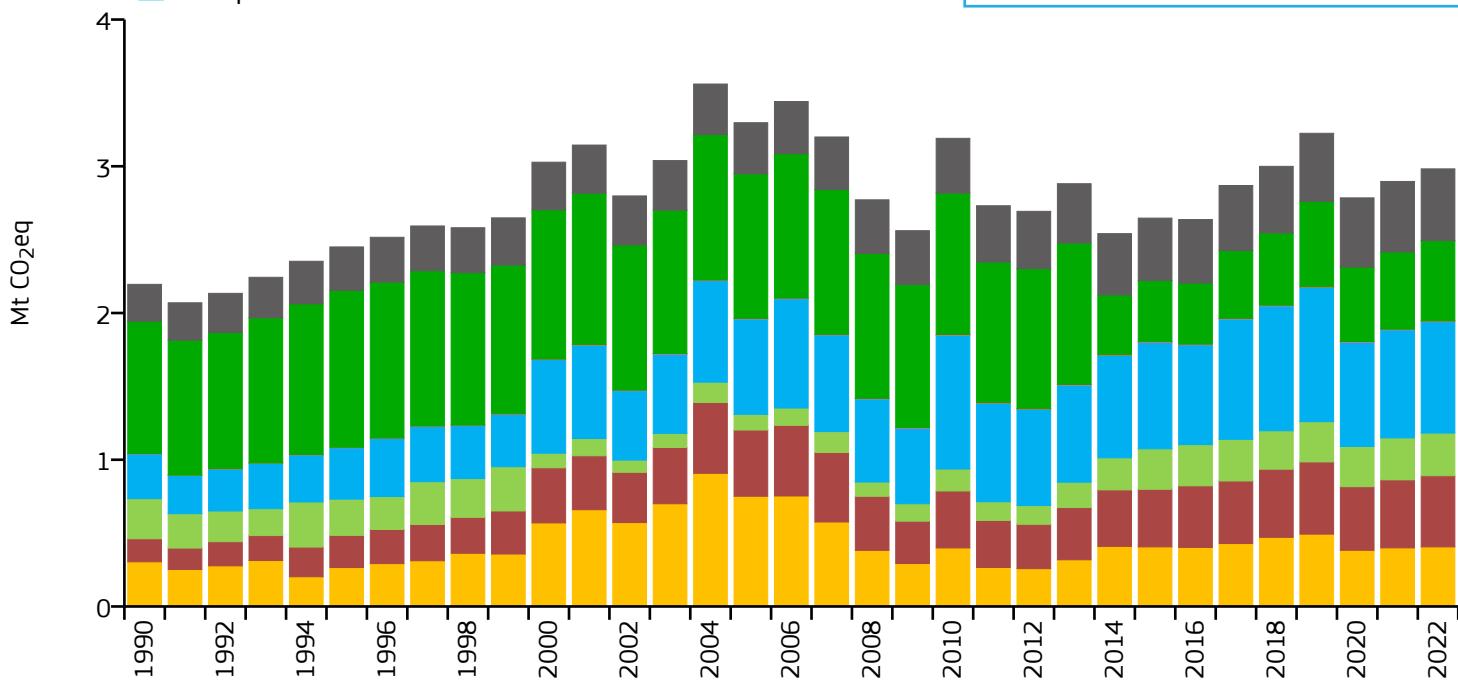
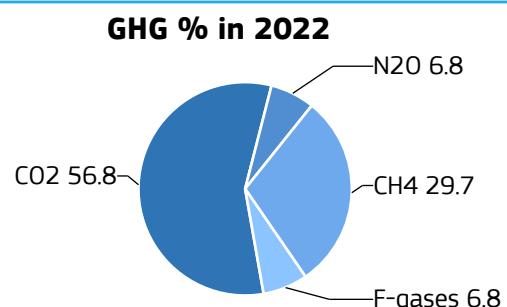
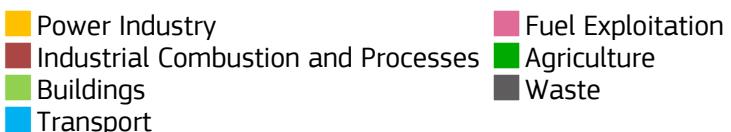
2022 vs 2005

2022 vs 2021



Fiji

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 2.982 | 3.186 | 0.268 | 936.000k |
| 2015 | 2.647 | 2.967 | 0.242 | 892.149k |
| 2005 | 3.297 | 4.012 | 0.377 | 821.817k |
| 1990 | 2.195 | 3.013 | 0.357 | 728.628k |

2022 vs 1990

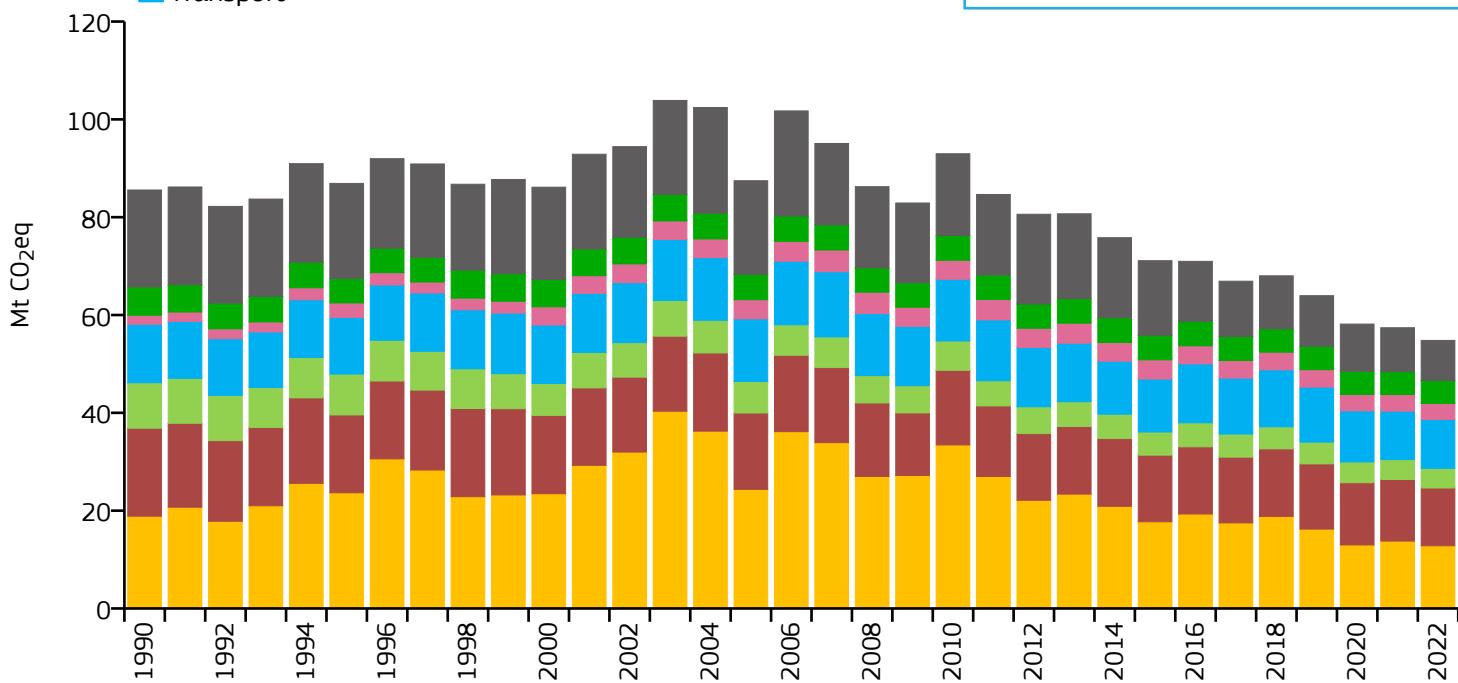
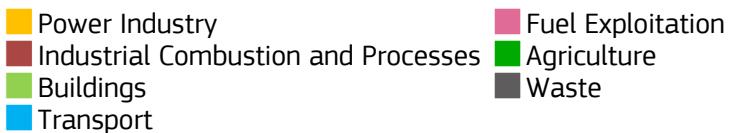
2022 vs 2005

2022 vs 2021

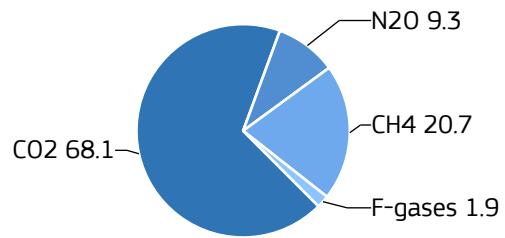


Finland

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 54.805 | 9.757 | 0.199 | 5.617M |
| 2015 | 71.106 | 12.971 | 0.288 | 5.482M |
| 2005 | 87.452 | 16.629 | 0.372 | 5.259M |
| 1990 | 85.558 | 17.125 | 0.521 | 4.996M |

2022 vs 1990

2022 vs 2005

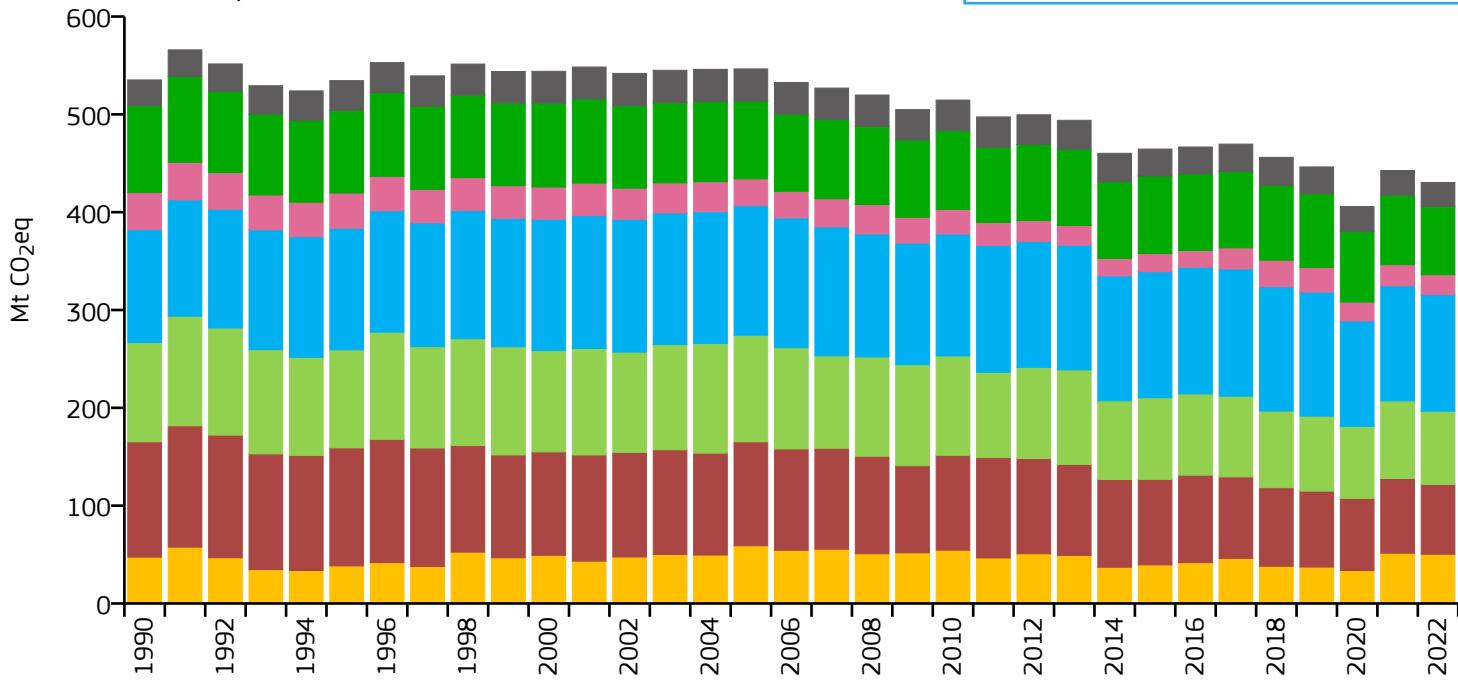
2022 vs 2021



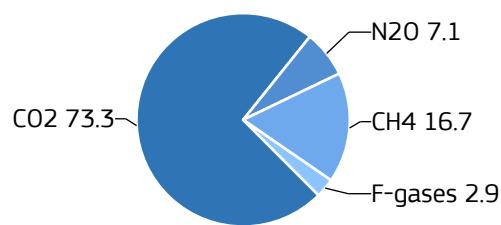
France and Monaco

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 430.363 | 6.503 | 0.138 | 66.183M |
| 2015 | 464.525 | 7.207 | 0.161 | 64.457M |
| 2005 | 546.470 | 8.924 | 0.208 | 61.234M |
| 1990 | 535.187 | 9.396 | 0.272 | 56.961M |

2022 vs 1990

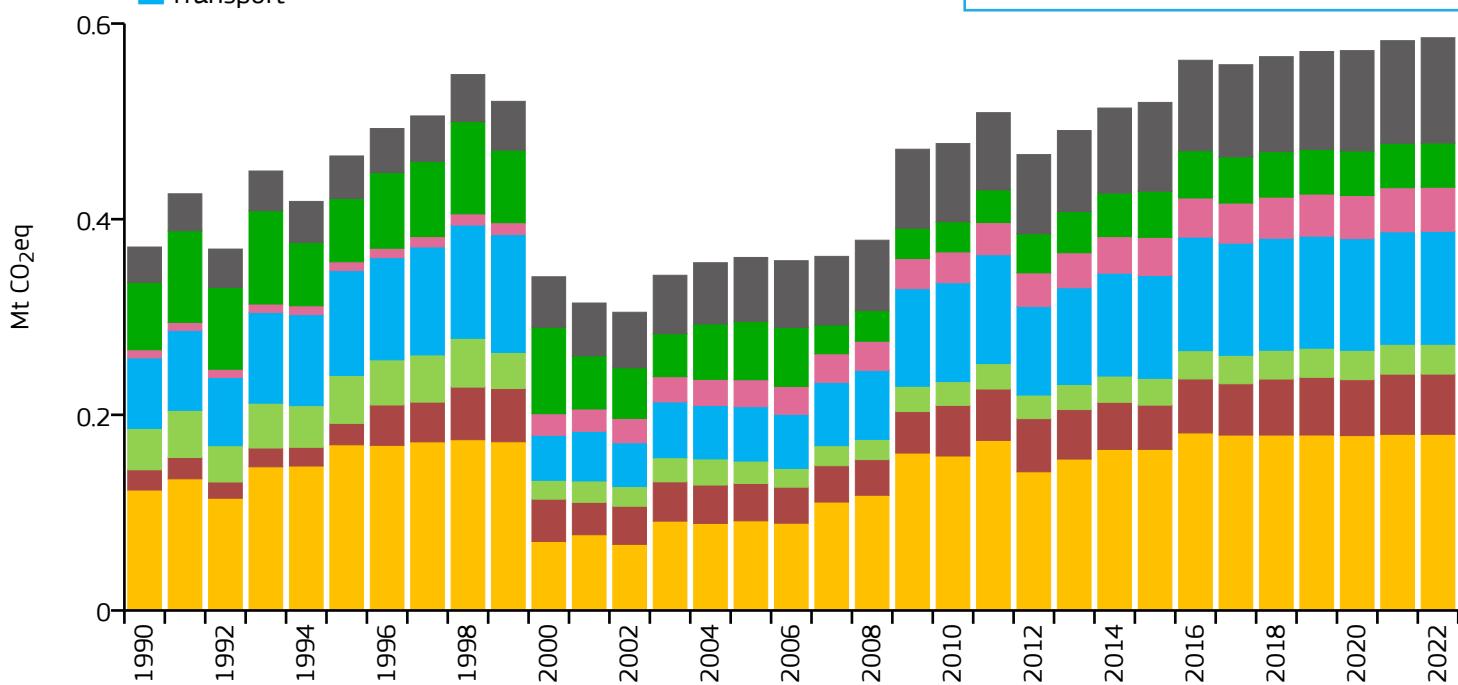
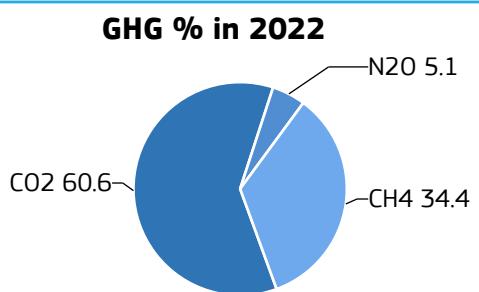
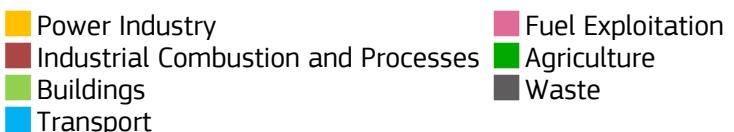
2022 vs 2005

2022 vs 2021



French Guiana

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.585 | 1.835 | n/a | 319.000k |
| 2015 | 0.519 | 1.933 | n/a | 268.691k |
| 2005 | 0.361 | 1.771 | n/a | 203.826k |
| 1990 | 0.372 | 3.209 | n/a | 115.784k |

2022 vs 1990

2022 vs 2005

2022 vs 2021

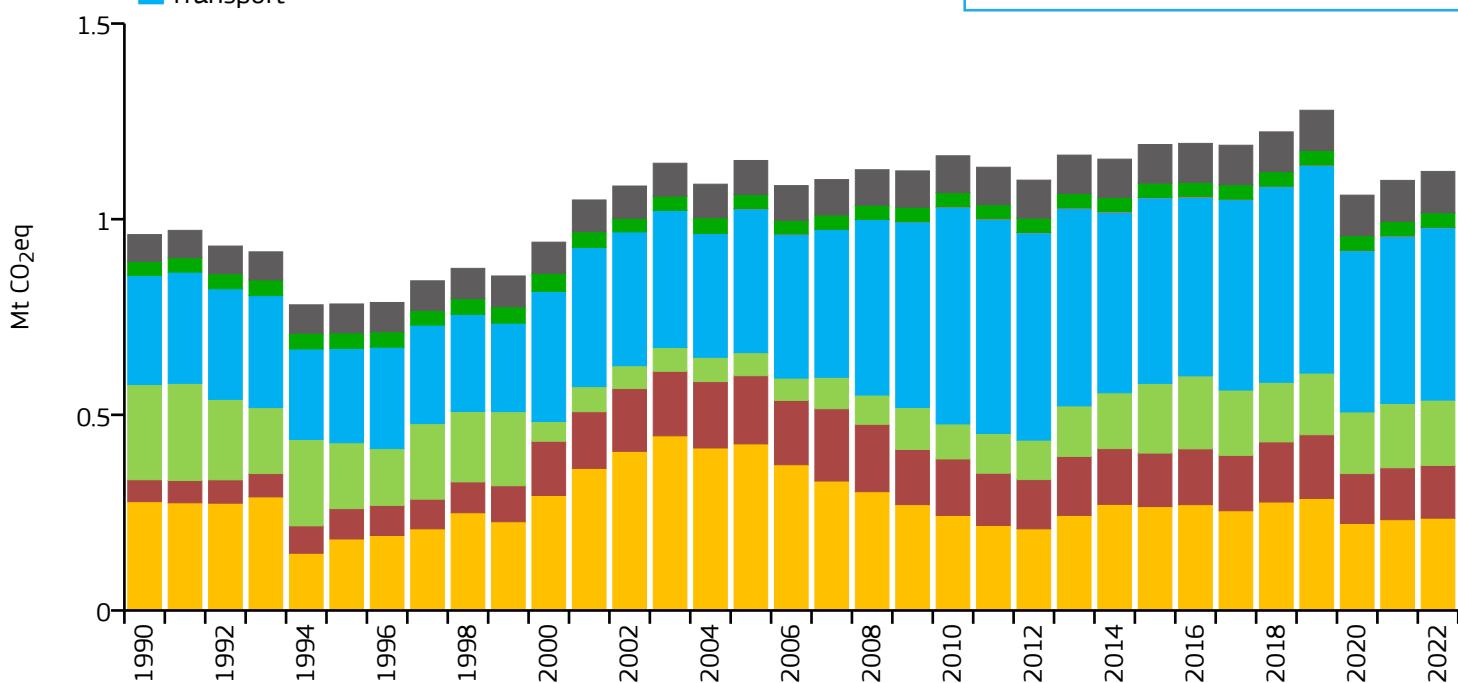
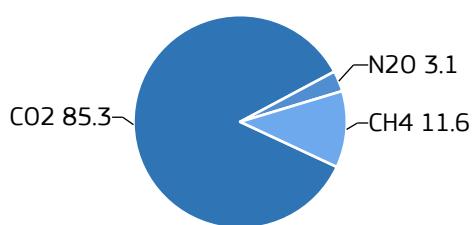


French Polynesia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1.122 | 3.817 | 0.203 | 294.000k |
| 2015 | 1.191 | 4.288 | 0.217 | 277.690k |
| 2005 | 1.150 | 4.512 | 0.199 | 254.886k |
| 1990 | 0.961 | 4.842 | 0.229 | 198.375k |

2022 vs 1990

2022 vs 2005

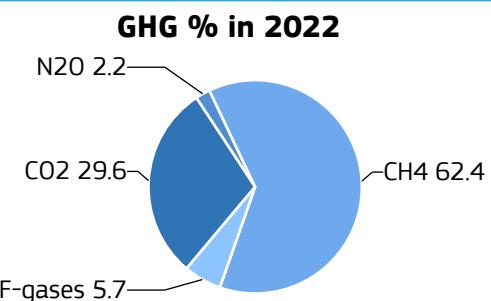
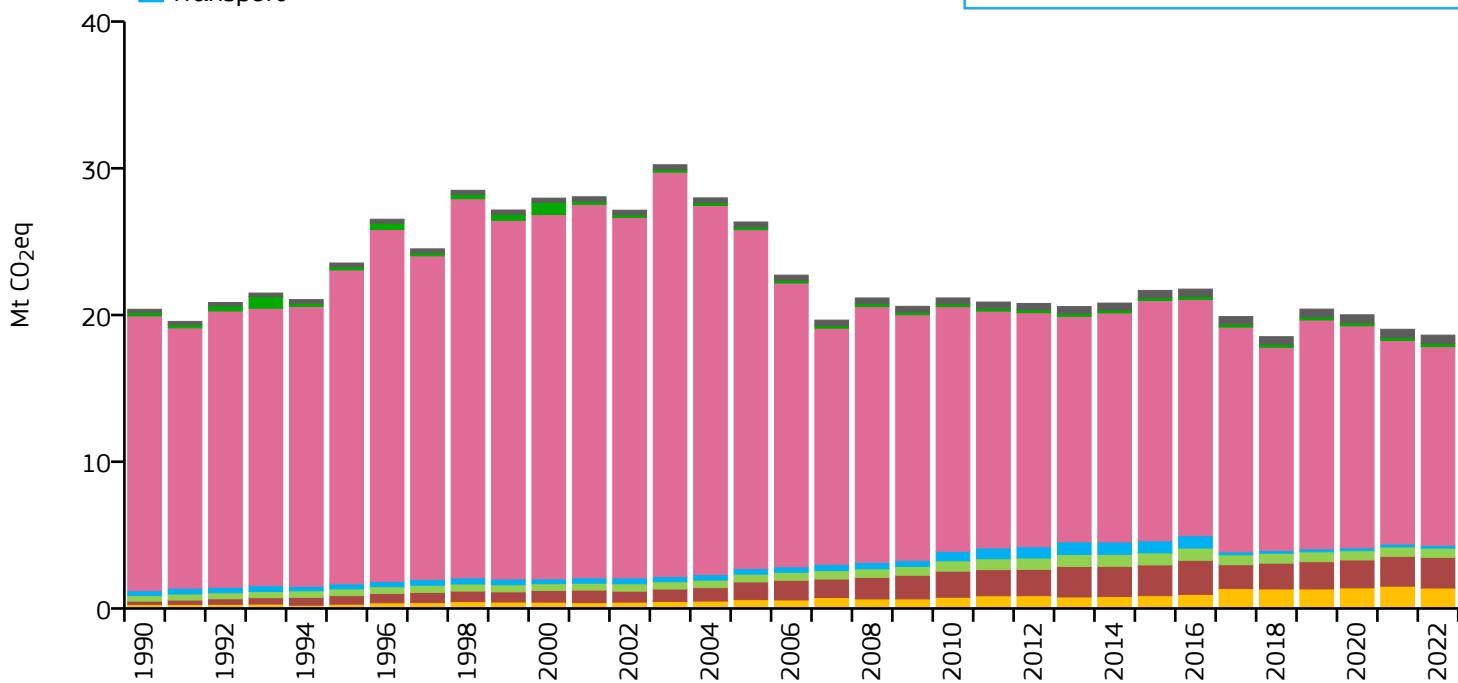
2022 vs 2021



Gabon

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 18.627 | 8.323 | 0.559 | 2.238M |
| 2015 | 21.676 | 11.230 | 0.718 | 1.930M |
| 2005 | 26.339 | 18.772 | 1.202 | 1.403M |
| 1990 | 20.391 | 21.415 | 1.181 | 952.212k |

2022 vs 1990

2022 vs 2005

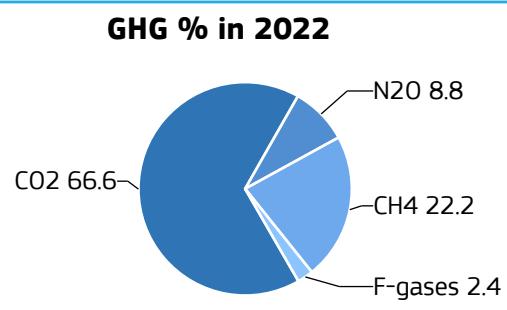
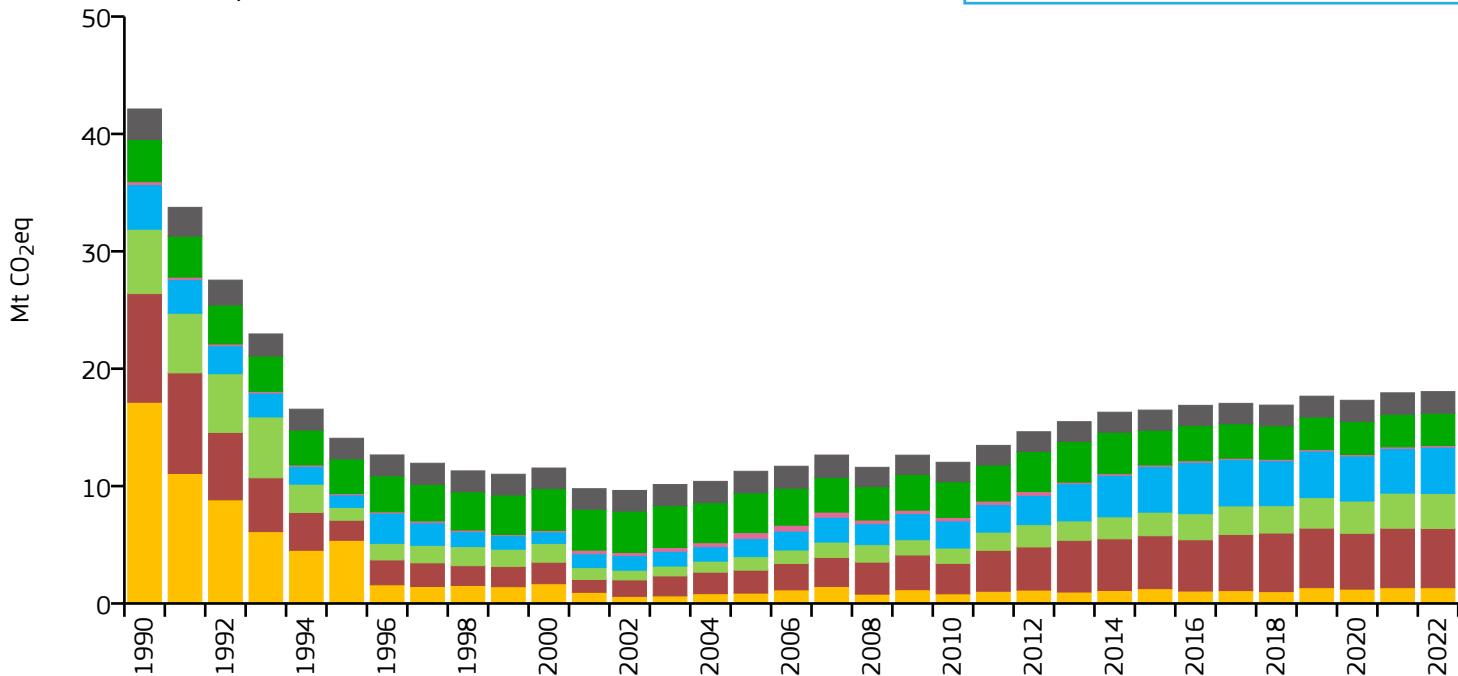
2022 vs 2021



Georgia

GHG emissions by sector

- | | |
|---|---|
|  |  |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 18.046 | 4.656 | 0.285 | 3.876M |
| 2015 | 16.472 | 4.169 | 0.351 | 3.952M |
| 2005 | 11.260 | 2.510 | 0.394 | 4.487M |
| 1990 | 42.124 | 7.786 | 0.788 | 5.410M |

2022 vs 1990

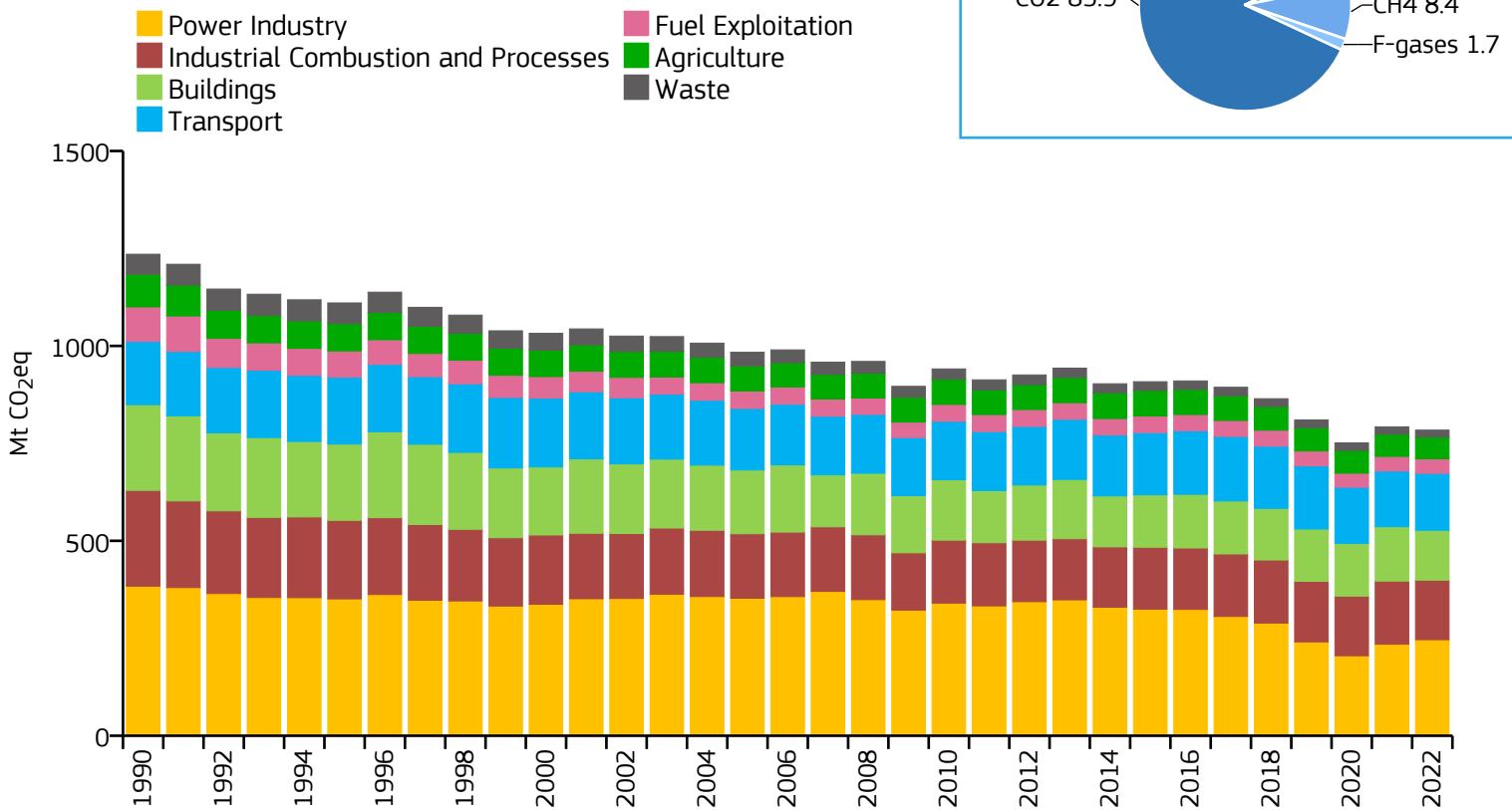
2022 vs 2005

2022 vs 2021



Germany

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 784.005 | 9.493 | 0.174 | 82.592M |
| 2015 | 908.132 | 11.114 | 0.217 | 81.708M |
| 2005 | 983.713 | 12.045 | 0.271 | 81.671M |
| 1990 | 1235.235 | 15.613 | 0.424 | 79.118M |

2022 vs 1990

2022 vs 2005

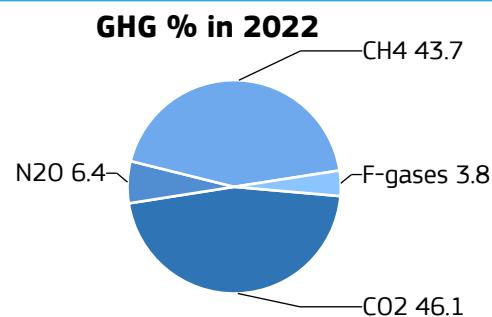
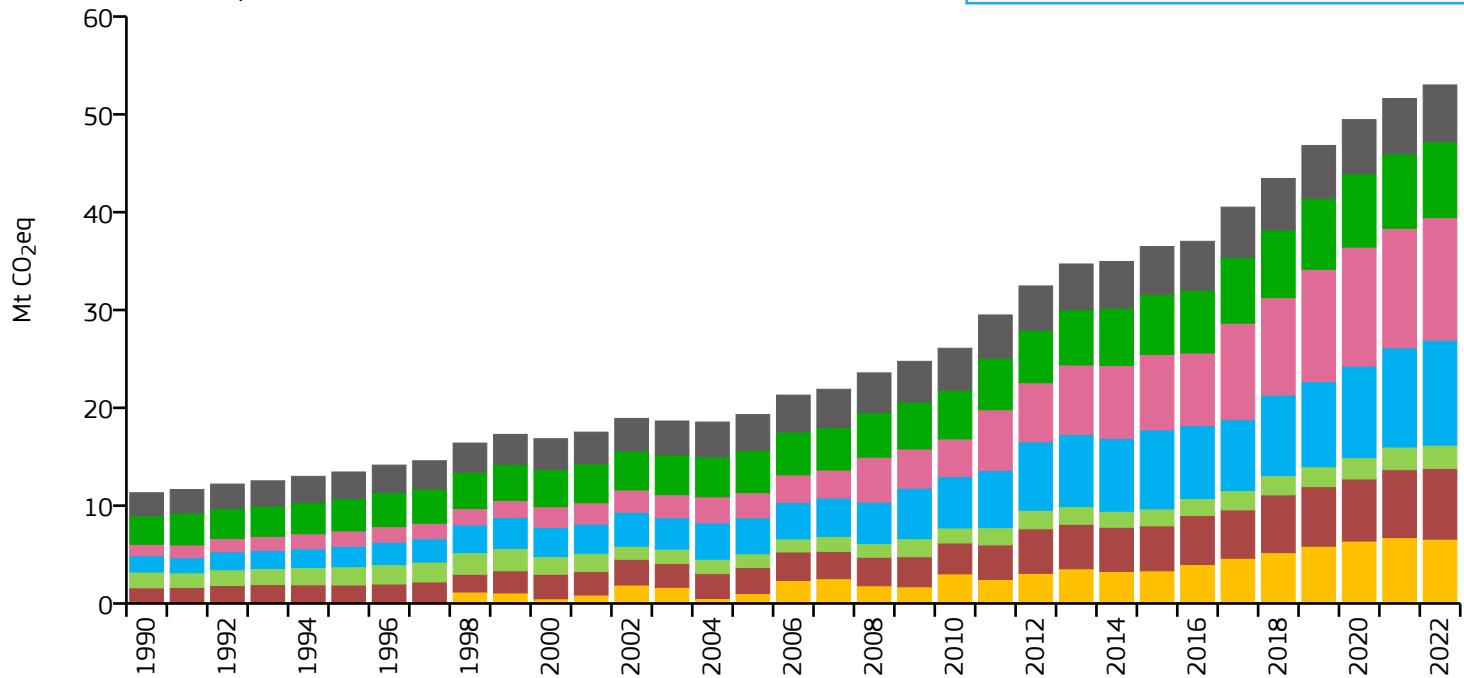
2022 vs 2021



Ghana

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 53.007 | 1.656 | 0.288 | 32.018M |
| 2015 | 36.492 | 1.323 | 0.274 | 27.583M |
| 2005 | 19.311 | 0.896 | 0.279 | 21.542M |
| 1990 | 11.319 | 0.774 | 0.319 | 14.628M |

2022 vs 1990

2022 vs 2005

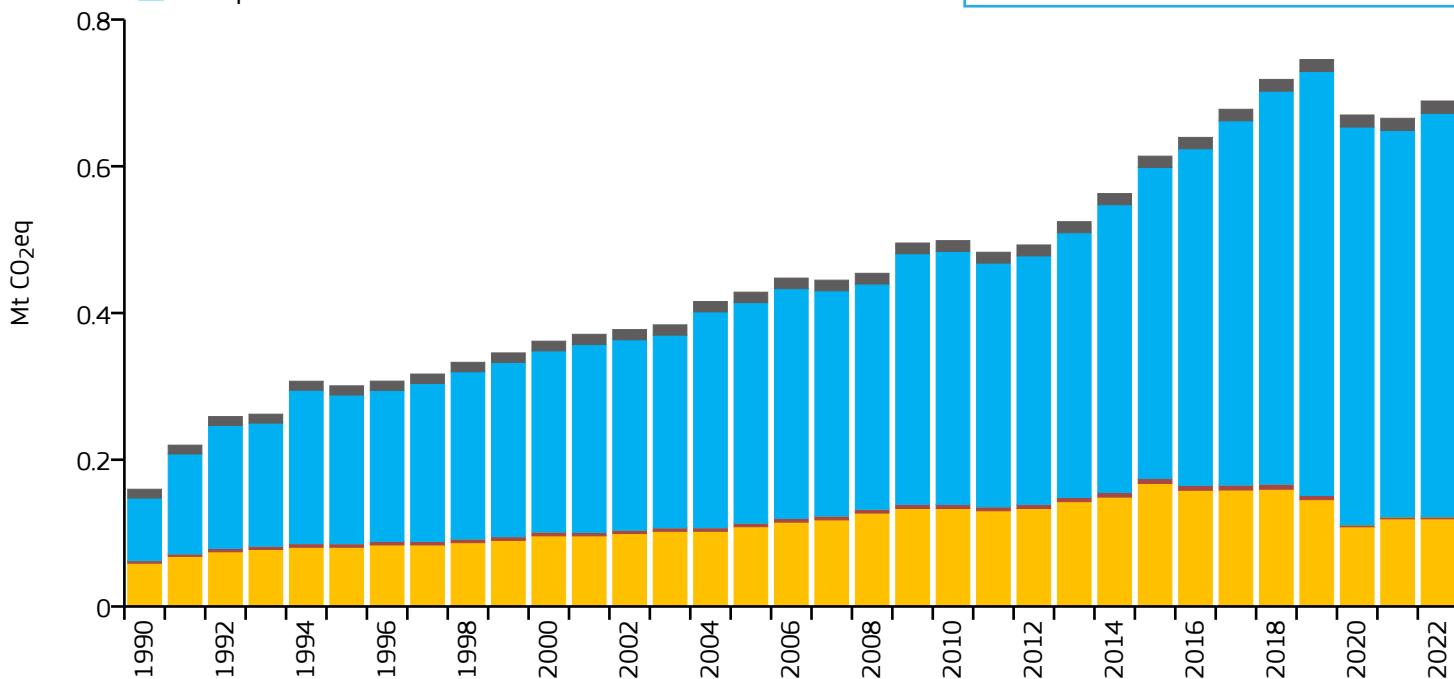
2022 vs 2021



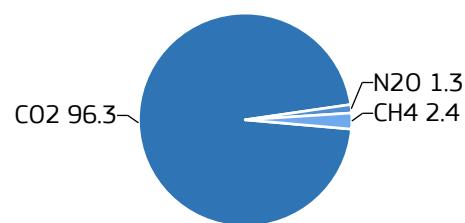
Gibraltar

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.689 | 19.685 | 0.235 | 35.000k |
| 2015 | 0.614 | 17.933 | 0.614 | 34.228k |
| 2005 | 0.428 | 13.352 | 0.576 | 32.085k |
| 1990 | 0.160 | 5.479 | 0.453 | 29.164k |

2022 vs 1990

2022 vs 2005

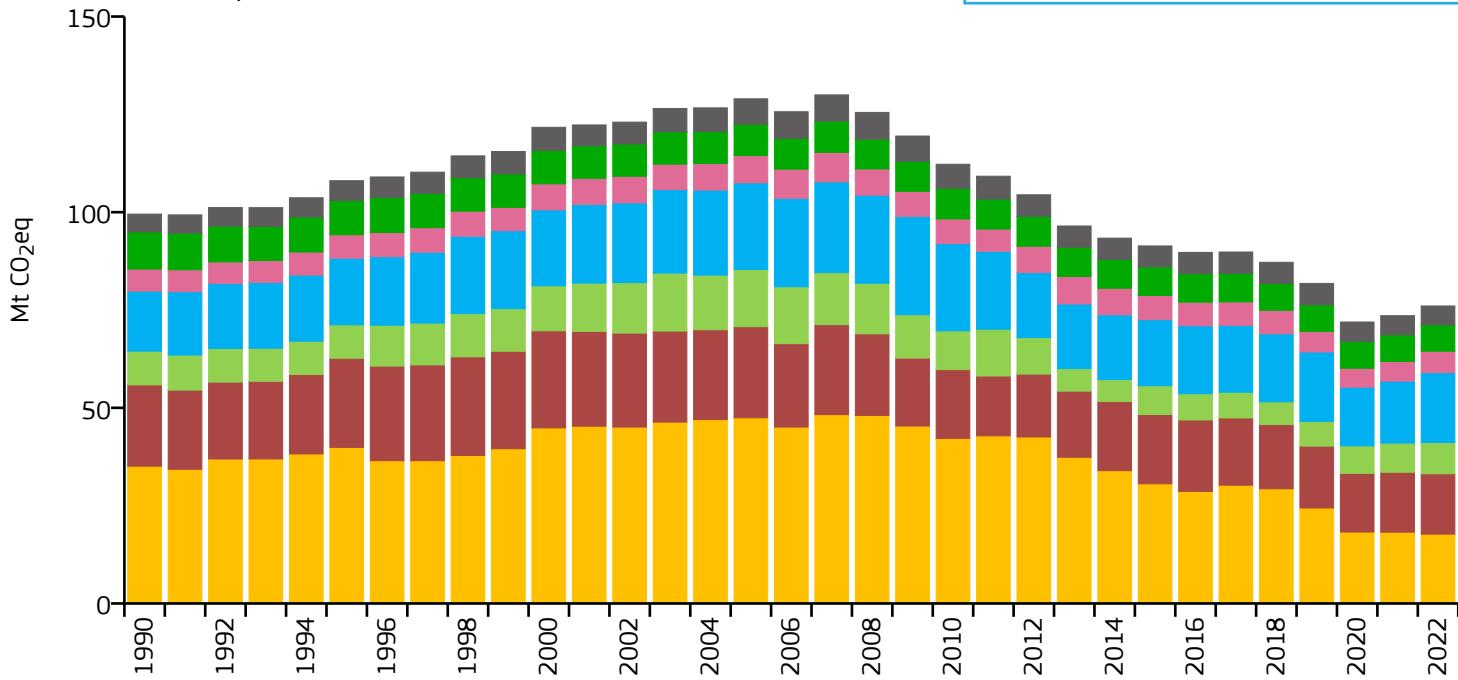
2022 vs 2021



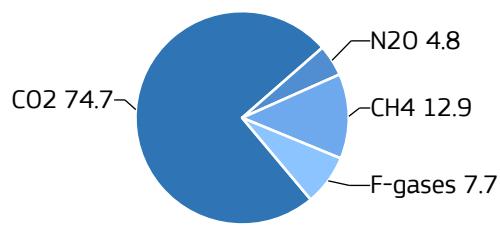
Greece

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 76.031 | 6.884 | 0.228 | 11.044M |
| 2015 | 91.374 | 8.145 | 0.299 | 11.218M |
| 2005 | 128.976 | 11.413 | 0.339 | 11.301M |
| 1990 | 99.514 | 9.710 | 0.402 | 10.248M |

2022 vs 1990

2022 vs 2005

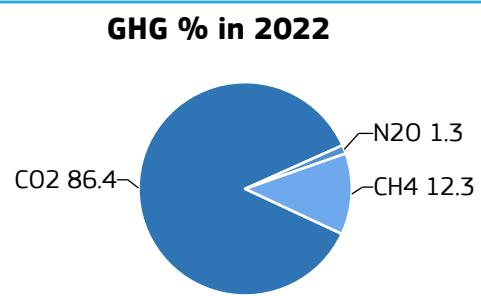
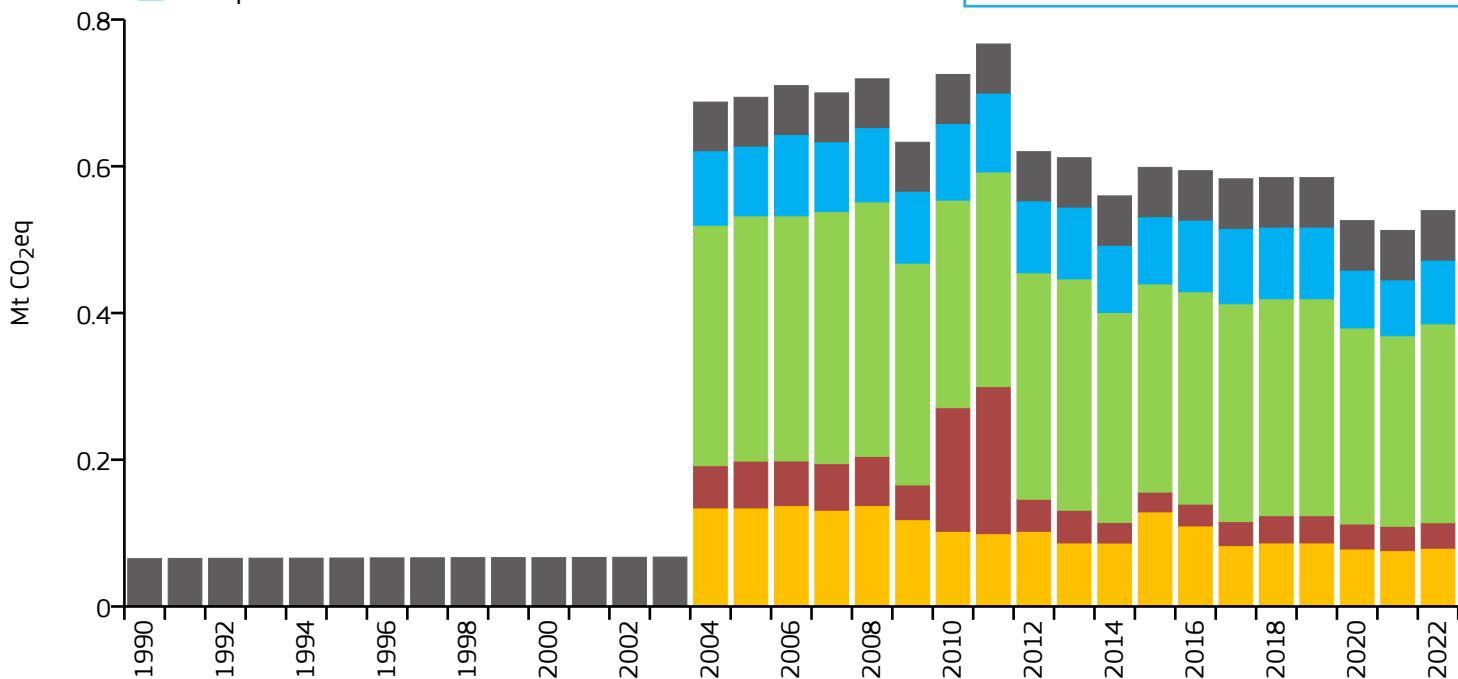
2022 vs 2021



Greenland

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.540 | 9.465 | 0.002 | 57.000k |
| 2015 | 0.599 | 10.617 | 0.002 | 56.377k |
| 2005 | 0.694 | 12.186 | 0.003 | 56.951k |
| 1990 | 0.065 | 1.173 | 0.000 | 55.604k |

2022 vs 1990

2022 vs 2005

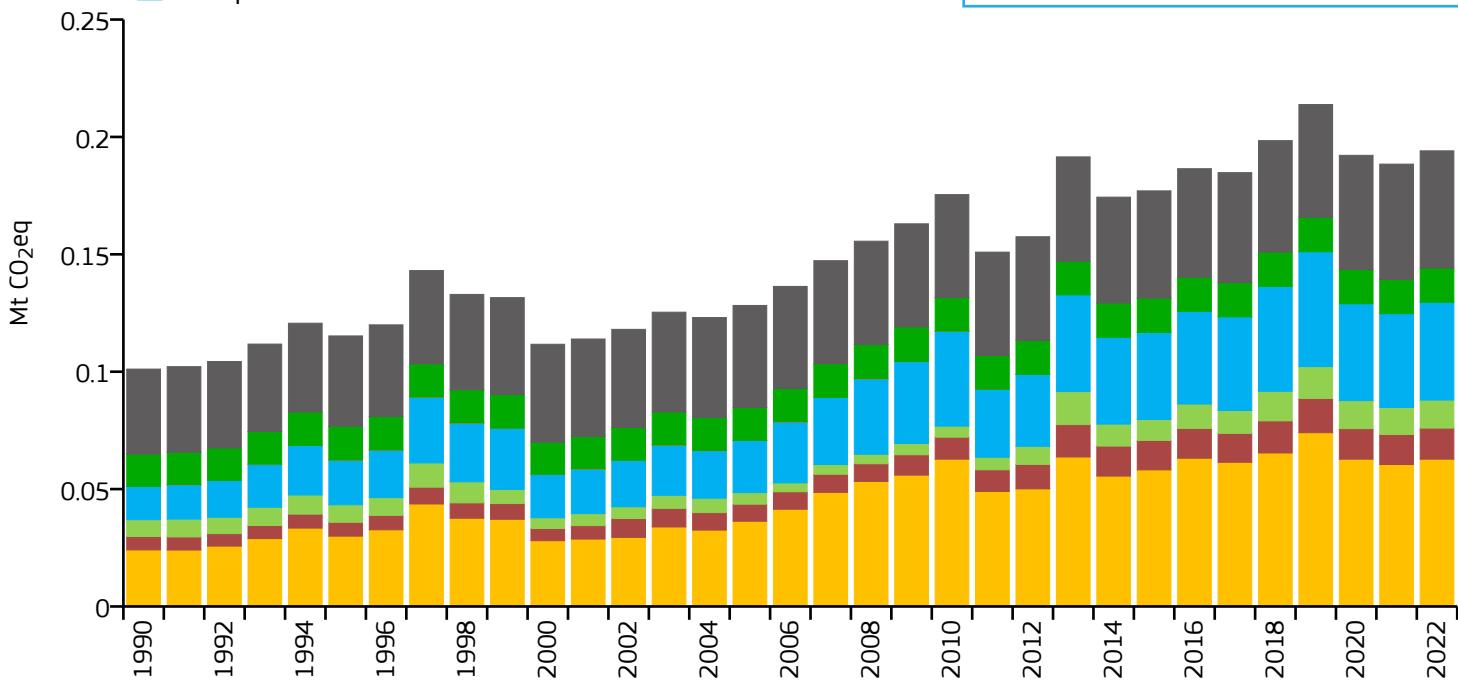
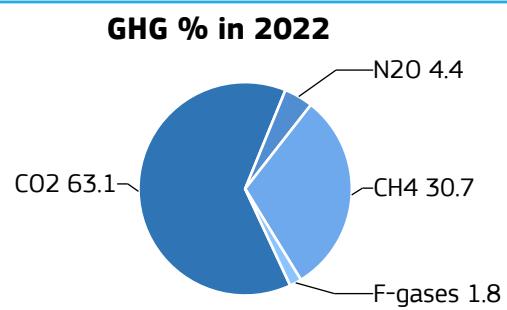
2022 vs 2021

| | | | | | | |
|--|-------------------------------------|-----|--|------|-----|------|
| | Power Industry | n/a | | -41% | | +4% |
| | Industrial Combustion and Processes | n/a | | -46% | | +4% |
| | Buildings | n/a | | -19% | | +4% |
| | Transport | n/a | | -9% | | +14% |
| | Fuel Exploitation | n/a | | | n/a | |
| | Agriculture | n/a | | | n/a | |
| | Waste | +5% | | +1% | | 0% |
| | All sectors | n/a | | -22% | | +5% |

Grenada

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.194 | 1.748 | 0.108 | 111.000k |
| 2015 | 0.177 | 1.657 | 0.107 | 106.823k |
| 2005 | 0.128 | 1.245 | 0.086 | 102.949k |
| 1990 | 0.101 | 1.050 | 0.119 | 96.283k |

2022 vs 1990

2022 vs 2005

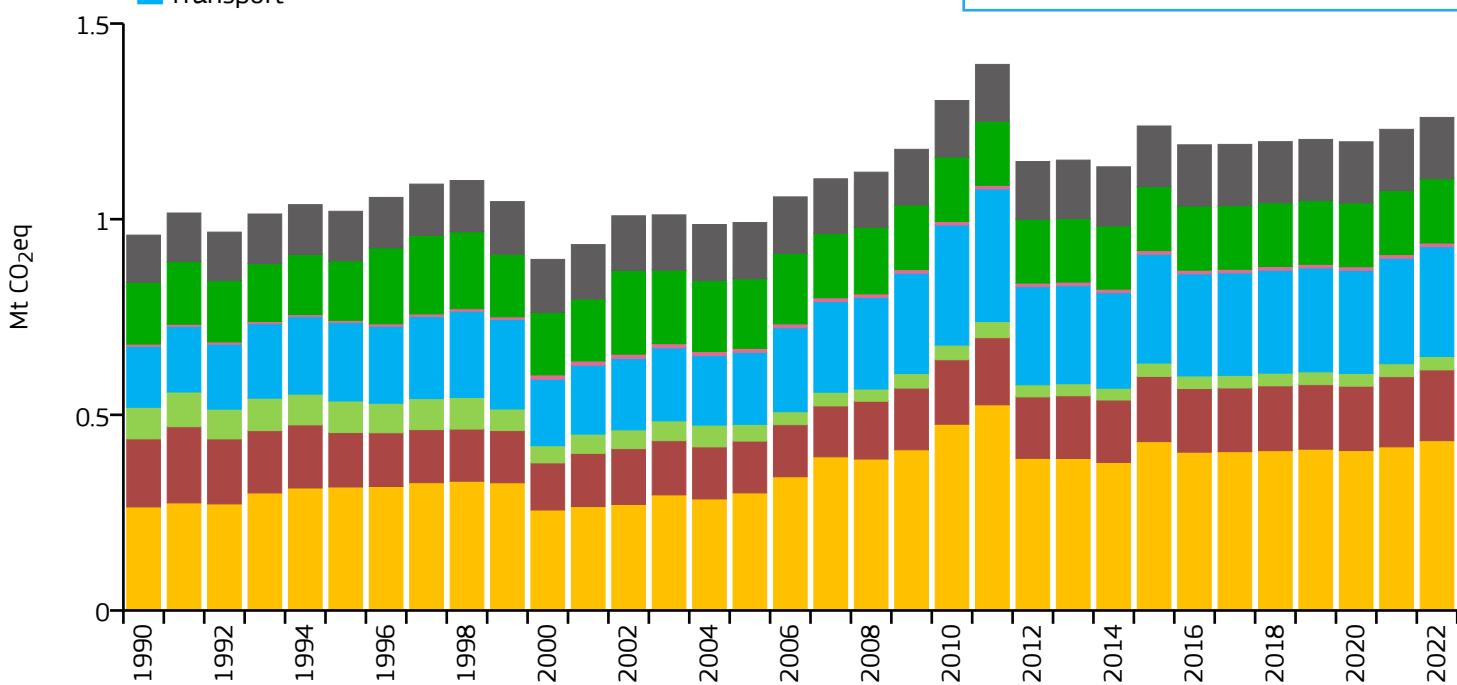
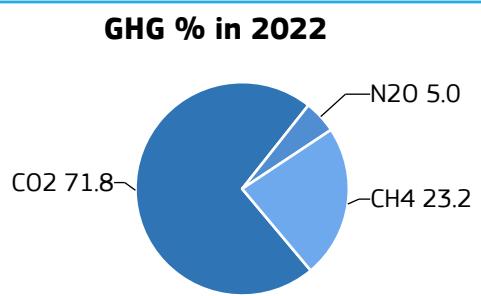
2022 vs 2021



Guadeloupe

GHG emissions by sector

- | | |
|---|---|
| ■ Power Industry ■ Industrial Combustion and Processes ■ Buildings ■ Transport | ■ Fuel Exploitation ■ Agriculture ■ Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1.260 | 2.813 | n/a | 448.000k |
| 2015 | 1.238 | 2.749 | n/a | 450.418k |
| 2005 | 0.991 | 2.256 | n/a | 439.552k |
| 1990 | 0.959 | 2.486 | n/a | 385.878k |

2022 vs 1990

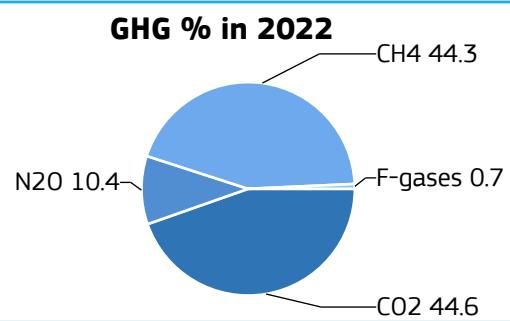
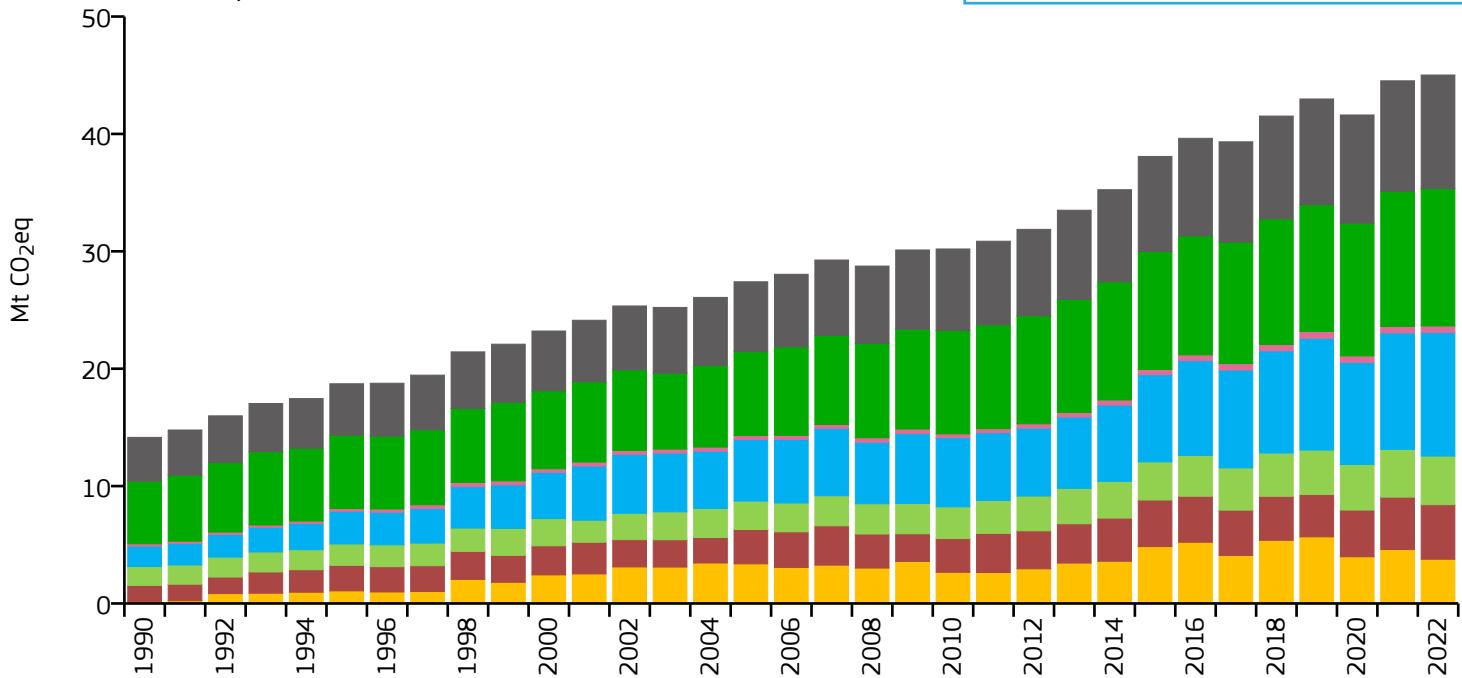
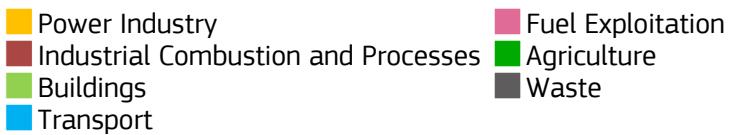
2022 vs 2005

2022 vs 2021



Guatemala

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 45.018 | 2.423 | 0.283 | 18.577M |
| 2015 | 38.083 | 2.343 | 0.301 | 16.252M |
| 2005 | 27.403 | 2.092 | 0.313 | 13.096M |
| 1990 | 14.151 | 1.528 | 0.281 | 9.264M |

2022 vs 1990

2022 vs 2005

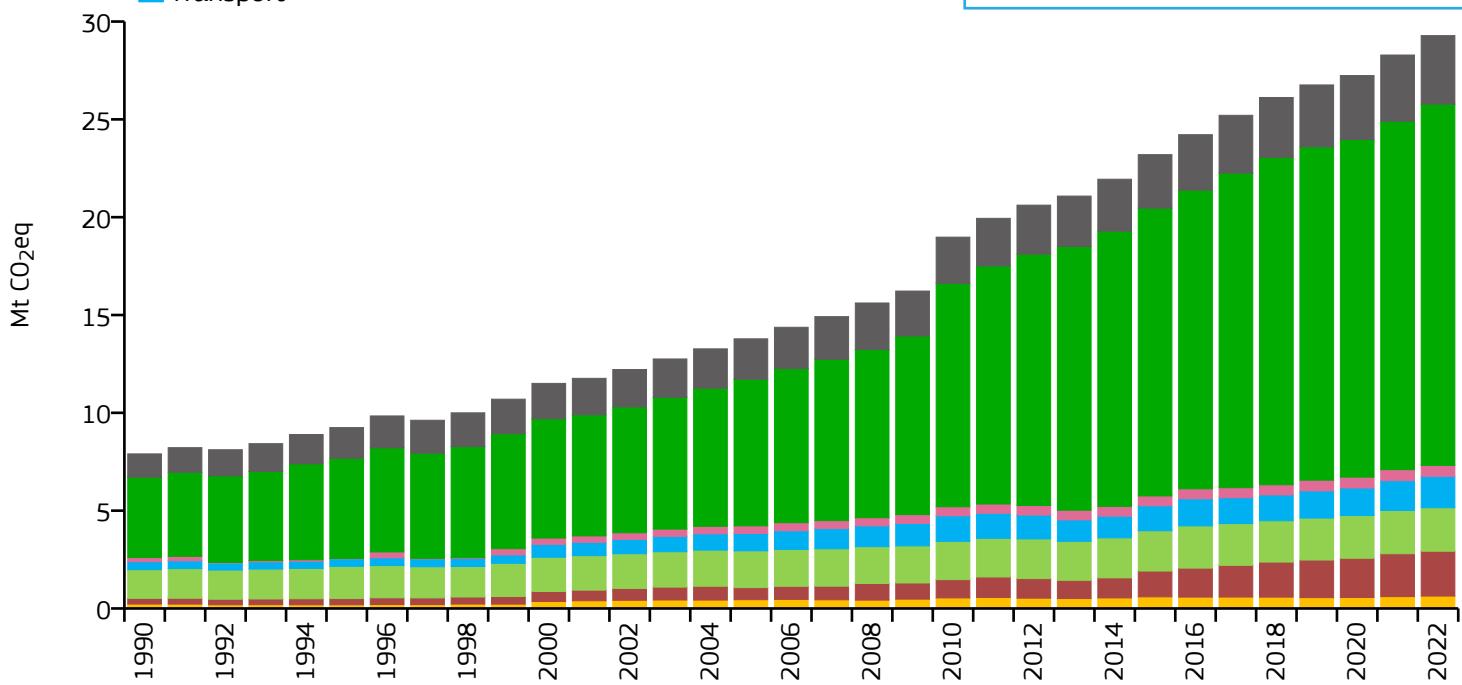
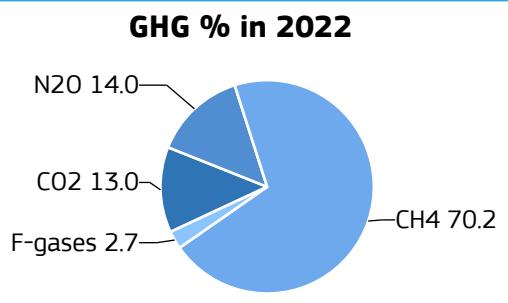
2022 vs 2021



Guinea

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 29.280 | 2.023 | 0.783 | 14.475M |
| 2015 | 23.197 | 1.918 | 0.972 | 12.091M |
| 2005 | 13.781 | 1.424 | 0.843 | 9.680M |
| 1990 | 7.901 | 1.308 | 0.825 | 6.041M |

2022 vs 1990

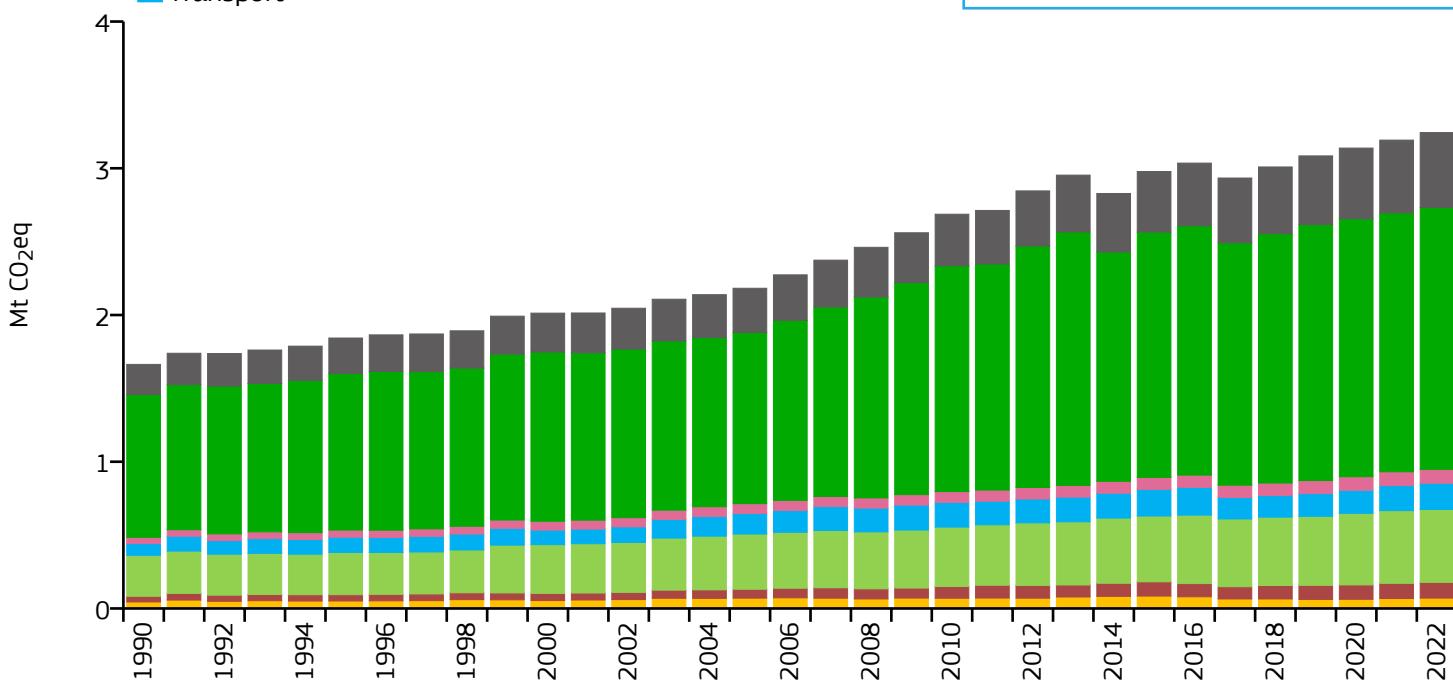
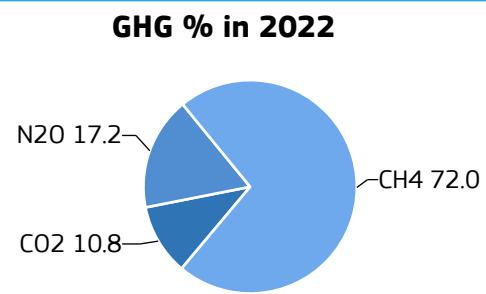
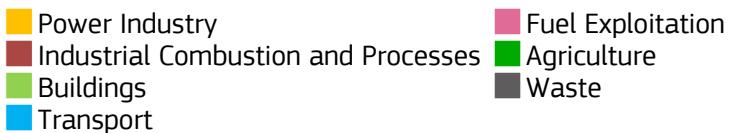
2022 vs 2005

2022 vs 2021



Guinea-Bissau

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 3.243 | 1.547 | 0.830 | 2.096M |
| 2015 | 2.978 | 1.682 | 0.952 | 1.771M |
| 2005 | 2.182 | 1.580 | 0.967 | 1.381M |
| 1990 | 1.663 | 1.643 | 0.855 | 1.012M |

2022 vs 1990

2022 vs 2005

2022 vs 2021

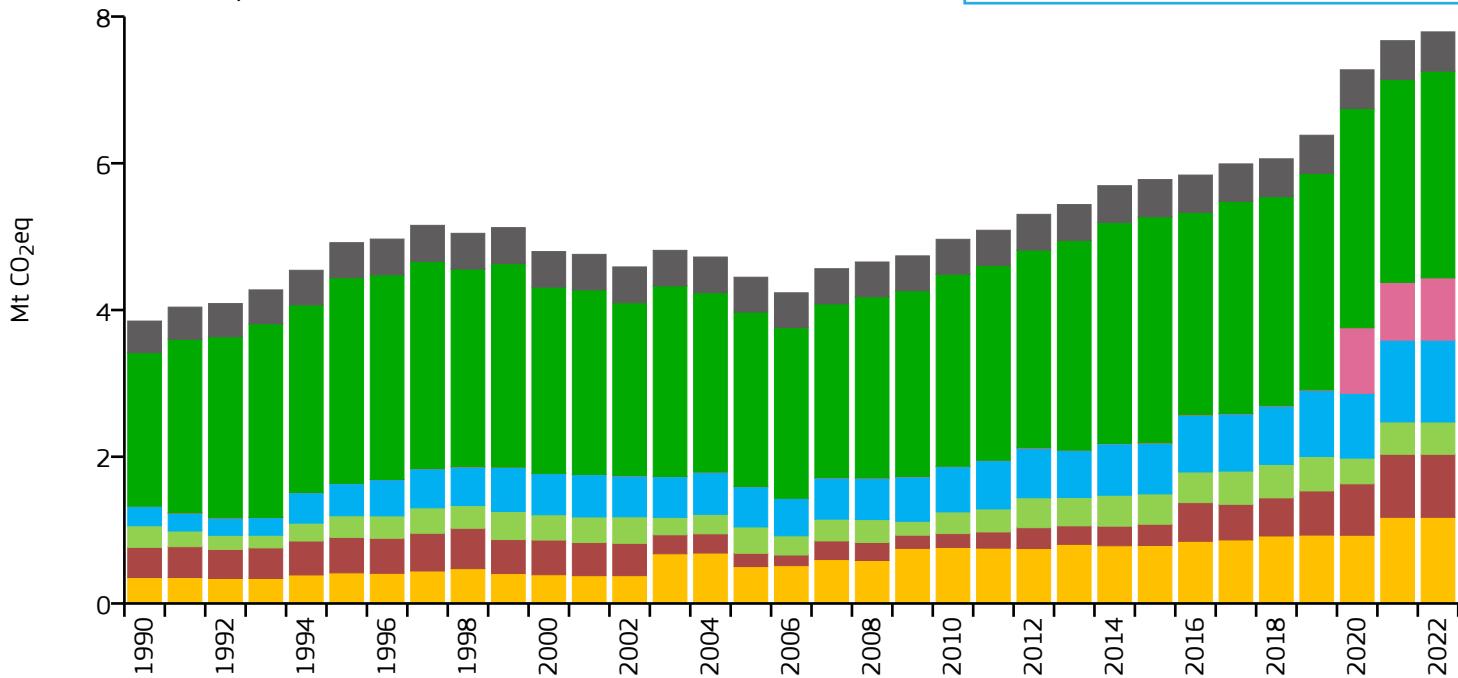
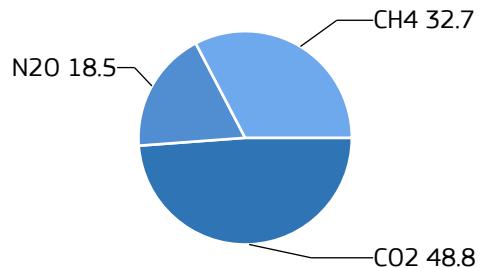


Guyana

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 7.791 | 9.751 | 0.280 | 799.000k |
| 2015 | 5.778 | 7.518 | 0.669 | 768.514k |
| 2005 | 4.447 | 5.922 | 0.748 | 750.946k |
| 1990 | 3.849 | 5.178 | 1.069 | 743.309k |

2022 vs 1990

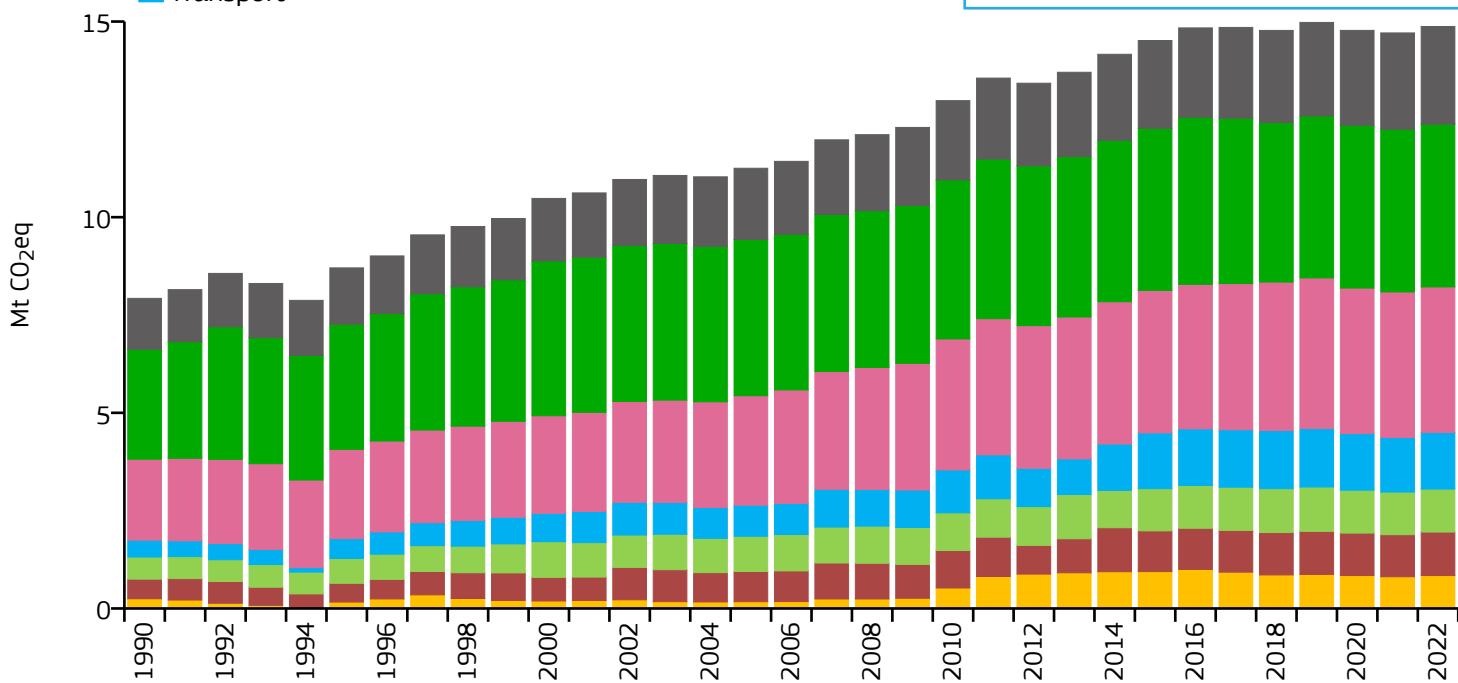
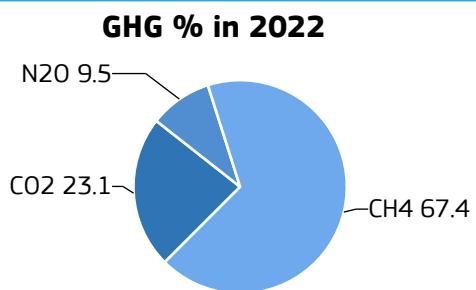
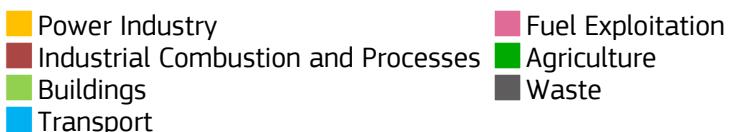
2022 vs 2005

2022 vs 2021



Haiti

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 14.874 | 1.280 | 0.459 | 11.623M |
| 2015 | 14.516 | 1.355 | 0.436 | 10.711M |
| 2005 | 11.251 | 1.215 | 0.424 | 9.263M |
| 1990 | 7.925 | 1.116 | 0.317 | 7.100M |

2022 vs 1990

2022 vs 2005

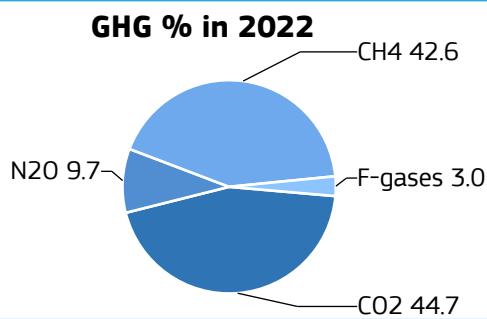
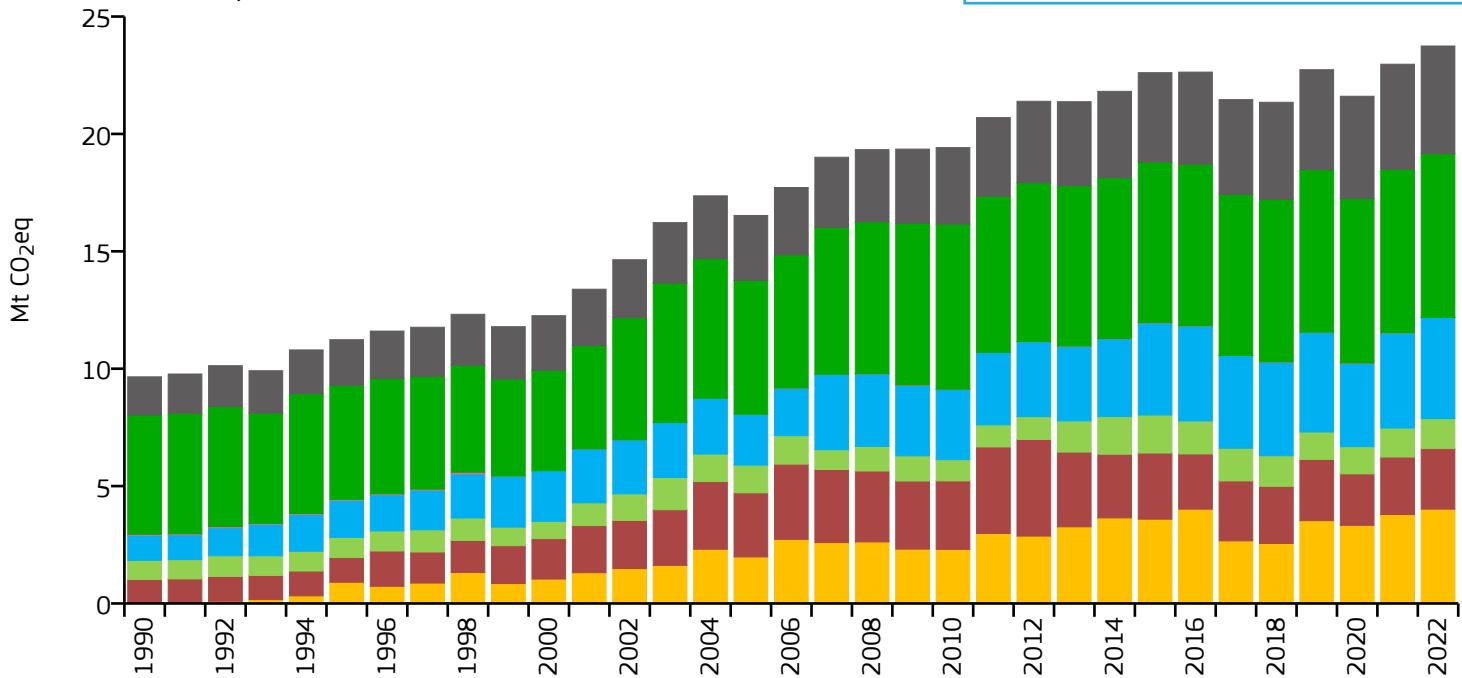
2022 vs 2021



Honduras

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 23.745 | 2.370 | 0.399 | 10.017M |
| 2015 | 22.609 | 2.523 | 0.470 | 8.961M |
| 2005 | 16.526 | 2.241 | 0.487 | 7.373M |
| 1990 | 9.653 | 1.948 | 0.488 | 4.955M |

2022 vs 1990

2022 vs 2005

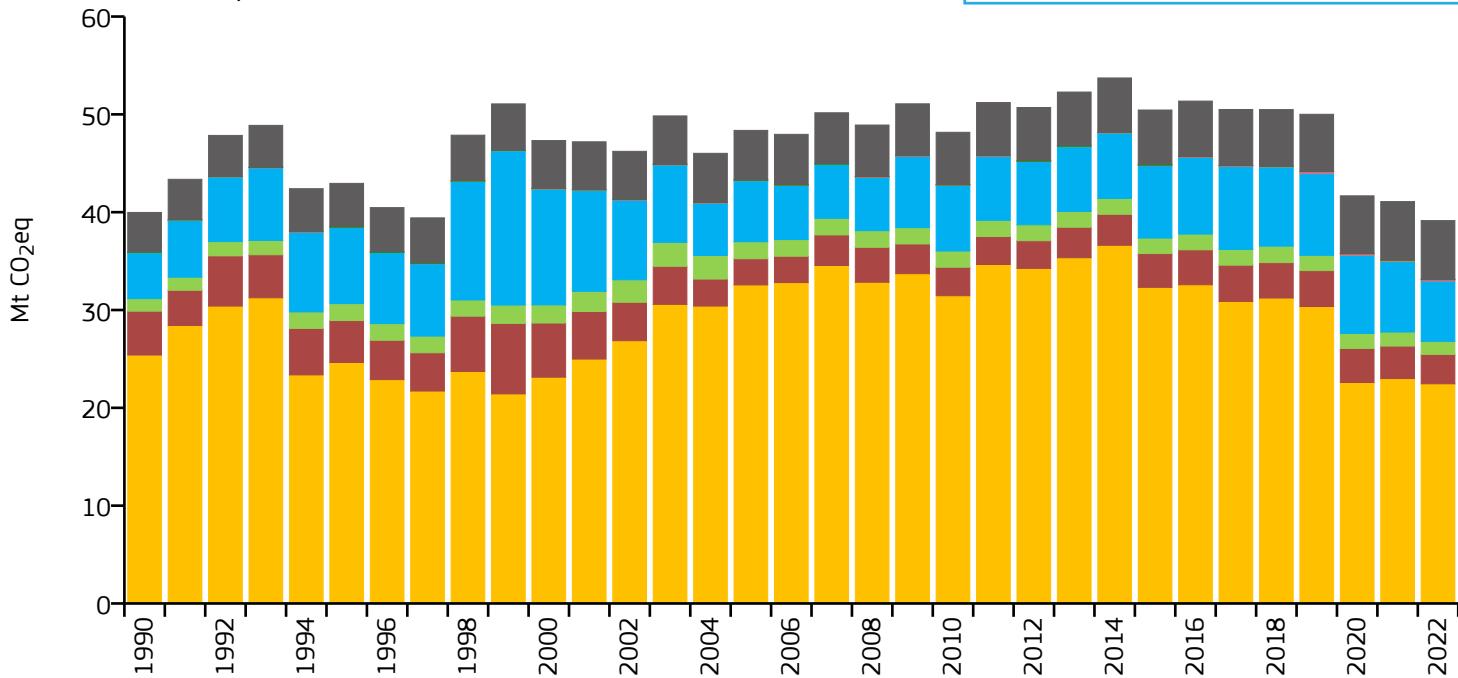
2022 vs 2021



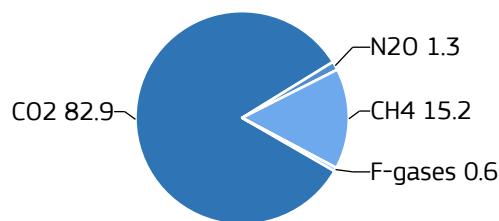
Hong Kong

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 39.140 | 5.121 | 0.091 | 7.643M |
| 2015 | 50.444 | 6.962 | 0.121 | 7.246M |
| 2005 | 48.364 | 7.083 | 0.162 | 6.828M |
| 1990 | 39.974 | 6.914 | 0.243 | 5.781M |

2022 vs 1990

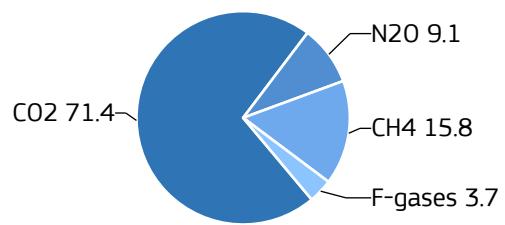
2022 vs 2005

2022 vs 2021



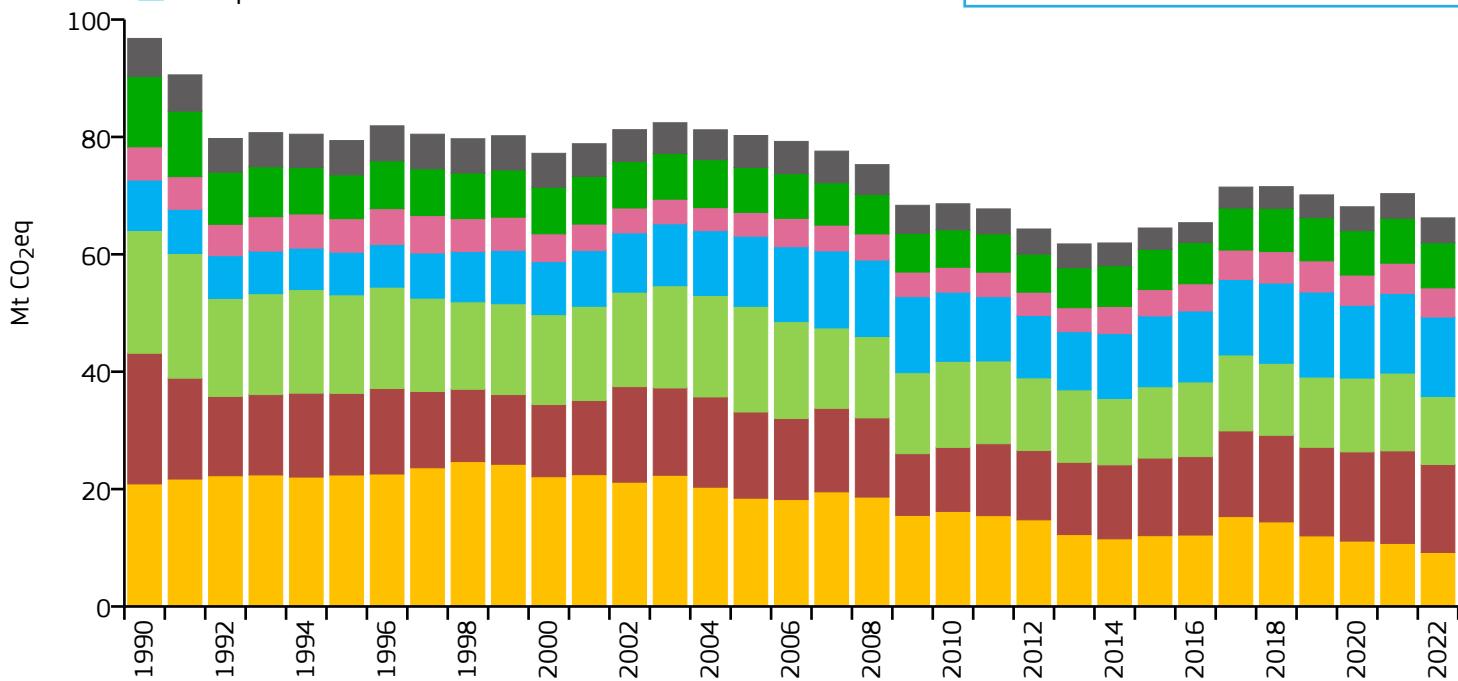
Hungary

GHG % in 2022



GHG emissions by sector

- | |
|---|
| Yellow: Power Industry Brown: Industrial Combustion and Processes Green: Buildings Blue: Transport Pink: Fuel Exploitation Dark Gray: Agriculture Gray: Waste |
|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 66.208 | 6.932 | 0.194 | 9.551M |
| 2015 | 64.482 | 6.591 | 0.238 | 9.784M |
| 2005 | 80.244 | 7.956 | 0.326 | 10.086M |
| 1990 | 96.781 | 9.326 | 0.491 | 10.378M |

2022 vs 1990

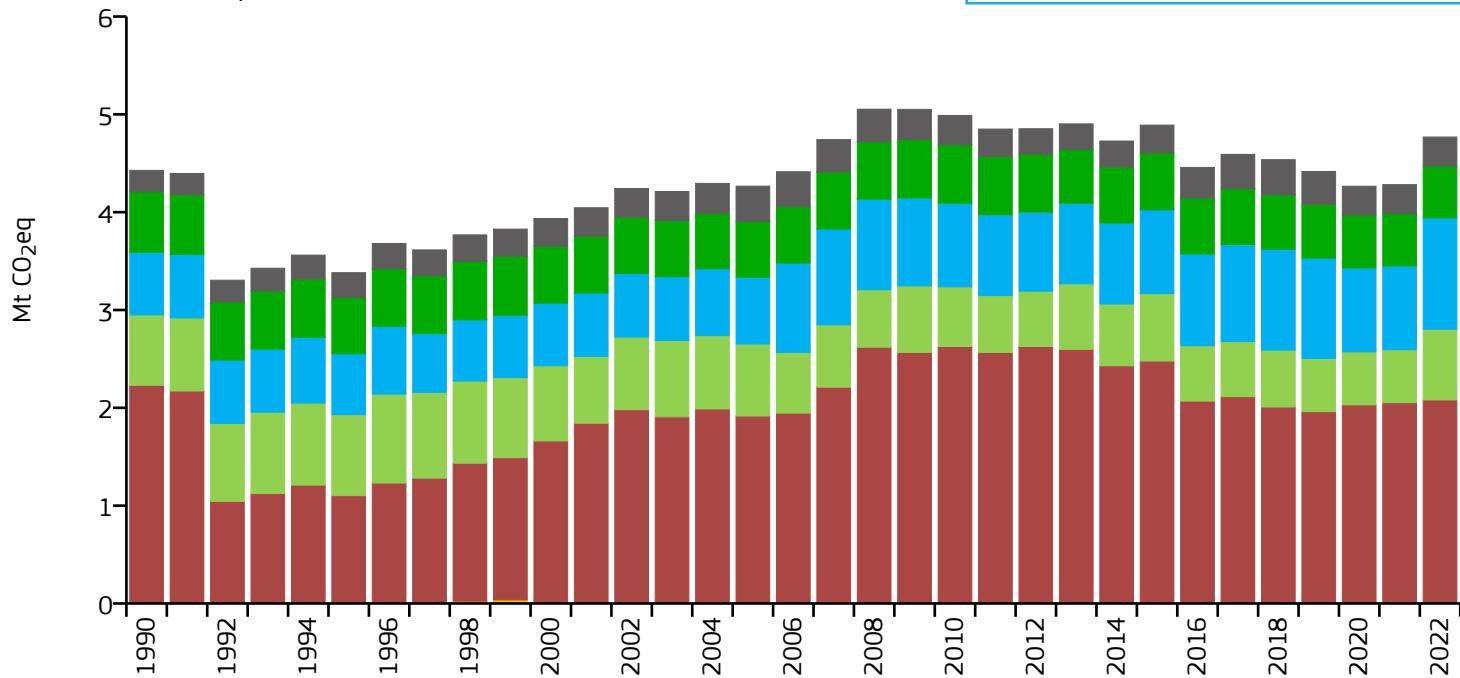
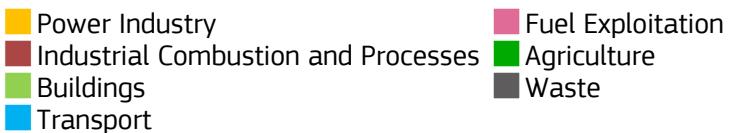
2022 vs 2005

2022 vs 2021

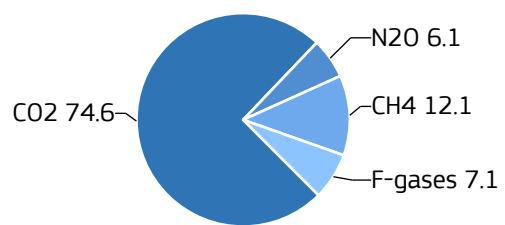


Iceland

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 4.768 | 13.702 | 0.227 | 348.000k |
| 2015 | 4.890 | 14.807 | 0.283 | 330.243k |
| 2005 | 4.266 | 14.464 | 0.299 | 294.979k |
| 1990 | 4.428 | 17.360 | 0.500 | 255.043k |

2022 vs 1990

Power Industry: -25%

Industrial Combustion and Processes: -7%

Buildings: 0%

Transport: +78%

Fuel Exploitation: n/a

Agriculture: -14%

Waste: +36%

All sectors: +8%

2022 vs 2005

Power Industry: -64%

Industrial Combustion and Processes: +9%

Buildings: -2%

Transport: +67%

Fuel Exploitation: n/a

Agriculture: -7%

Waste: -18%

All sectors: +12%

2022 vs 2021

Power Industry: +33%

Industrial Combustion and Processes: +1%

Buildings: +33%

Transport: +33%

Fuel Exploitation: n/a

Agriculture: -1%

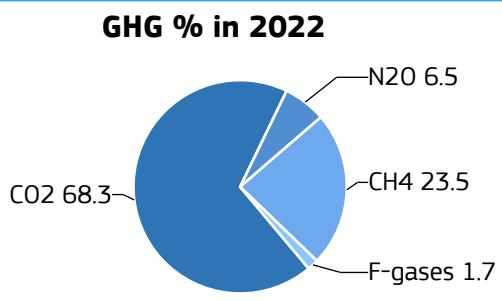
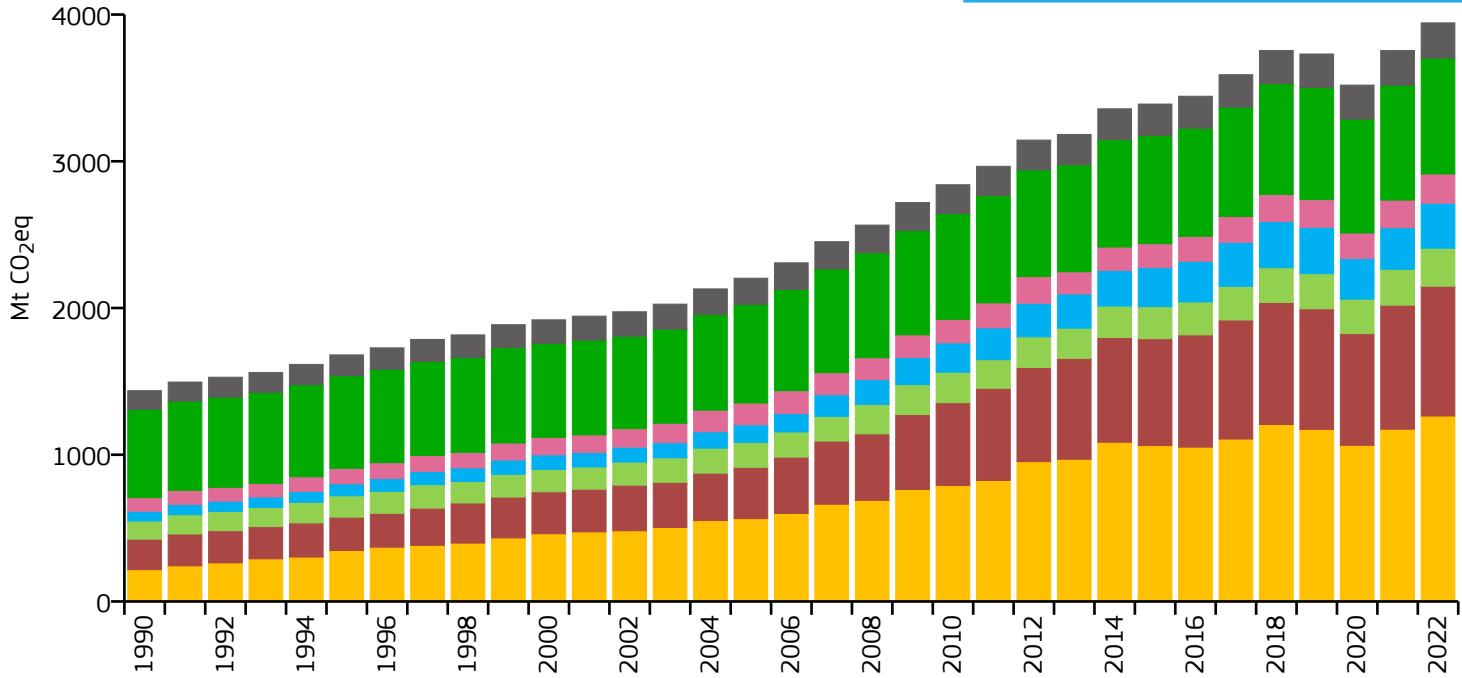
Waste: +1%

All sectors: +11%

India

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 3943.265 | 2.794 | 0.392 | 1.411G |
| 2015 | 3389.882 | 2.590 | 0.474 | 1.309G |
| 2005 | 2203.100 | 1.926 | 0.592 | 1.144G |
| 1990 | 1436.581 | 1.651 | 0.907 | 870.133M |

2022 vs 1990

2022 vs 2005

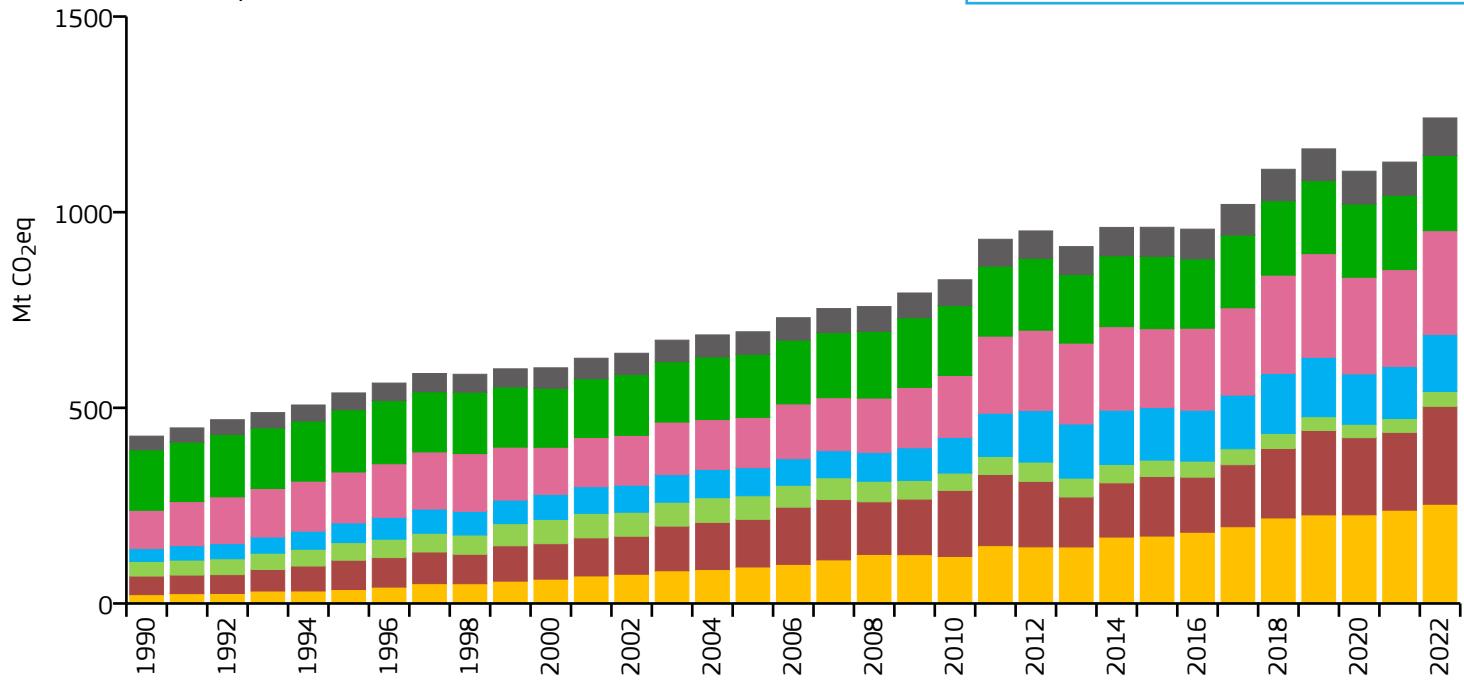
2022 vs 2021



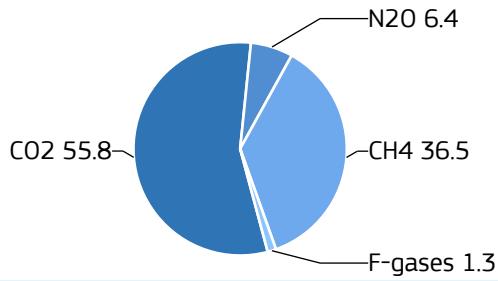
Indonesia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1240.833 | 4.473 | 0.363 | 277.425M |
| 2015 | 961.407 | 3.724 | 0.367 | 258.162M |
| 2005 | 694.314 | 3.063 | 0.458 | 226.713M |
| 1990 | 427.655 | 2.357 | 0.519 | 181.437M |

2022 vs 1990

2022 vs 2005

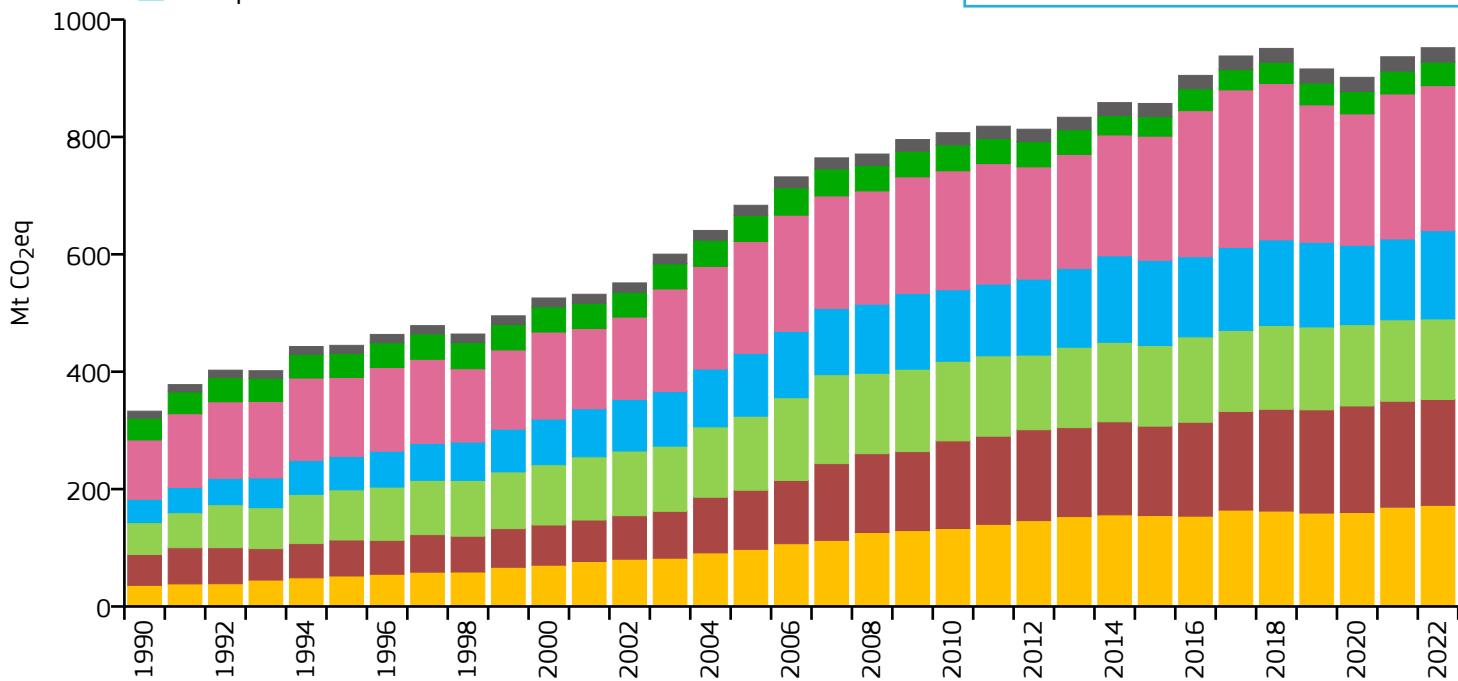
2022 vs 2021



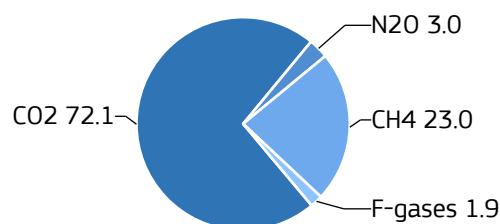
Iran

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 951.984 | 11.202 | 0.702 | 84.982M |
| 2015 | 857.022 | 10.799 | 0.748 | 79.361M |
| 2005 | 683.557 | 9.707 | 0.731 | 70.422M |
| 1990 | 332.763 | 5.918 | 0.632 | 56.226M |

2022 vs 1990

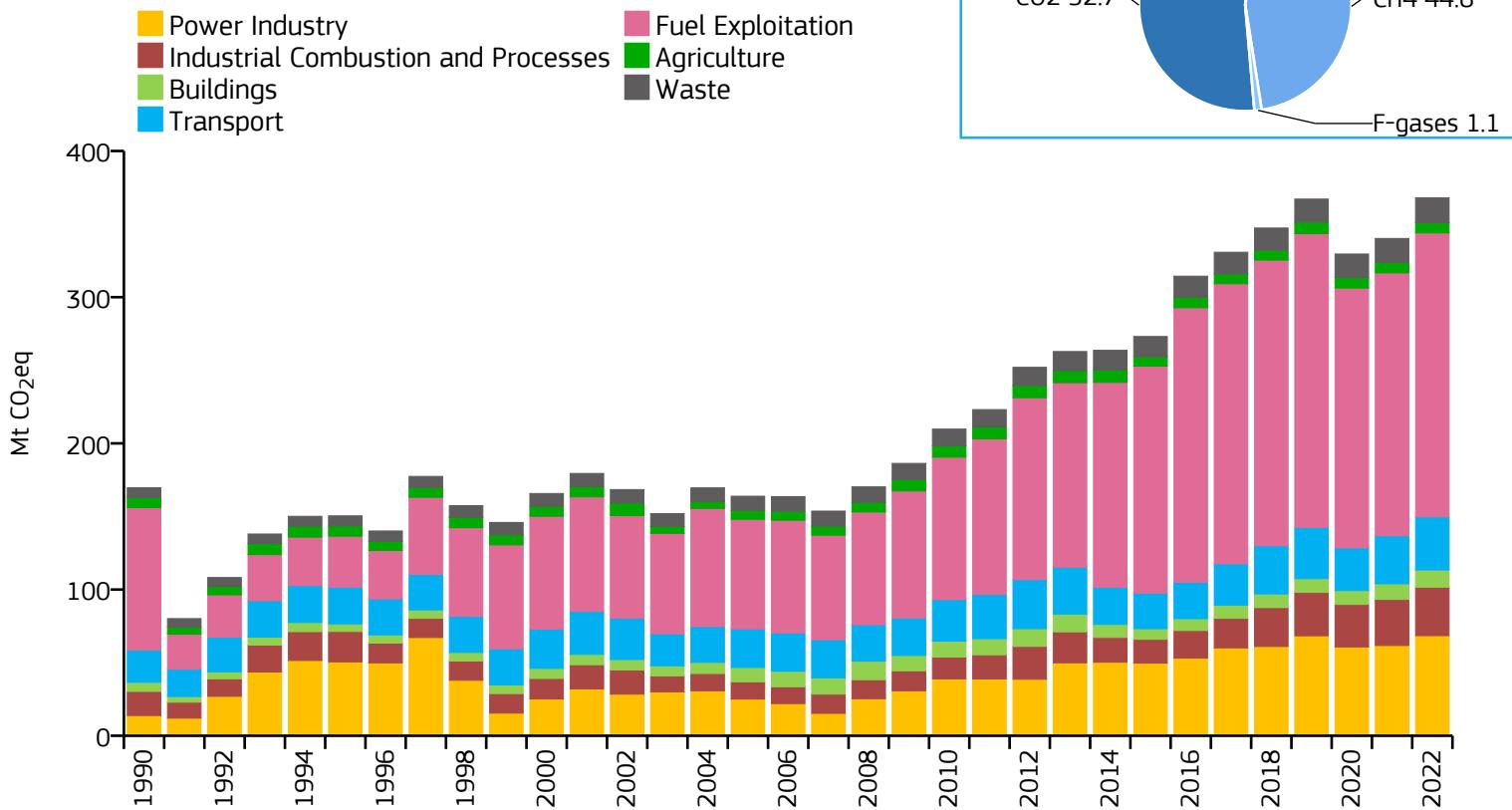
2022 vs 2005

2022 vs 2021

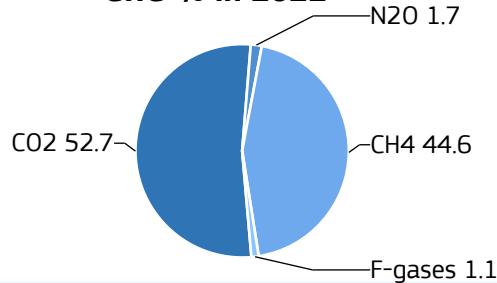


Iraq

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO2eq/yr | GHG emissions per capita t CO2eq/cap/yr | GHG emissions per unit of GDP PPP t CO2eq/kUSD/yr | Population |
|------|------------------------------|--|--|------------|
| 2022 | 367.941 | 8.413 | 0.899 | 43.736M |
| 2015 | 273.106 | 7.562 | 0.772 | 36.116M |
| 2005 | 163.849 | 6.067 | 0.821 | 27.008M |
| 1990 | 169.632 | 9.710 | 1.289 | 17.469M |

2022 vs 1990

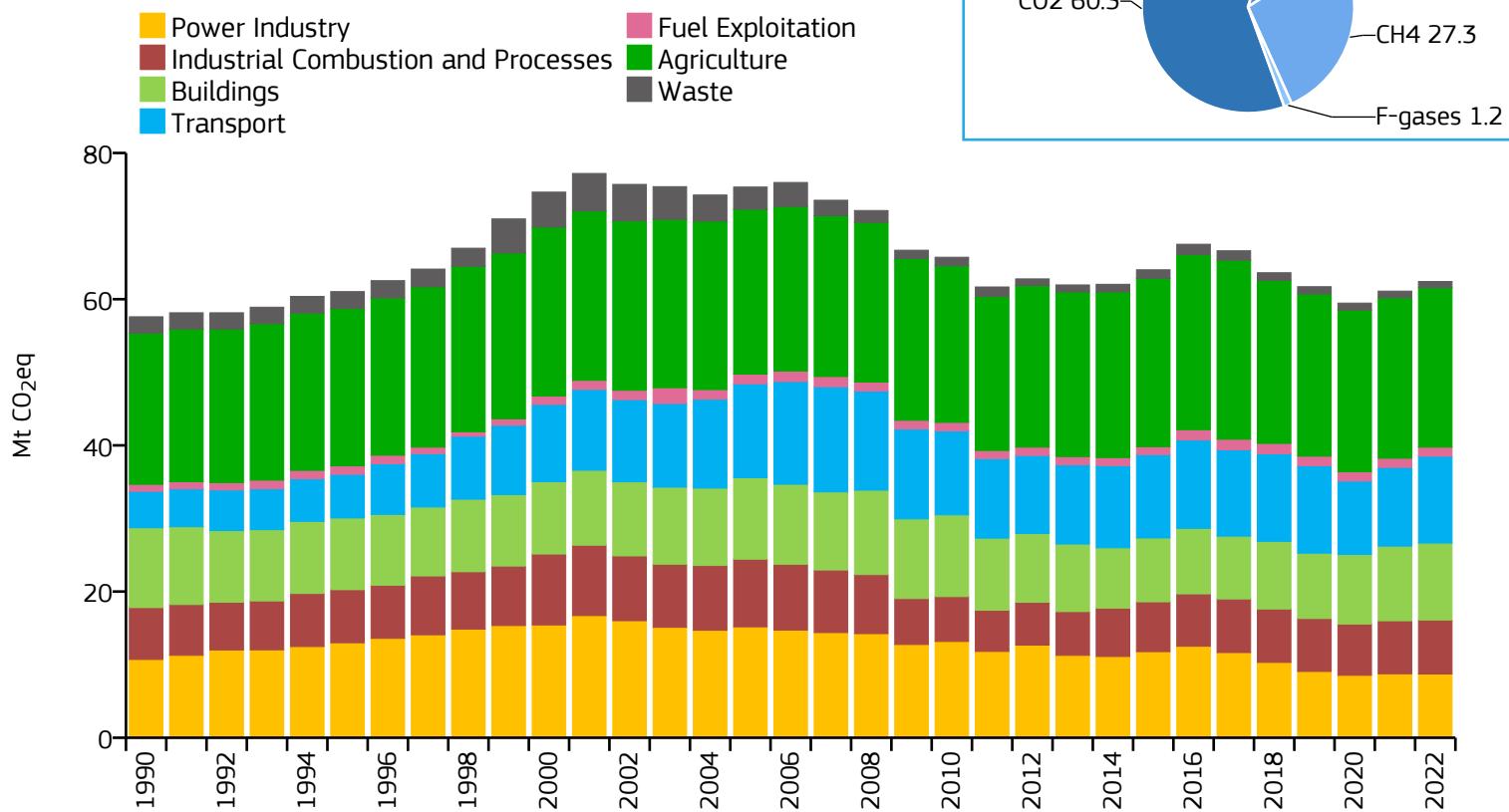
2022 vs 2005

2022 vs 2021

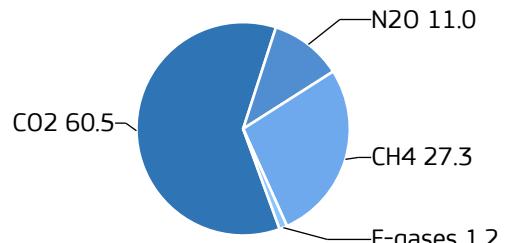


Ireland

GHG emissions by sector



GHG % in 2022

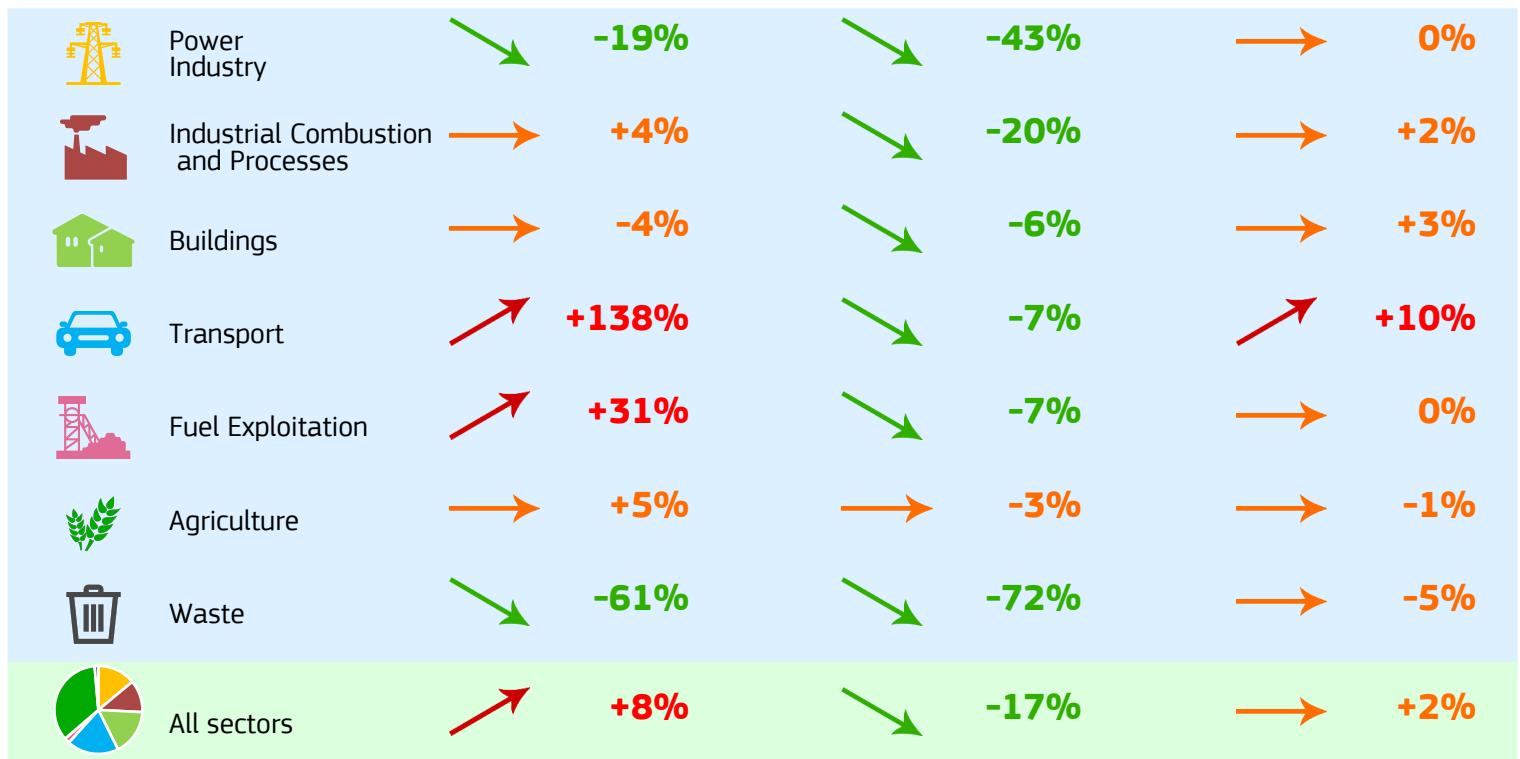


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 62.419 | 12.579 | 0.108 | 4.962M |
| 2015 | 64.021 | 13.621 | 0.190 | 4.700M |
| 2005 | 75.339 | 17.883 | 0.314 | 4.213M |
| 1990 | 57.591 | 16.135 | 0.612 | 3.569M |

2022 vs 1990

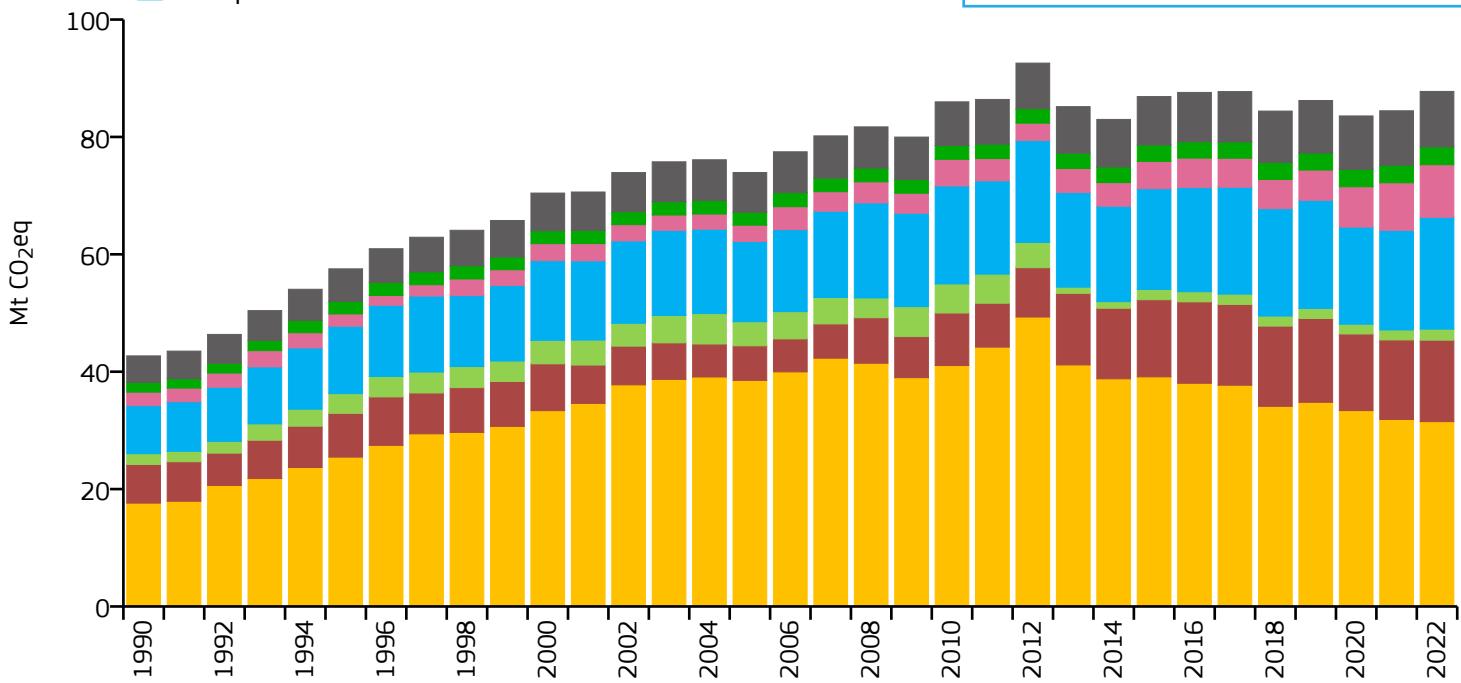
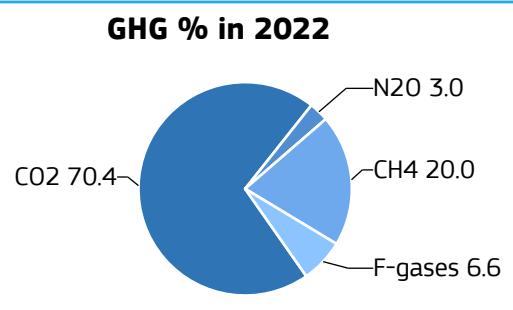
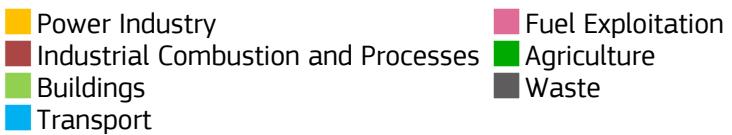
2022 vs 2005

2022 vs 2021



Israel and Palestine, State of

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 87.754 | 6.024 | 0.194 | 14.568M |
| 2015 | 86.879 | 6.826 | 0.255 | 12.727M |
| 2005 | 73.941 | 7.264 | 0.323 | 10.179M |
| 1990 | 42.693 | 6.467 | 0.404 | 6.601M |

2022 vs 1990

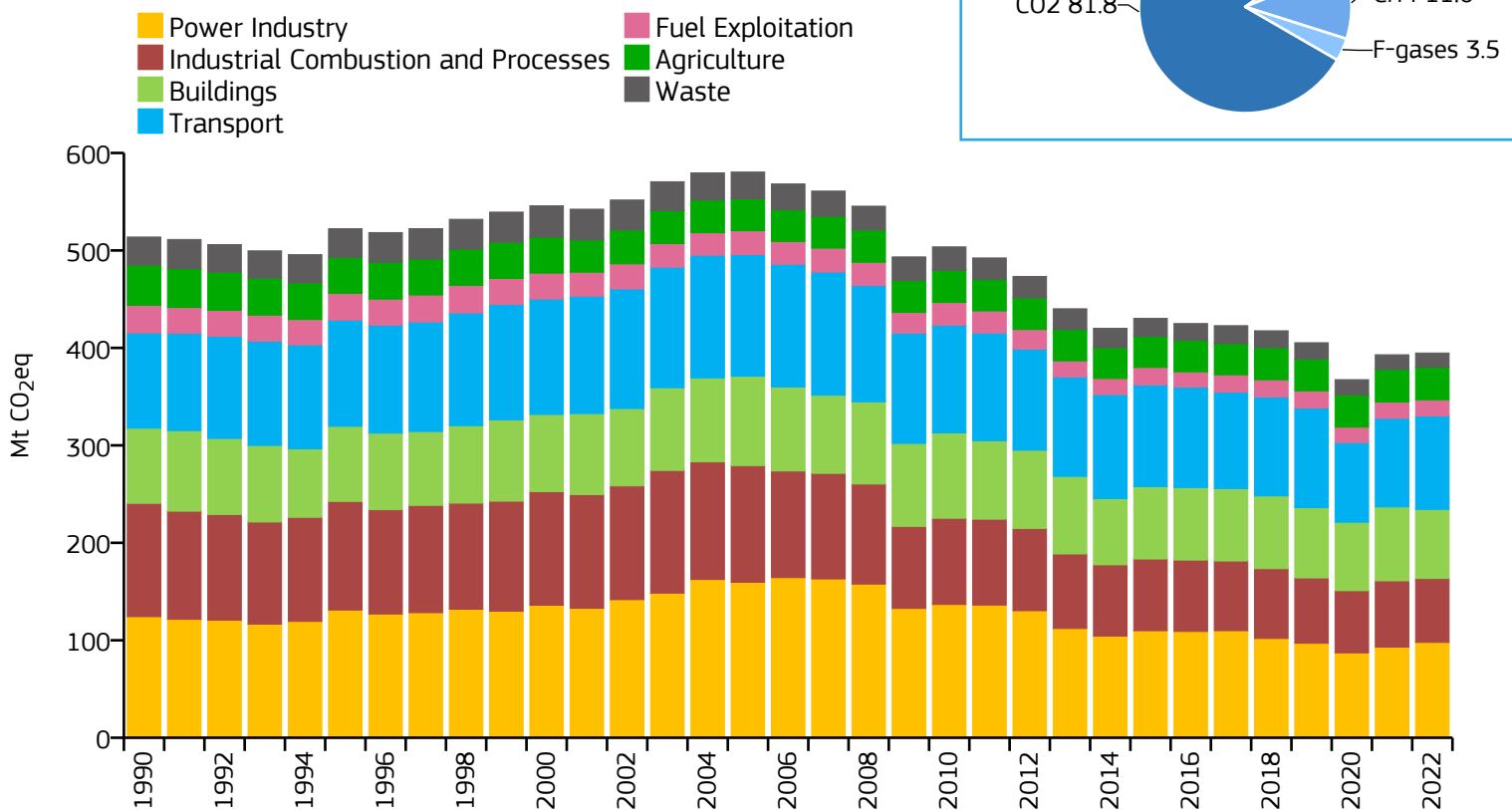
2022 vs 2005

2022 vs 2021



Italy, San Marino and the Holy See

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 394.748 | 6.698 | 0.153 | 58.937M |
| 2015 | 430.297 | 7.231 | 0.176 | 59.504M |
| 2005 | 580.427 | 9.870 | 0.226 | 58.809M |
| 1990 | 513.738 | 8.993 | 0.248 | 57.127M |

2022 vs 1990

2022 vs 2005

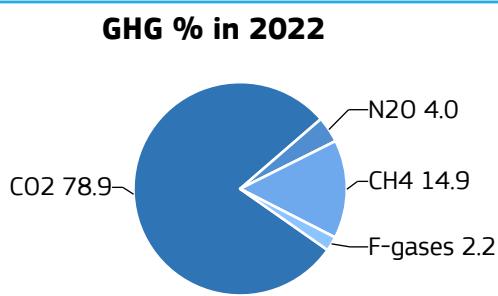
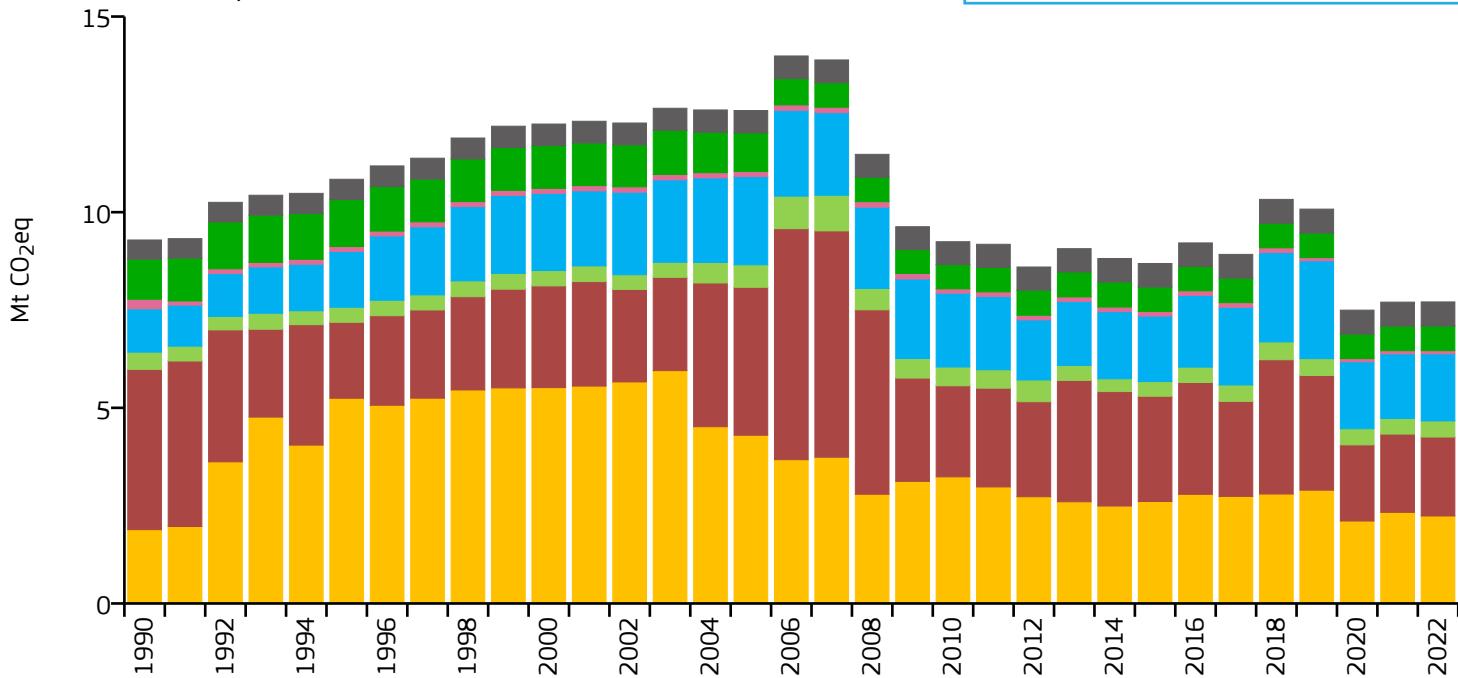
2022 vs 2021



Jamaica

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 7.707 | 2.636 | 0.272 | 2.924M |
| 2015 | 8.689 | 3.026 | 0.317 | 2.872M |
| 2005 | 12.598 | 4.590 | 0.464 | 2.745M |
| 1990 | 9.290 | 3.832 | 0.447 | 2.424M |

2022 vs 1990

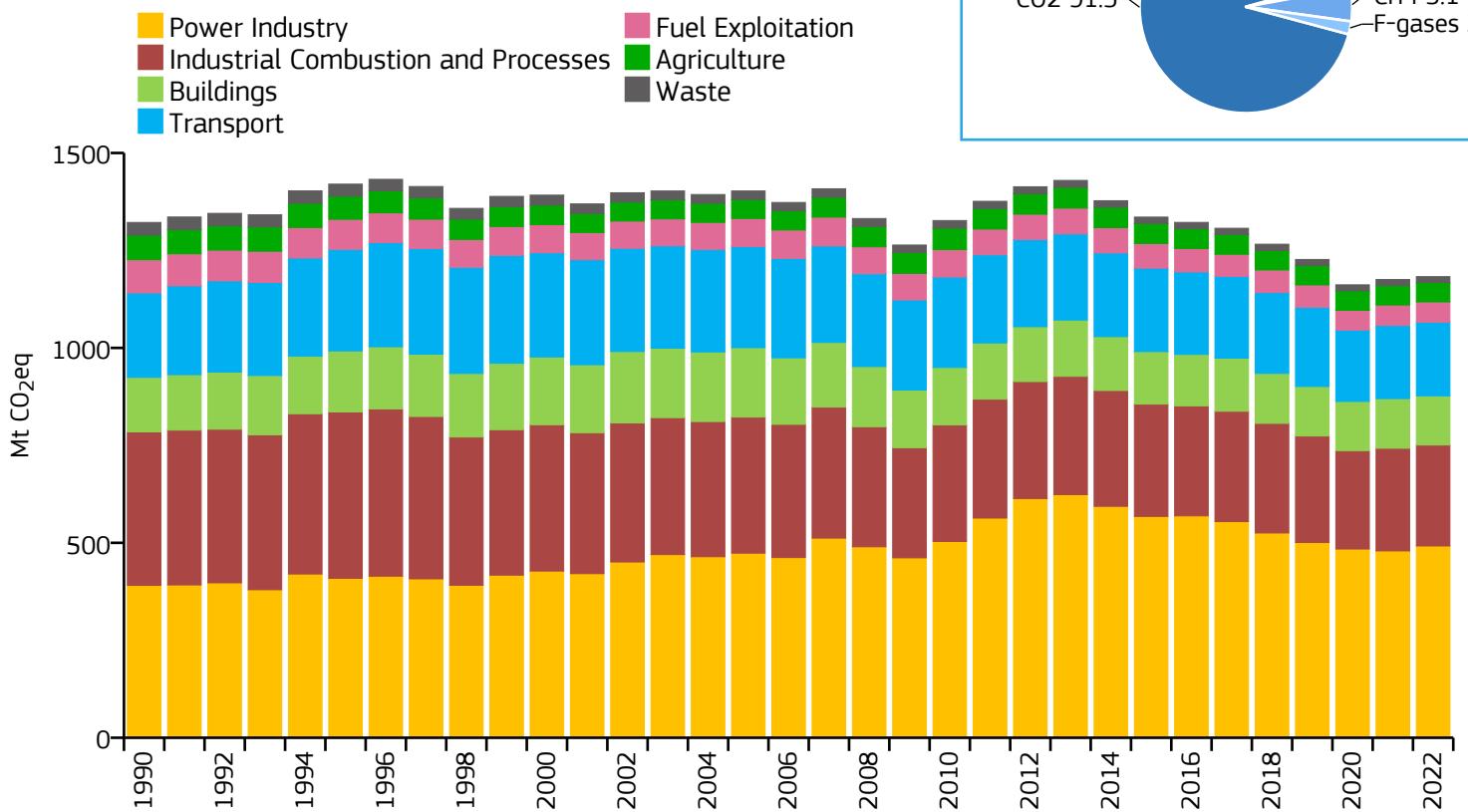
2022 vs 2005

2022 vs 2021



Japan

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1182.770 | 9.410 | 0.227 | 125.697M |
| 2015 | 1335.568 | 10.436 | 0.260 | 127.975M |
| 2005 | 1402.608 | 10.929 | 0.287 | 128.336M |
| 1990 | 1321.808 | 10.616 | 0.326 | 124.516M |

2022 vs 1990

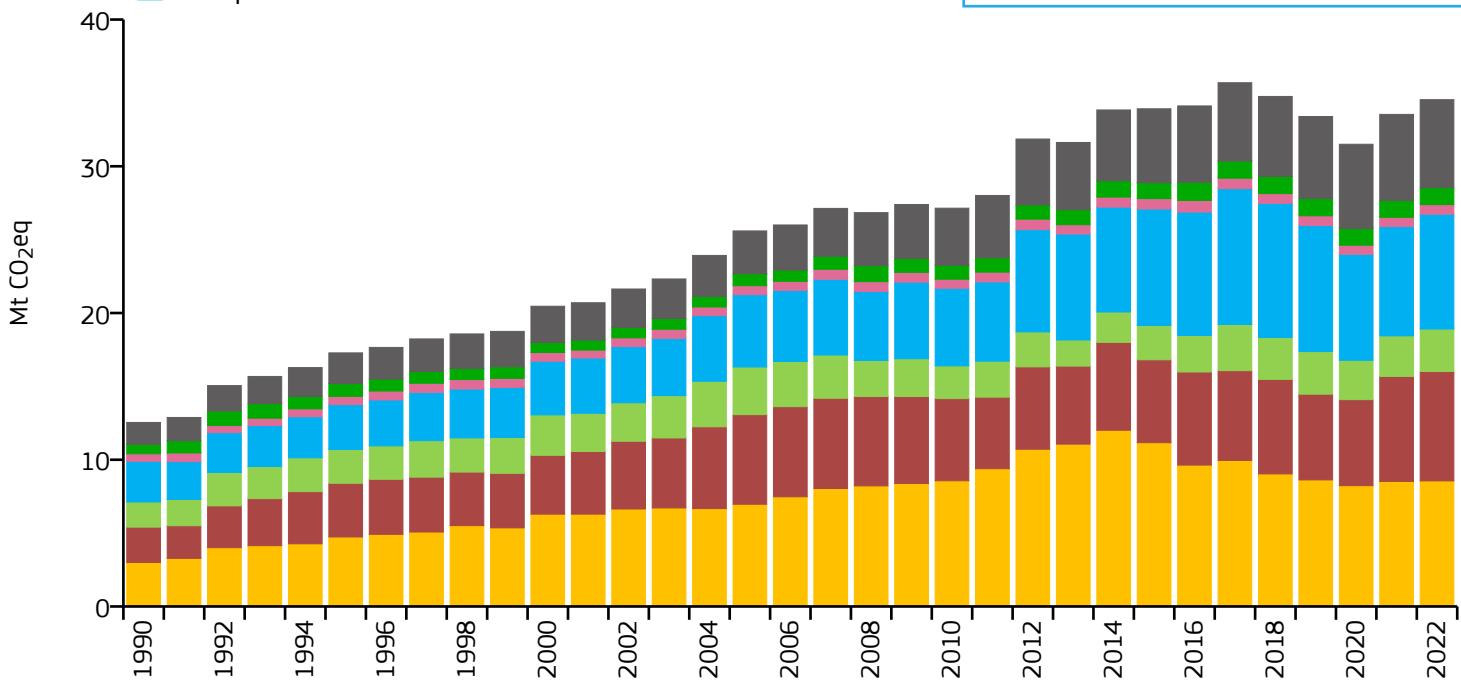
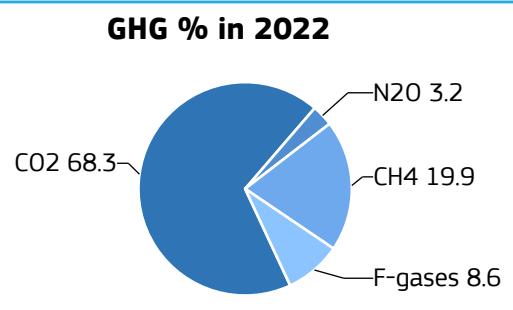
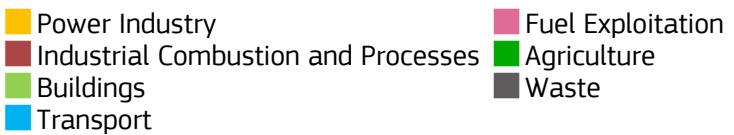
2022 vs 2005

2022 vs 2021



Jordan

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 34.539 | 3.319 | 0.328 | 10.405M |
| 2015 | 33.918 | 3.703 | 0.360 | 9.159M |
| 2005 | 25.593 | 4.479 | 0.419 | 5.714M |
| 1990 | 12.542 | 3.522 | 0.443 | 3.561M |

2022 vs 1990

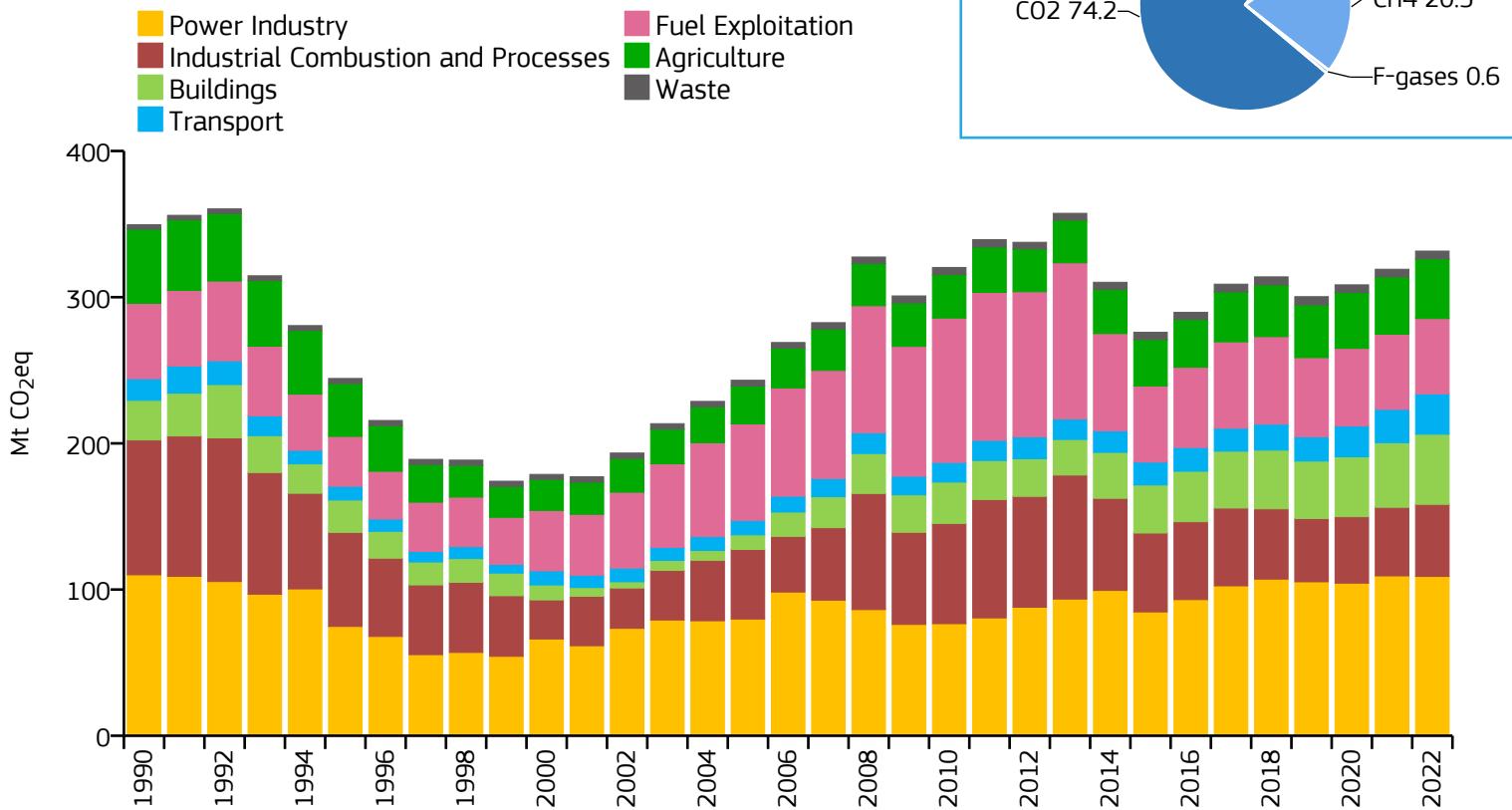
2022 vs 2005

2022 vs 2021



Kazakhstan

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 331.530 | 17.329 | 0.648 | 19.131M |
| 2015 | 276.035 | 15.552 | 0.648 | 17.750M |
| 2005 | 243.169 | 15.646 | 0.971 | 15.541M |
| 1990 | 349.541 | 21.133 | 1.587 | 16.540M |

2022 vs 1990

2022 vs 2005

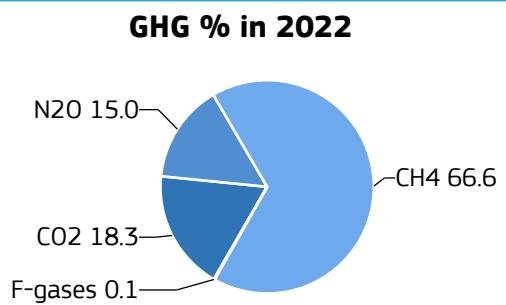
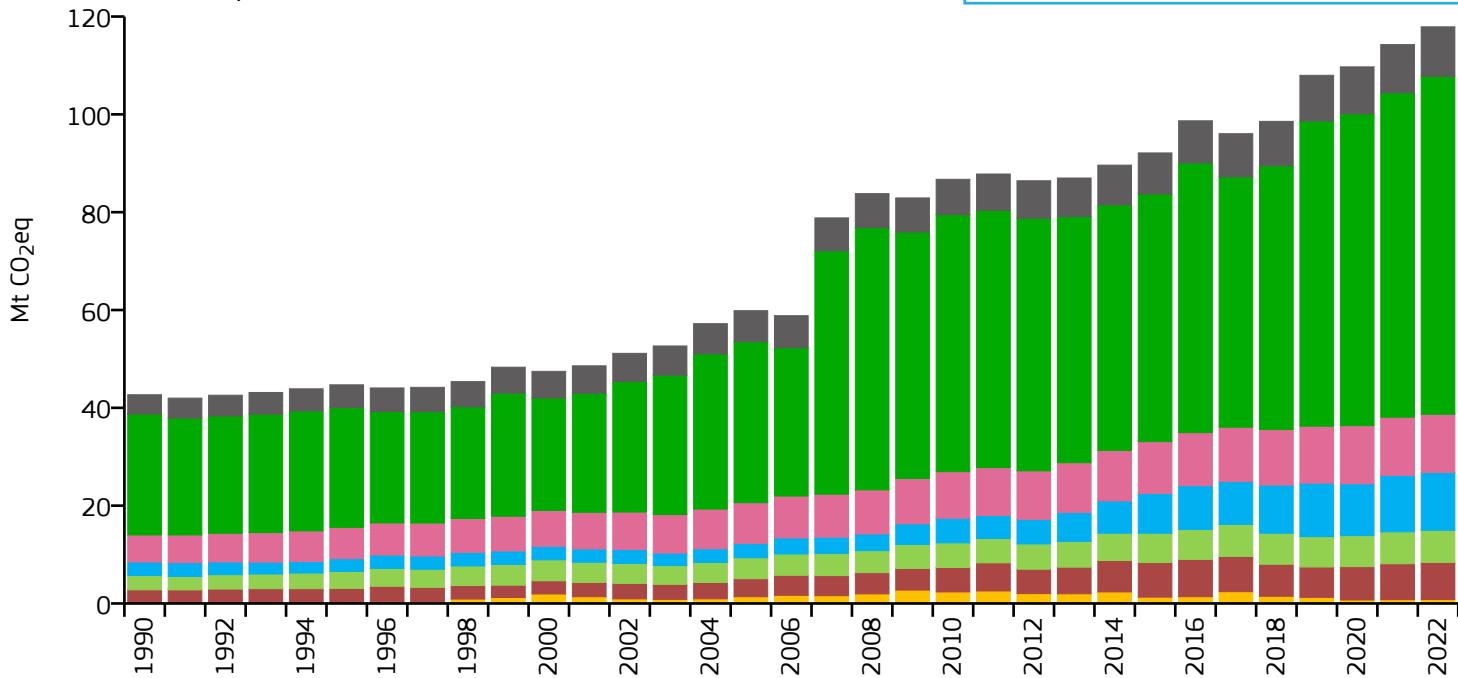
2022 vs 2021



Kenya

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 117.895 | 2.102 | 0.447 | 56.082M |
| 2015 | 92.114 | 1.950 | 0.472 | 47.236M |
| 2005 | 59.859 | 1.661 | 0.491 | 36.048M |
| 1990 | 42.675 | 1.824 | 0.504 | 23.402M |

2022 vs 1990

2022 vs 2005

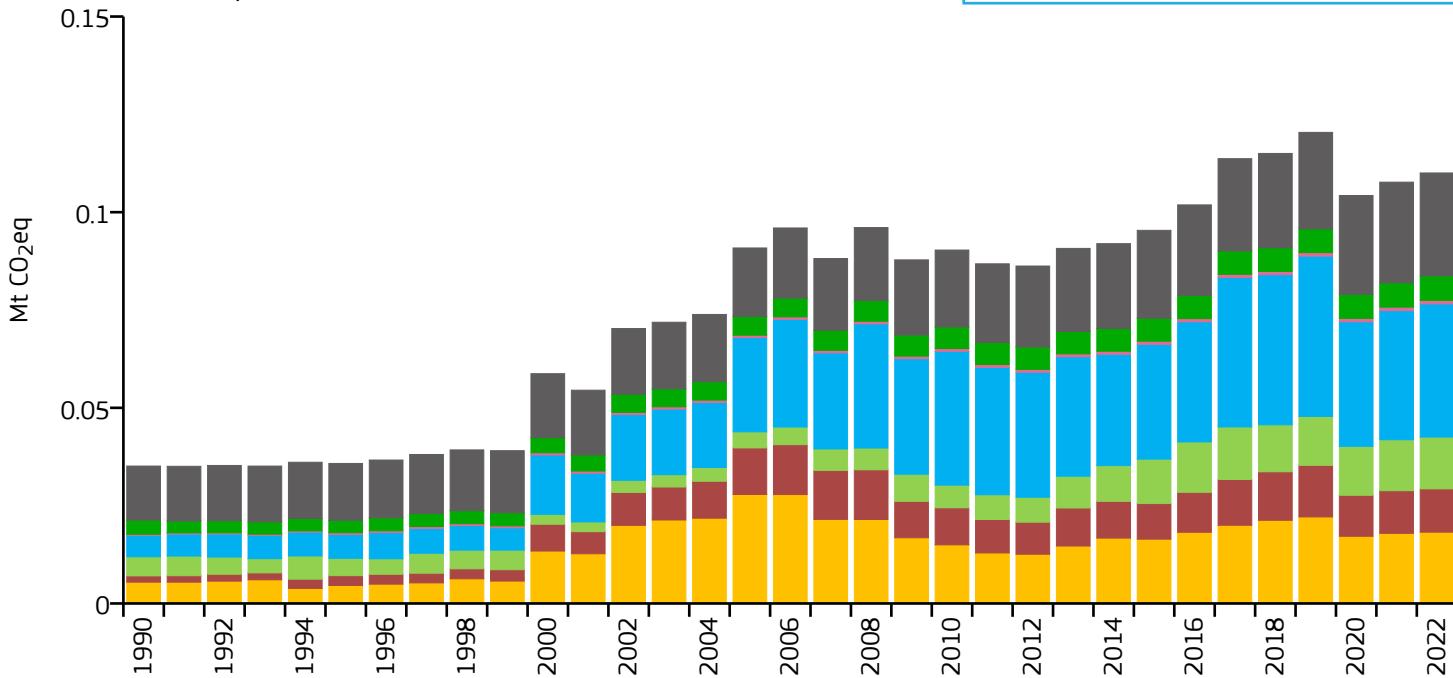
2022 vs 2021



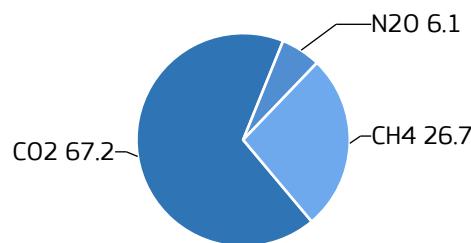
Kiribati

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.110 | 0.873 | 0.419 | 126.000k |
| 2015 | 0.095 | 0.848 | 0.401 | 112.407k |
| 2005 | 0.091 | 0.984 | 0.460 | 92.325k |
| 1990 | 0.035 | 0.485 | 0.229 | 72.412k |

2022 vs 1990

2022 vs 2005

2022 vs 2021

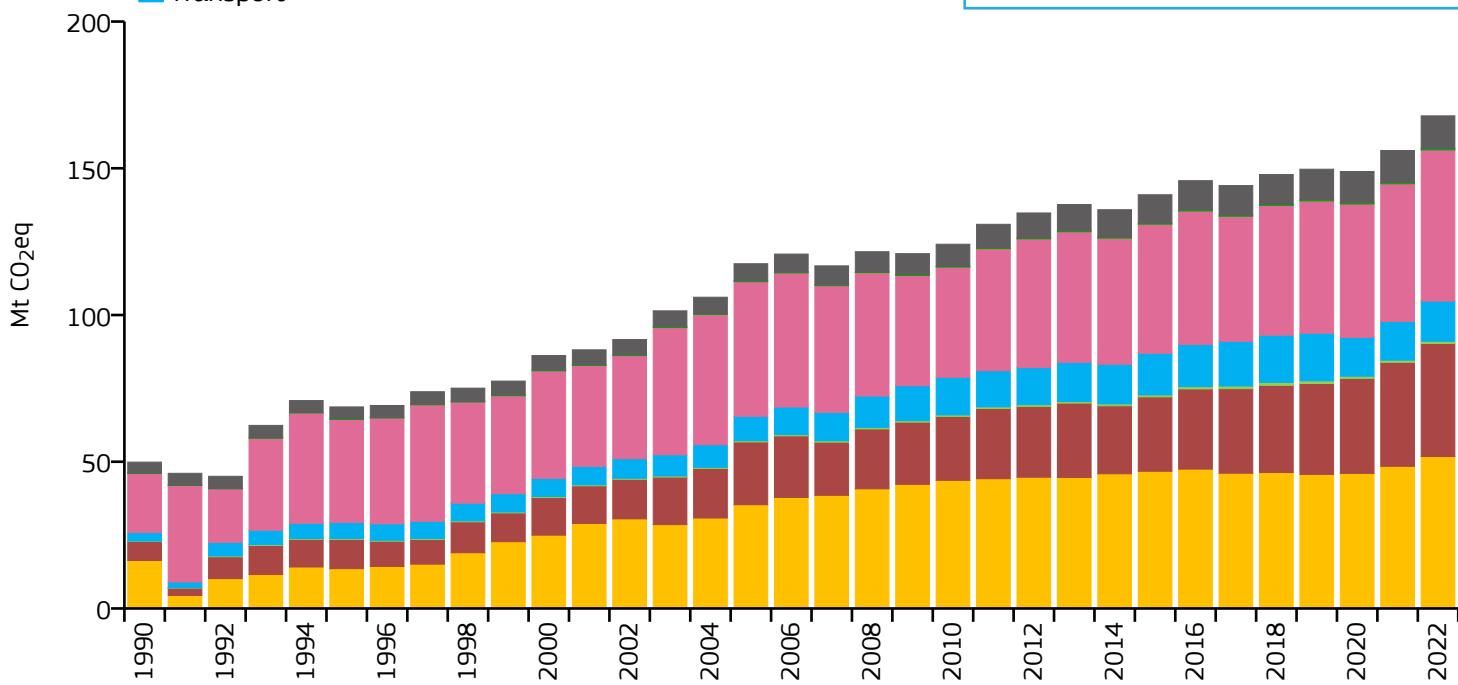
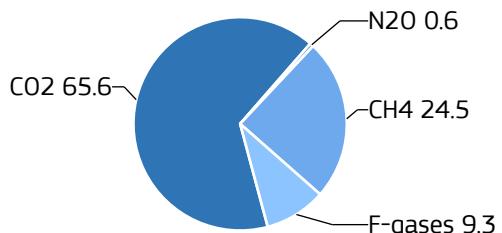


Kuwait

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 167.862 | 37.961 | 0.800 | 4.422M |
| 2015 | 140.976 | 35.819 | 0.670 | 3.936M |
| 2005 | 117.473 | 51.600 | 0.707 | 2.277M |
| 1990 | 49.868 | 23.751 | 0.791 | 2.100M |

2022 vs 1990

2022 vs 2005

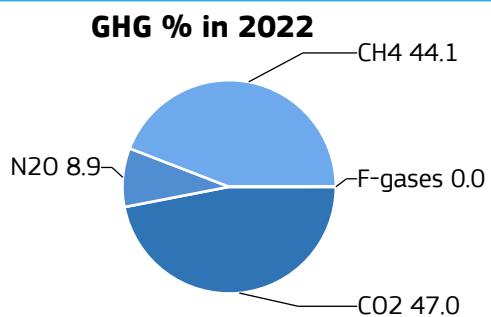
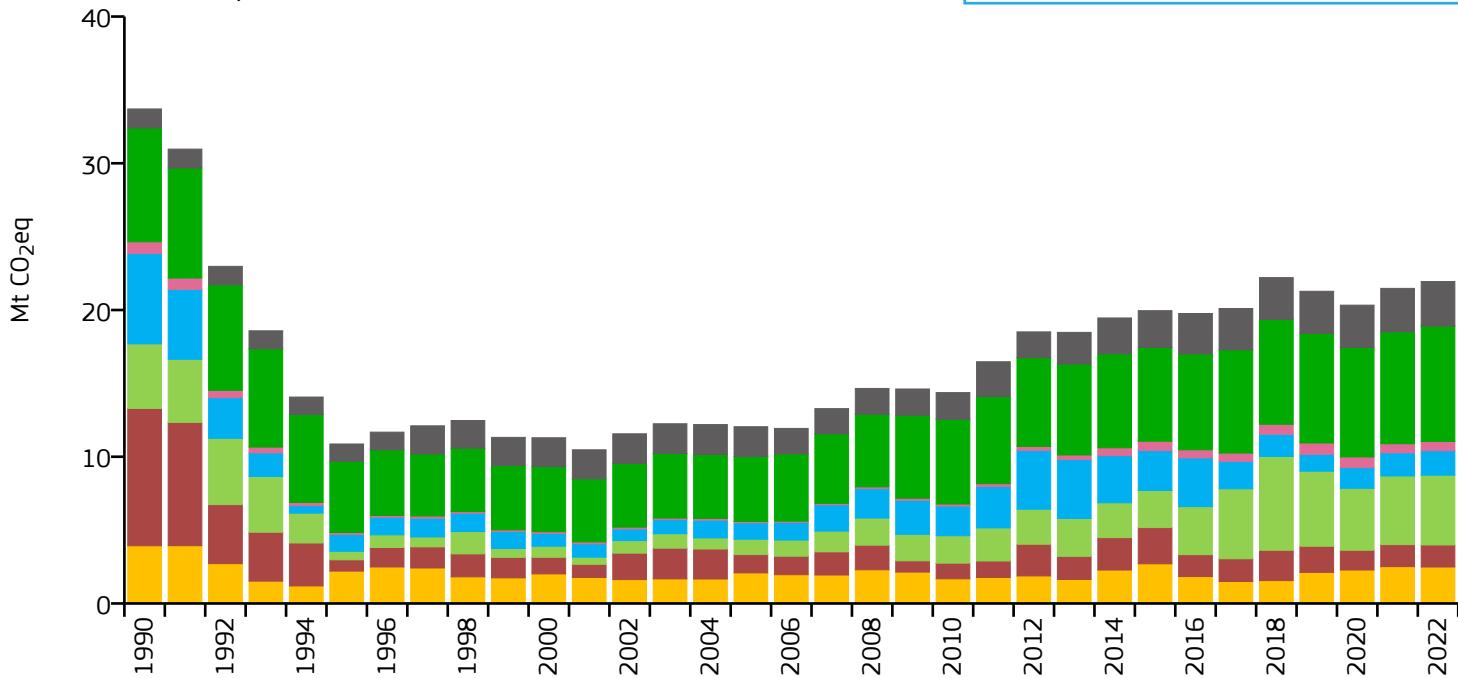
2022 vs 2021



Kyrgyzstan

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

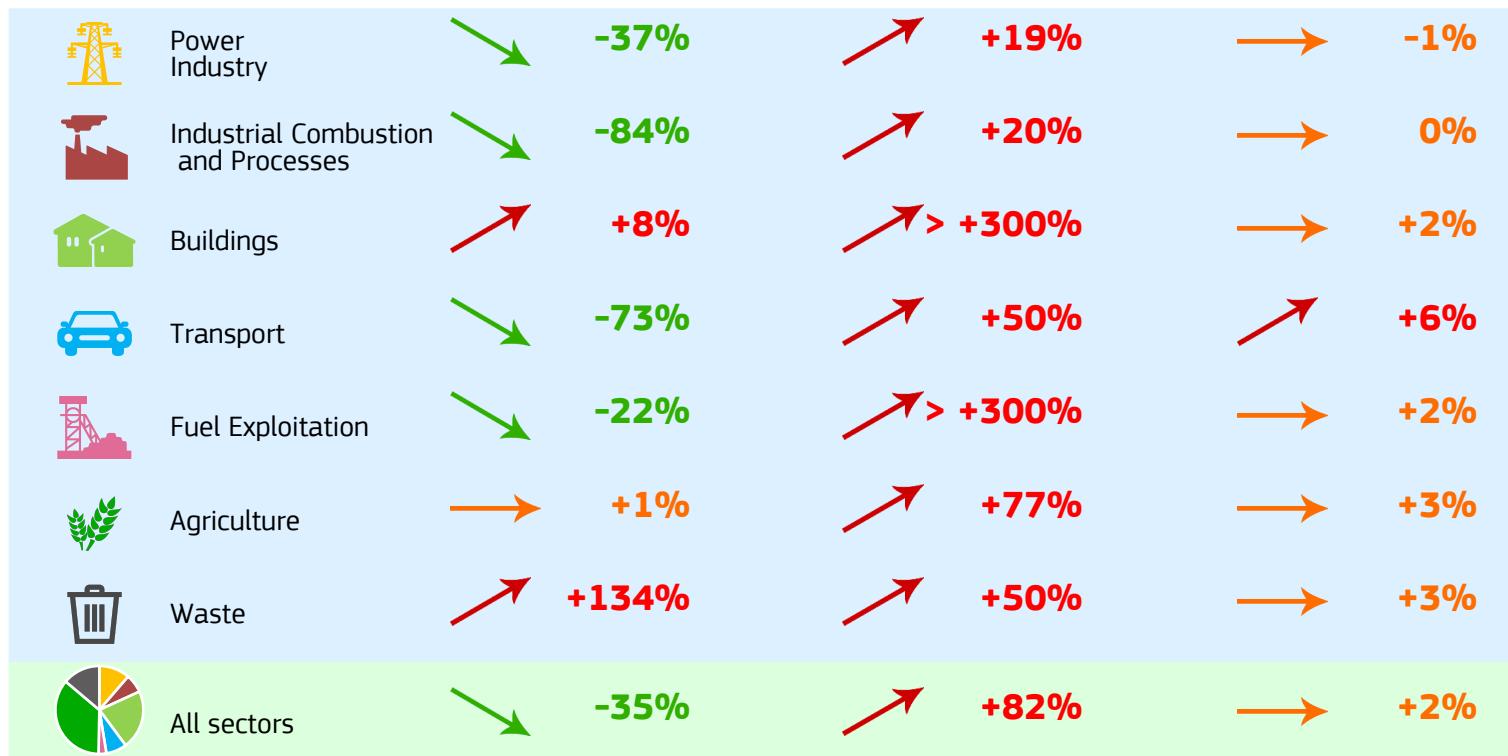


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 21.940 | 3.397 | 0.621 | 6.459M |
| 2015 | 19.954 | 3.402 | 0.697 | 5.865M |
| 2005 | 12.045 | 2.373 | 0.663 | 5.075M |
| 1990 | 33.703 | 7.707 | 1.488 | 4.373M |

2022 vs 1990

2022 vs 2005

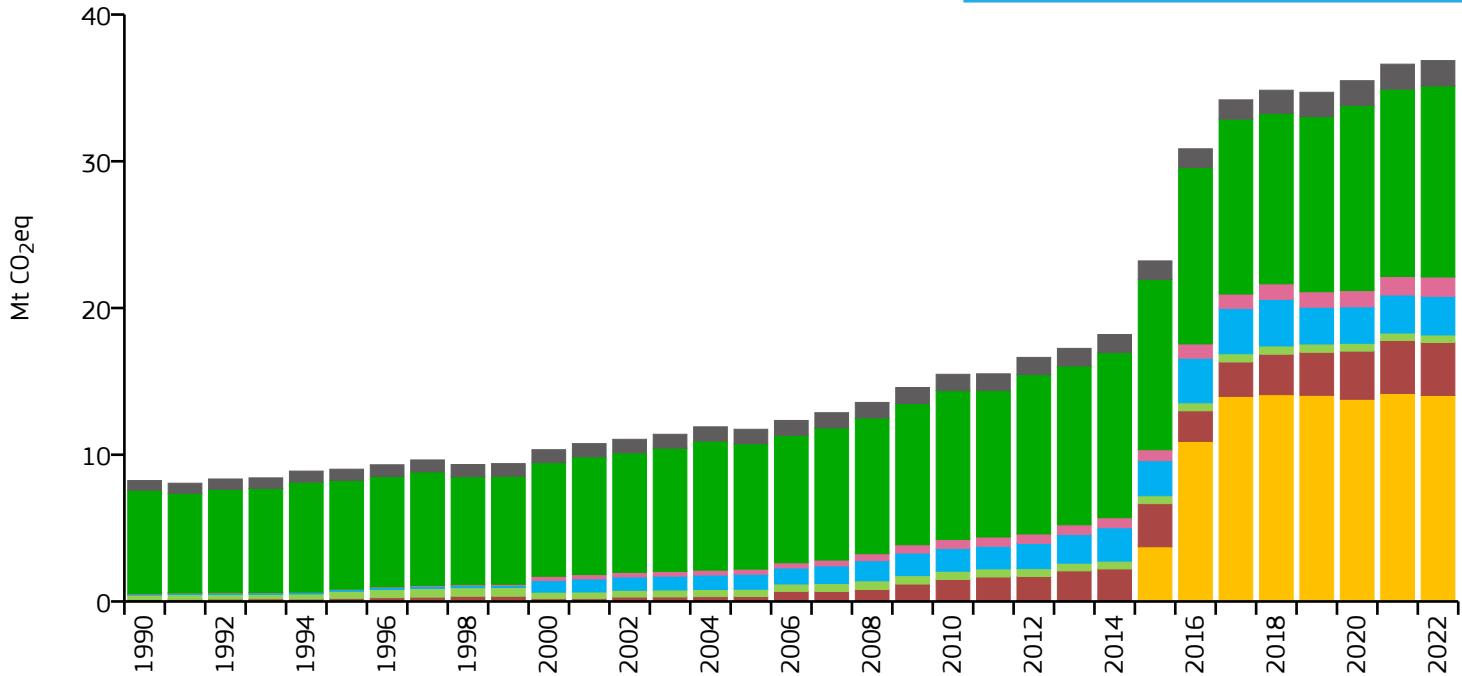
2022 vs 2021



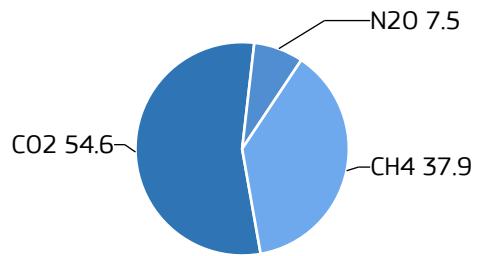
Laos

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 36.862 | 5.010 | 0.616 | 7.358M |
| 2015 | 23.210 | 3.483 | 0.526 | 6.664M |
| 2005 | 11.736 | 2.040 | 0.569 | 5.754M |
| 1990 | 8.240 | 1.935 | 0.985 | 4.258M |

2022 vs 1990

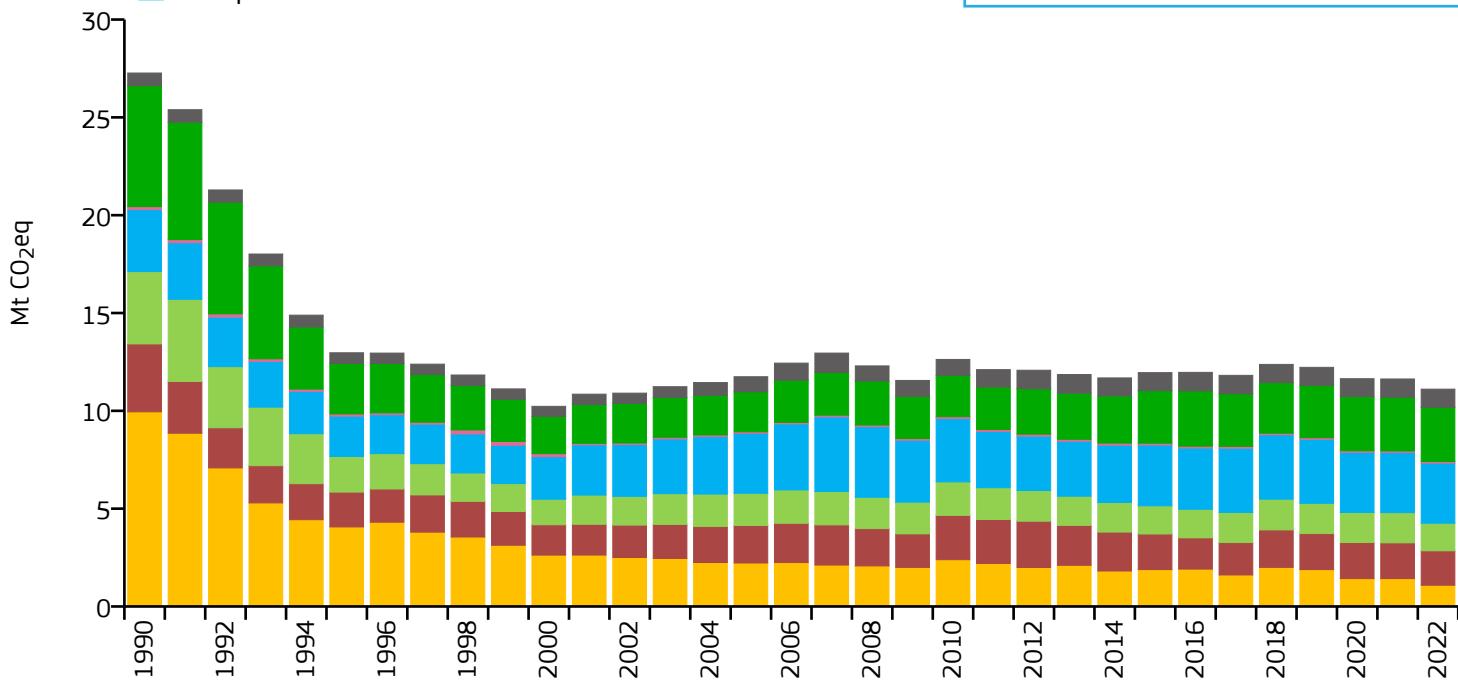
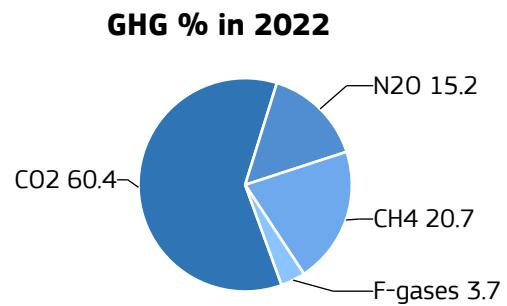
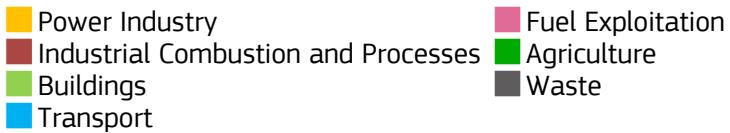
2022 vs 2005

2022 vs 2021



Latvia

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 11.108 | 5.975 | 0.180 | 1.859M |
| 2015 | 11.952 | 5.998 | 0.227 | 1.993M |
| 2005 | 11.742 | 5.214 | 0.258 | 2.252M |
| 1990 | 27.267 | 10.234 | 0.640 | 2.664M |

2022 vs 1990

2022 vs 2005

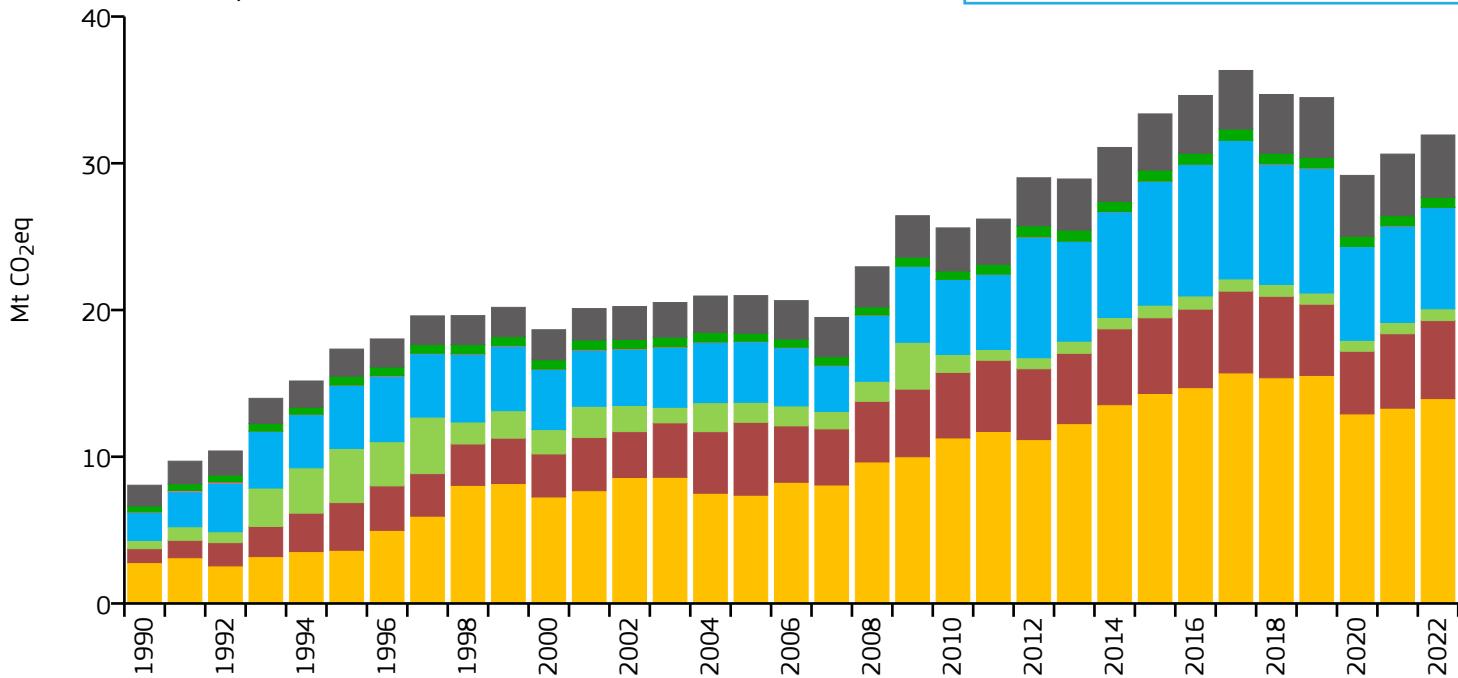
2022 vs 2021



Lebanon

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 31.927 | 5.434 | 0.440 | 5.875M |
| 2015 | 33.364 | 5.702 | 0.314 | 5.851M |
| 2005 | 20.980 | 5.262 | 0.315 | 3.987M |
| 1990 | 8.060 | 2.982 | 0.383 | 2.703M |

2022 vs 1990

2022 vs 2005

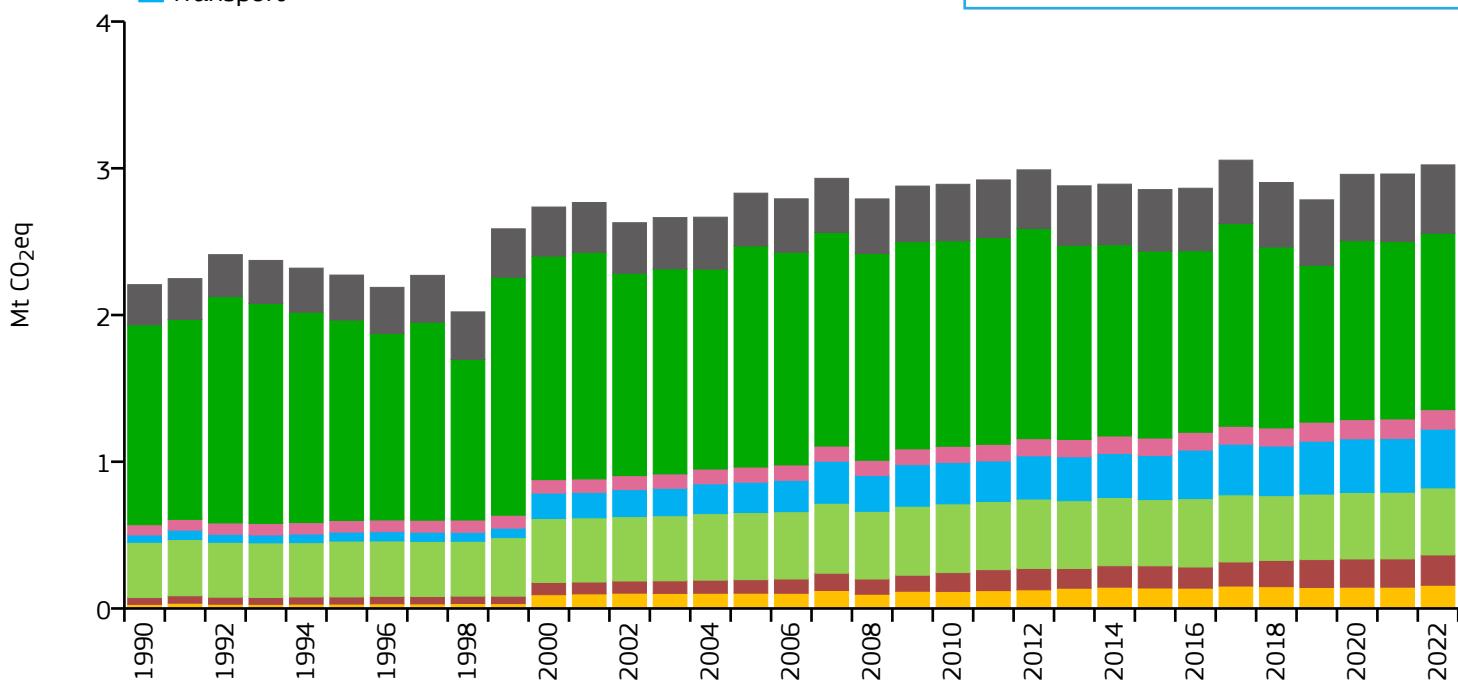
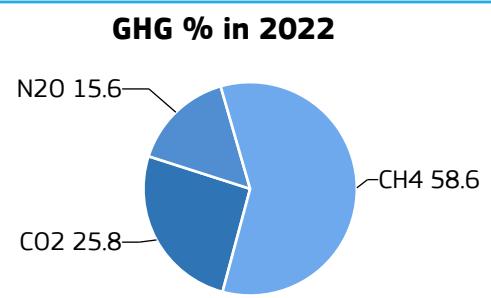
2022 vs 2021



Lesotho

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 3.023 | 1.270 | 0.575 | 2.381M |
| 2015 | 2.855 | 1.313 | 0.513 | 2.175M |
| 2005 | 2.830 | 1.452 | 0.720 | 1.950M |
| 1990 | 2.207 | 1.376 | 0.969 | 1.604M |

2022 vs 1990

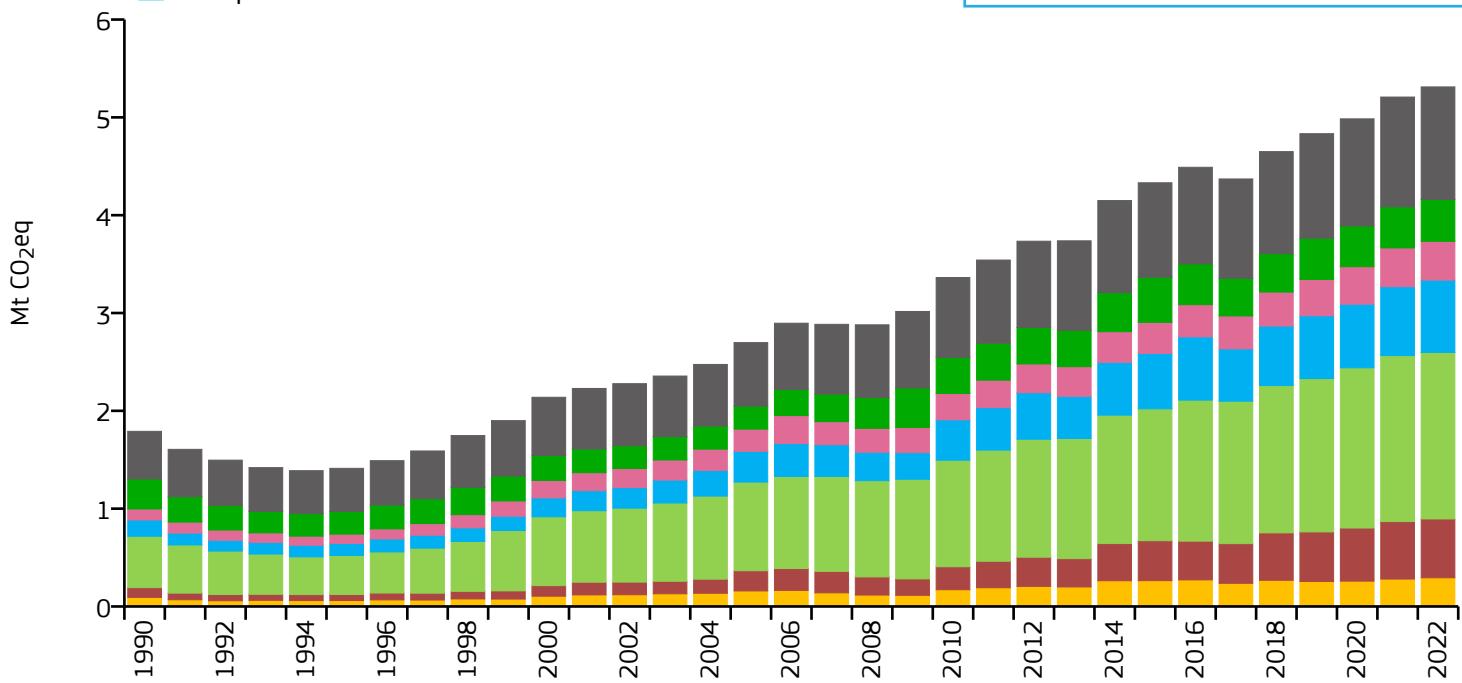
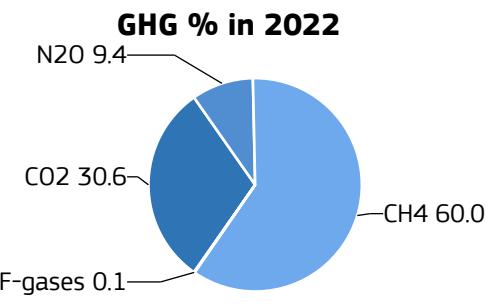
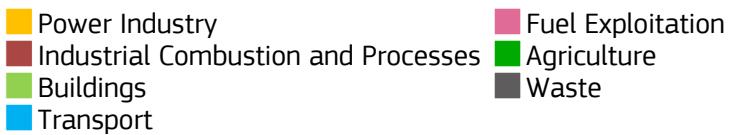
2022 vs 2005

2022 vs 2021



Liberia

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 5.311 | 0.990 | 0.686 | 5.363M |
| 2015 | 4.331 | 0.963 | 0.594 | 4.500M |
| 2005 | 2.697 | 0.827 | 0.670 | 3.261M |
| 1990 | 1.790 | 0.854 | 0.536 | 2.097M |

2022 vs 1990

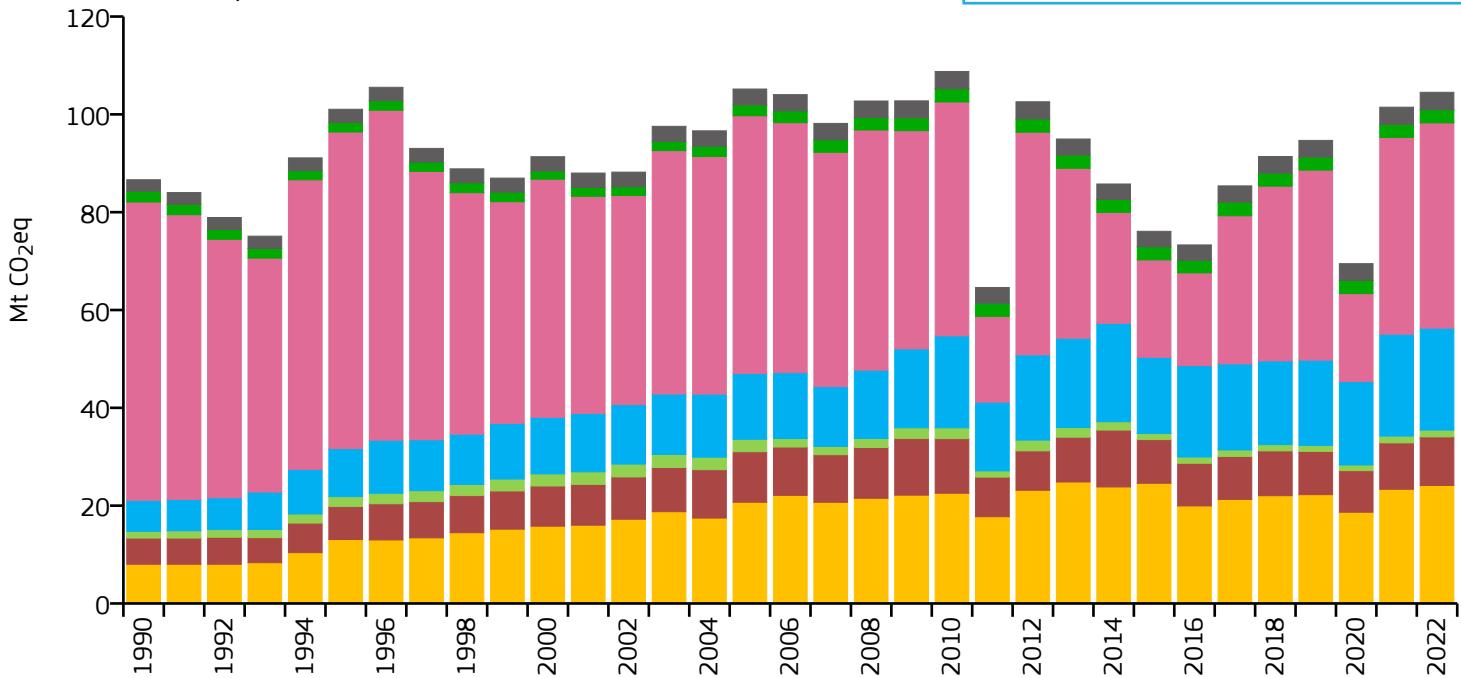
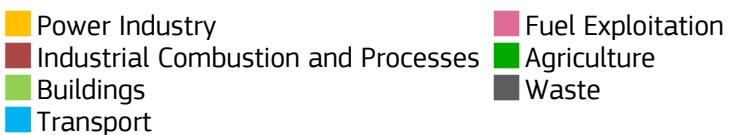
2022 vs 2005

2022 vs 2021

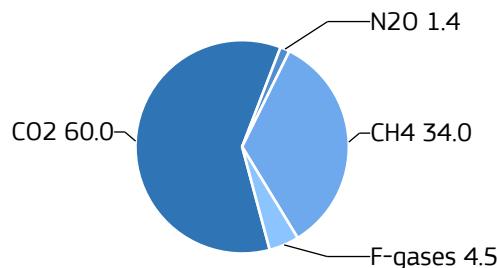


Libya

GHG emissions by sector



GHG % in 2022

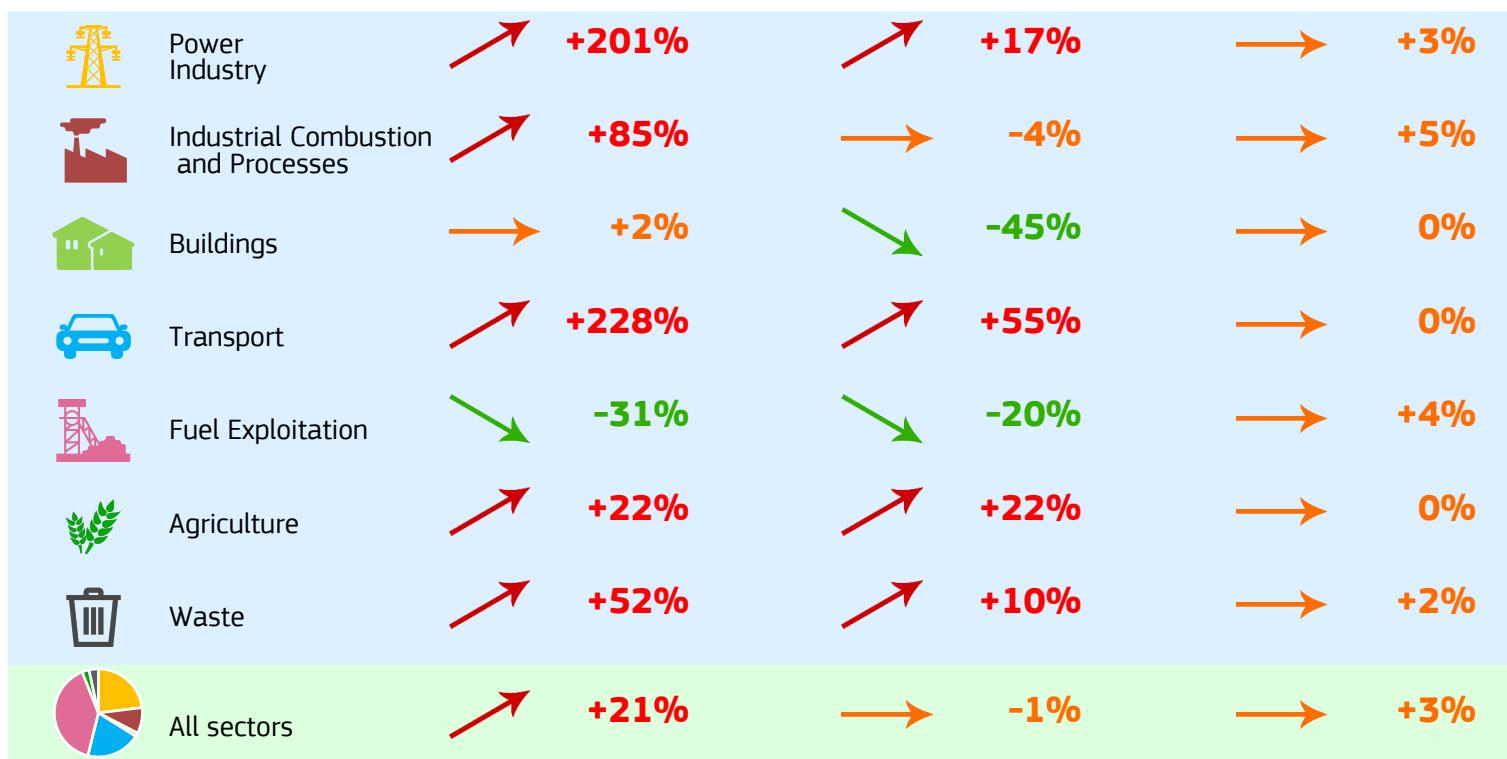


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 104.514 | 15.318 | 0.775 | 6.823M |
| 2015 | 76.094 | 12.204 | 0.643 | 6.235M |
| 2005 | 105.180 | 18.157 | 0.585 | 5.793M |
| 1990 | 86.632 | 19.526 | 0.627 | 4.437M |

2022 vs 1990

2022 vs 2005

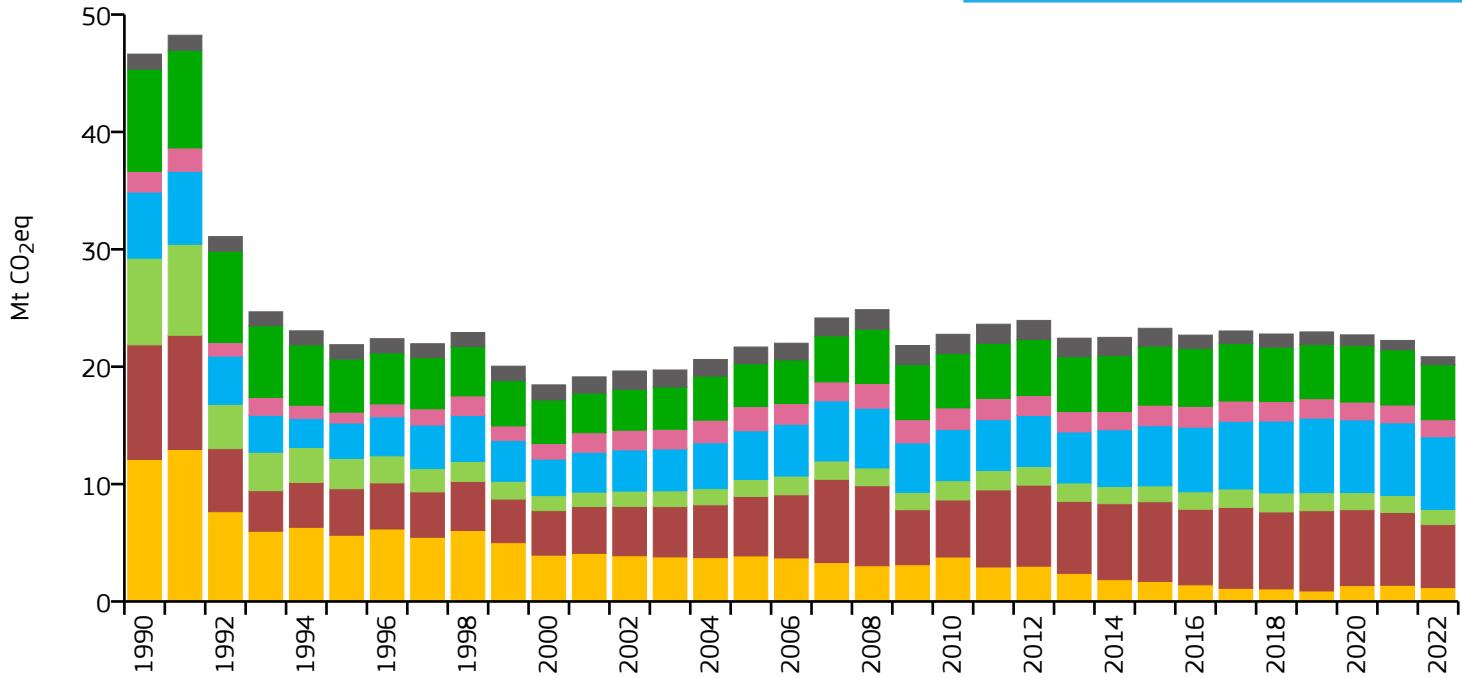
2022 vs 2021



Lithuania

GHG emissions by sector

- | | |
|---|---|
|  |  |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 20.847 | 7.372 | 0.186 | 2.828M |
| 2015 | 23.274 | 7.938 | 0.261 | 2.932M |
| 2005 | 21.676 | 6.482 | 0.310 | 3.344M |
| 1990 | 46.631 | 12.617 | 0.752 | 3.696M |

2022 vs 1990

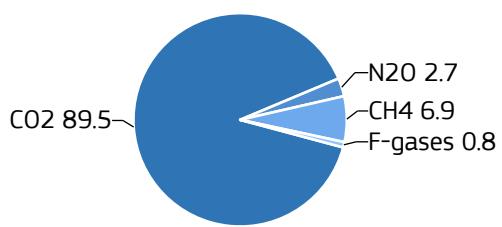
2022 vs 2005

2022 vs 2021



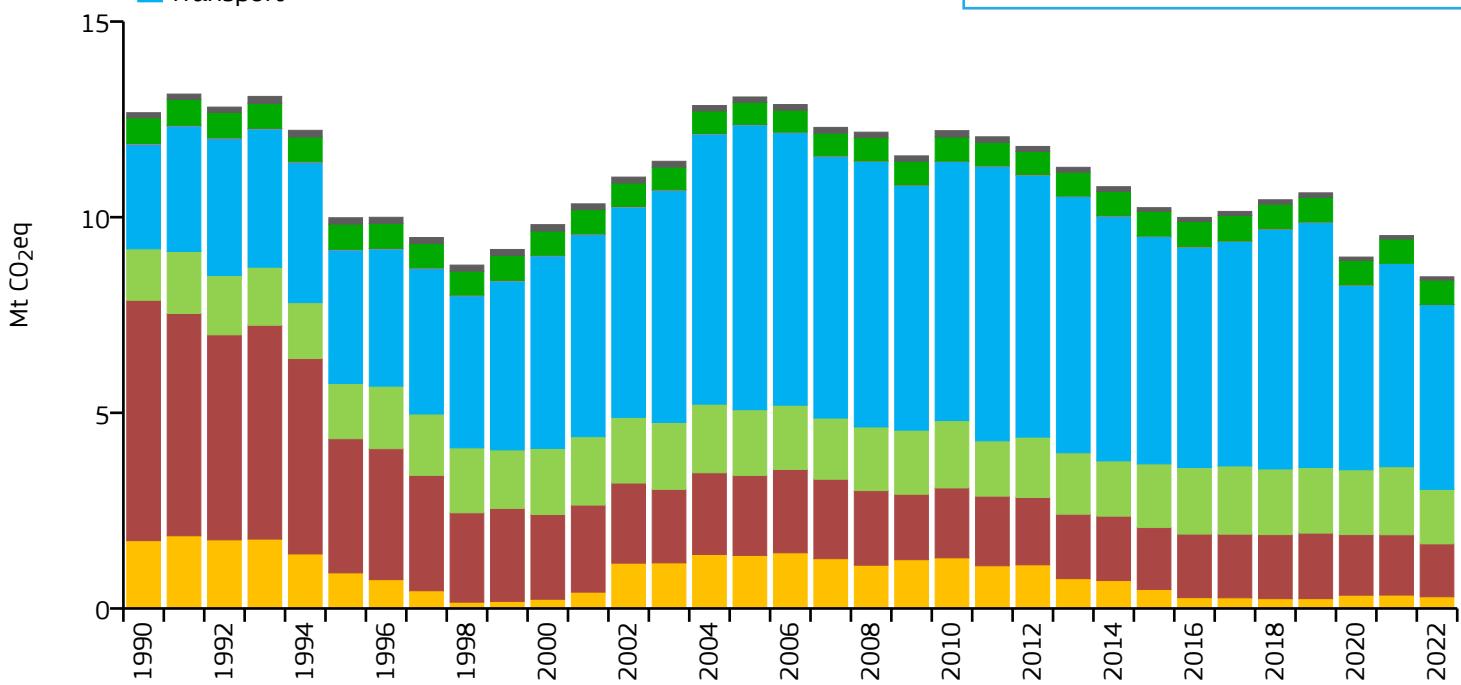
Luxembourg

GHG % in 2022



GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 8.476 | 13.692 | 0.113 | 619.000k |
| 2015 | 10.243 | 18.073 | 0.159 | 566.741k |
| 2005 | 13.072 | 28.552 | 0.259 | 457.842k |
| 1990 | 12.670 | 33.185 | 0.468 | 381.791k |

2022 vs 1990

2022 vs 2005

2022 vs 2021

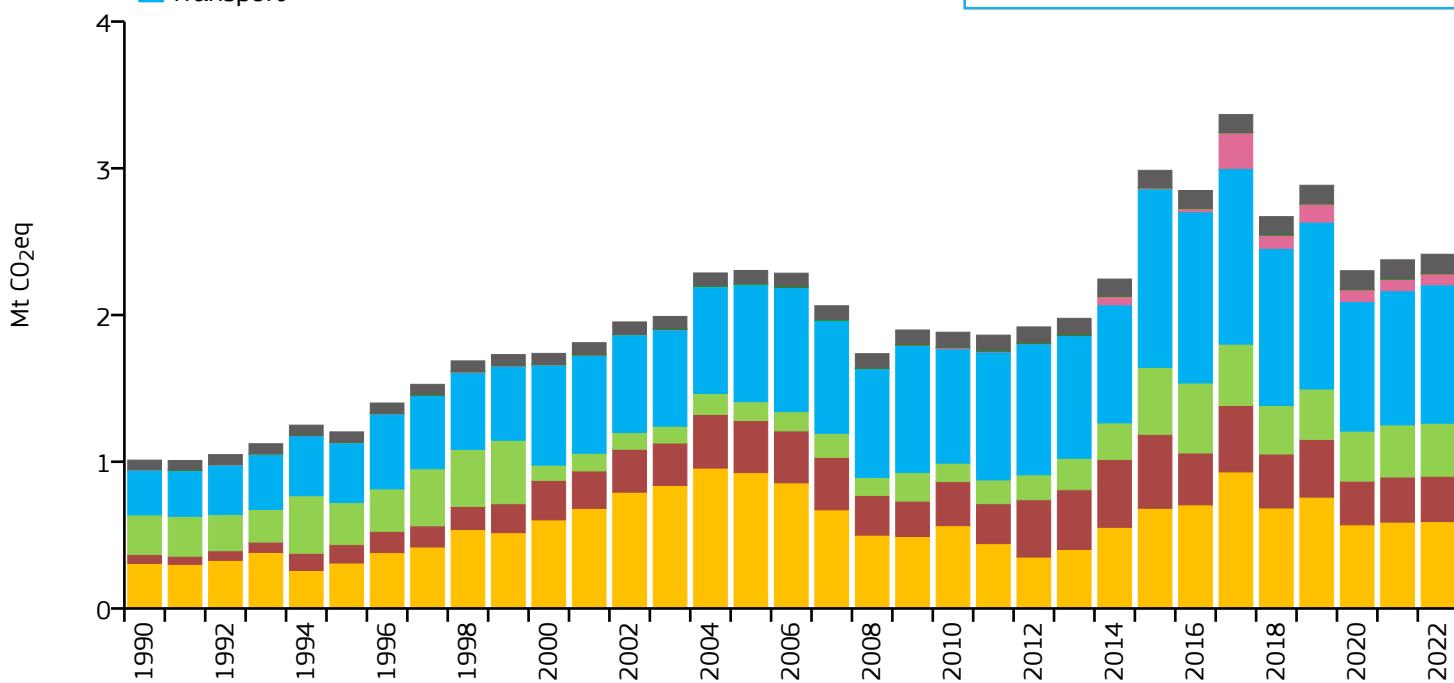
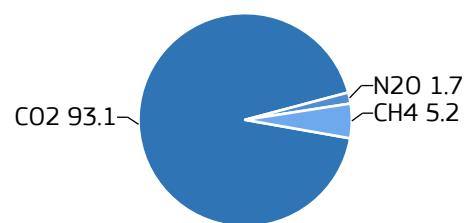


Macao

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 2.414 | 3.592 | 0.074 | 672.000k |
| 2015 | 2.986 | 4.969 | 0.042 | 600.942k |
| 2005 | 2.304 | 4.774 | 0.062 | 482.559k |
| 1990 | 1.011 | 2.939 | 0.060 | 343.935k |

2022 vs 1990

2022 vs 2005

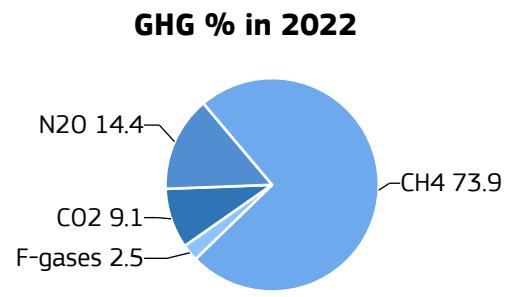
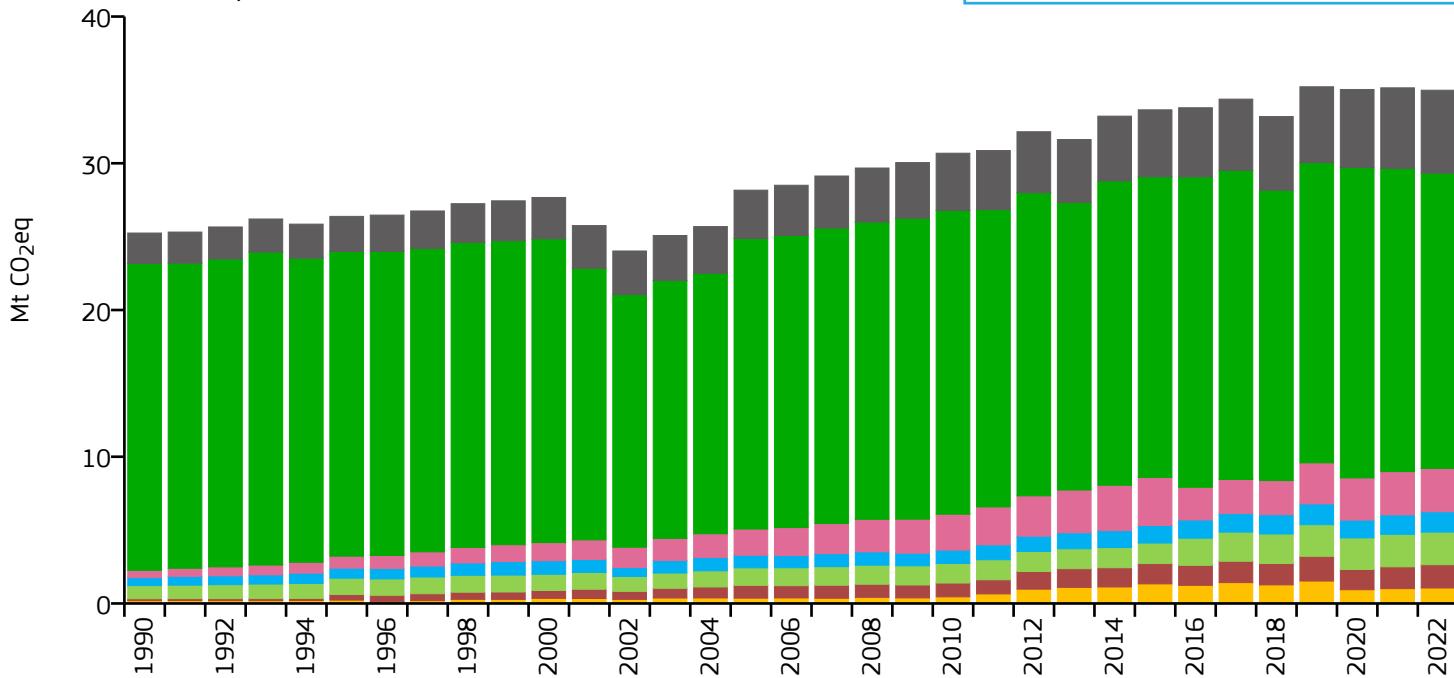
2022 vs 2021



Madagascar

GHG emissions by sector

- | | |
|---|---|
|  |  |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 34.980 | 1.199 | 0.786 | 29.176M |
| 2015 | 33.643 | 1.388 | 0.898 | 24.234M |
| 2005 | 28.168 | 1.536 | 0.985 | 18.337M |
| 1990 | 25.245 | 2.177 | 1.175 | 11.599M |

2022 vs 1990

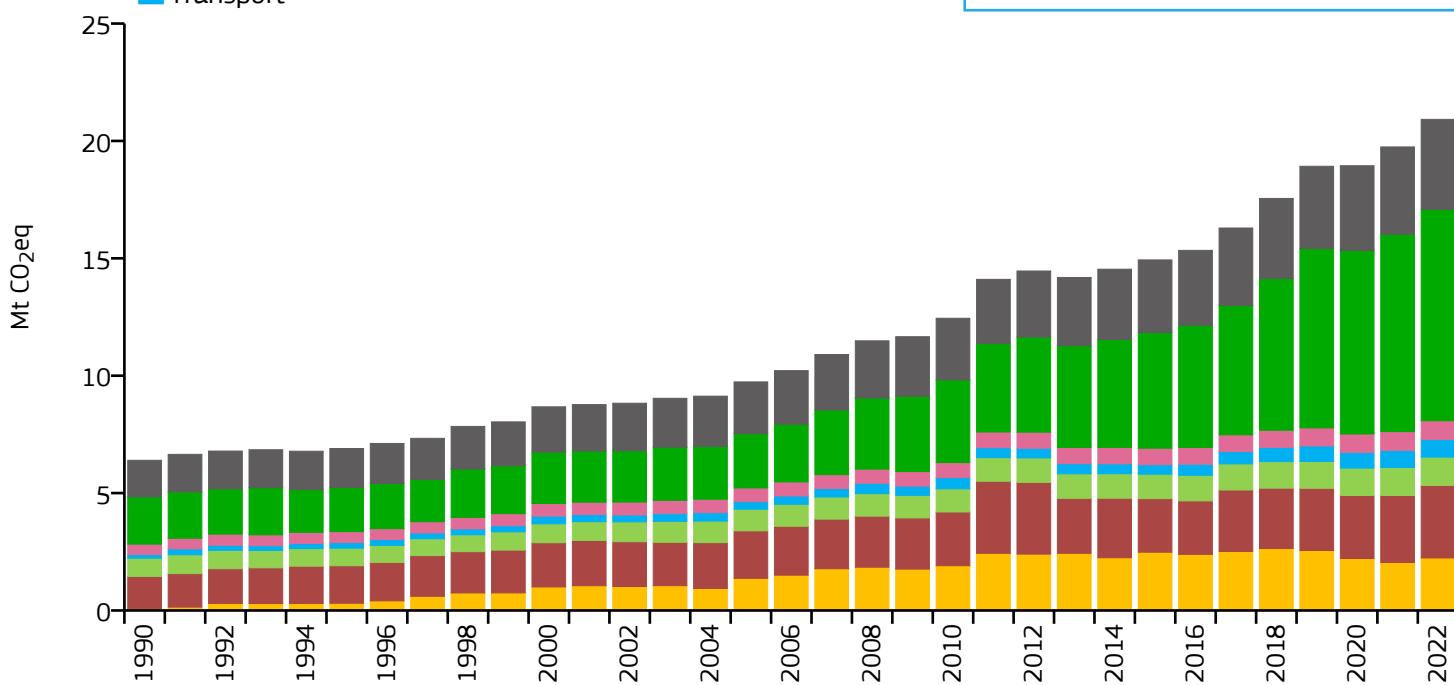
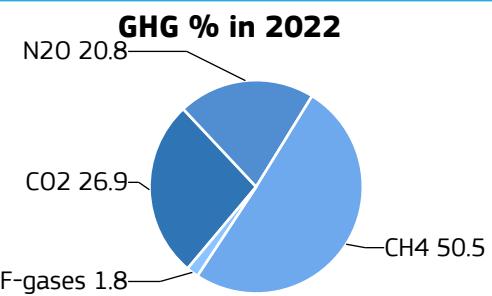
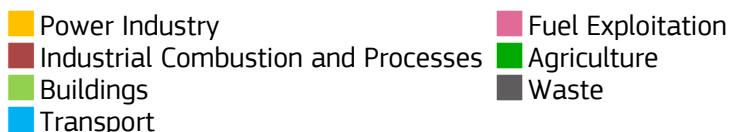
2022 vs 2005

2022 vs 2021



Malawi

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 20.919 | 0.975 | 0.699 | 21.446M |
| 2015 | 14.932 | 0.850 | 0.612 | 17.574M |
| 2005 | 9.736 | 0.747 | 0.698 | 13.040M |
| 1990 | 6.397 | 0.678 | 0.716 | 9.438M |

2022 vs 1990

2022 vs 2005

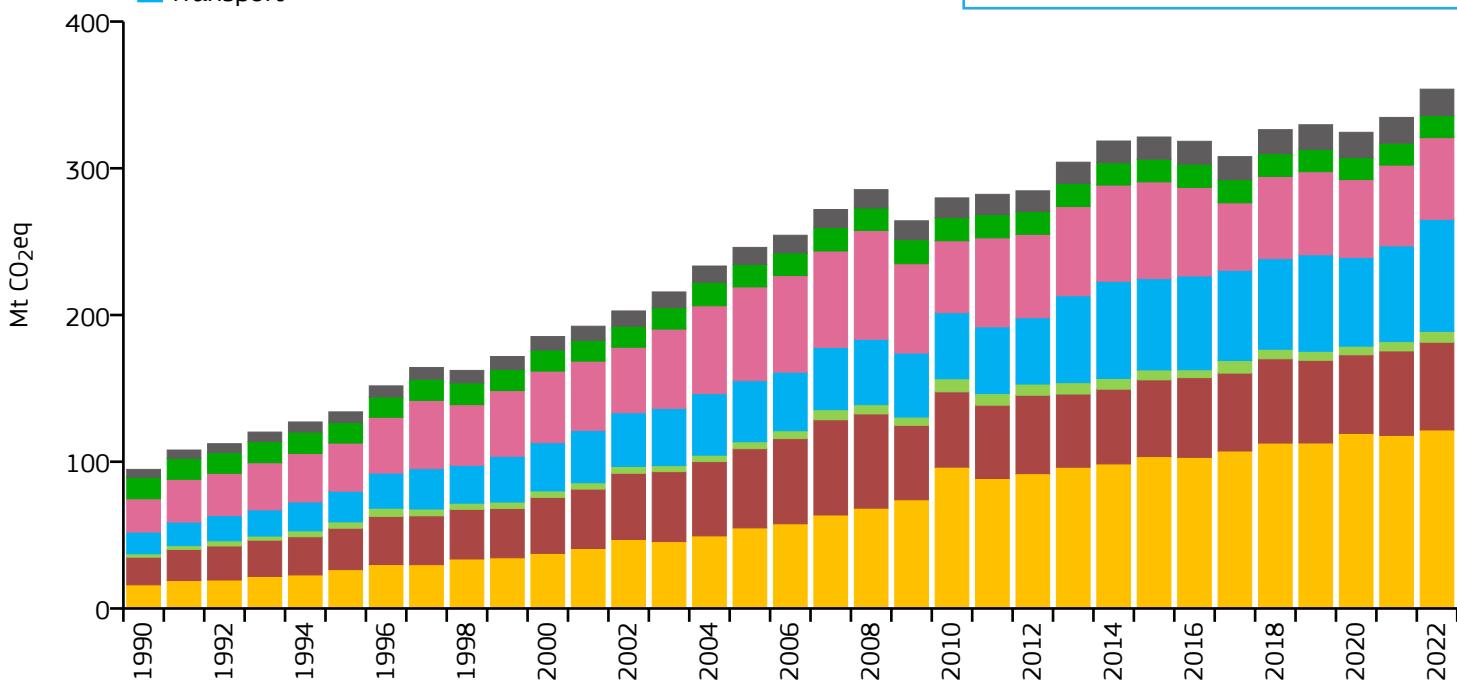
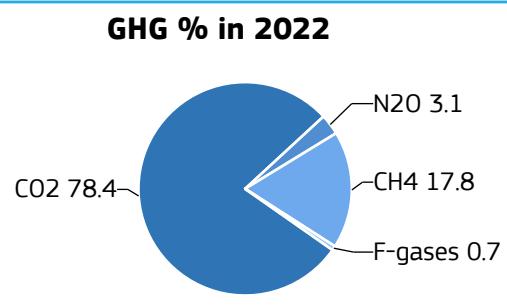
2022 vs 2021



Malaysia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 353.917 | 10.499 | 0.368 | 33.711M |
| 2015 | 321.309 | 10.458 | 0.428 | 30.723M |
| 2005 | 246.078 | 9.590 | 0.529 | 25.659M |
| 1990 | 94.791 | 5.255 | 0.510 | 18.038M |

2022 vs 1990

2022 vs 2005

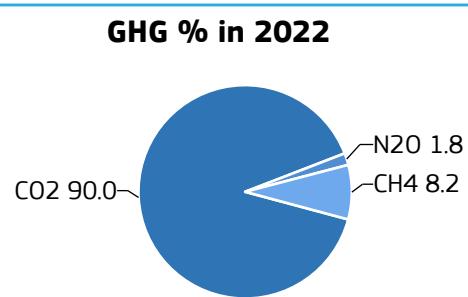
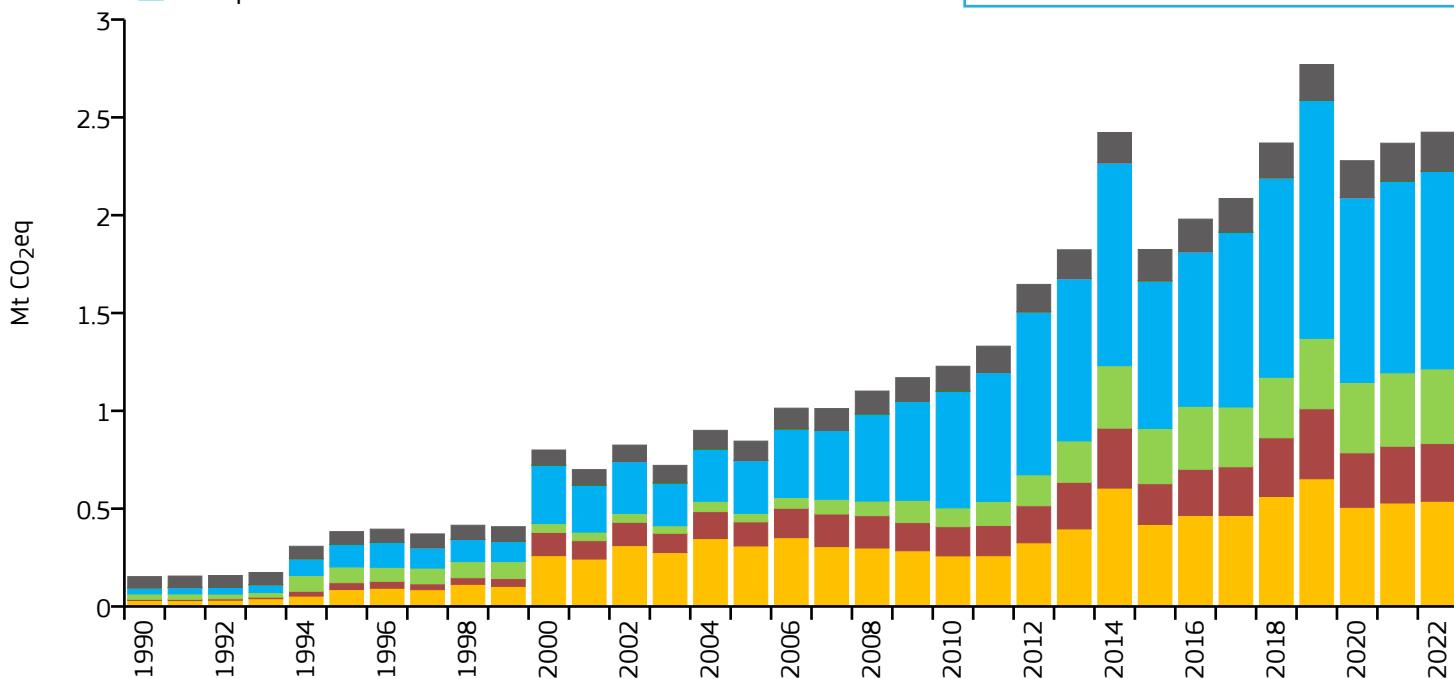
2022 vs 2021



Maldives

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 2.424 | 5.136 | 0.221 | 472.000k |
| 2015 | 1.825 | 4.361 | 0.232 | 418.403k |
| 2005 | 0.845 | 2.651 | 0.210 | 318.836k |
| 1990 | 0.152 | 0.683 | 0.064 | 223.215k |

2022 vs 1990

2022 vs 2005

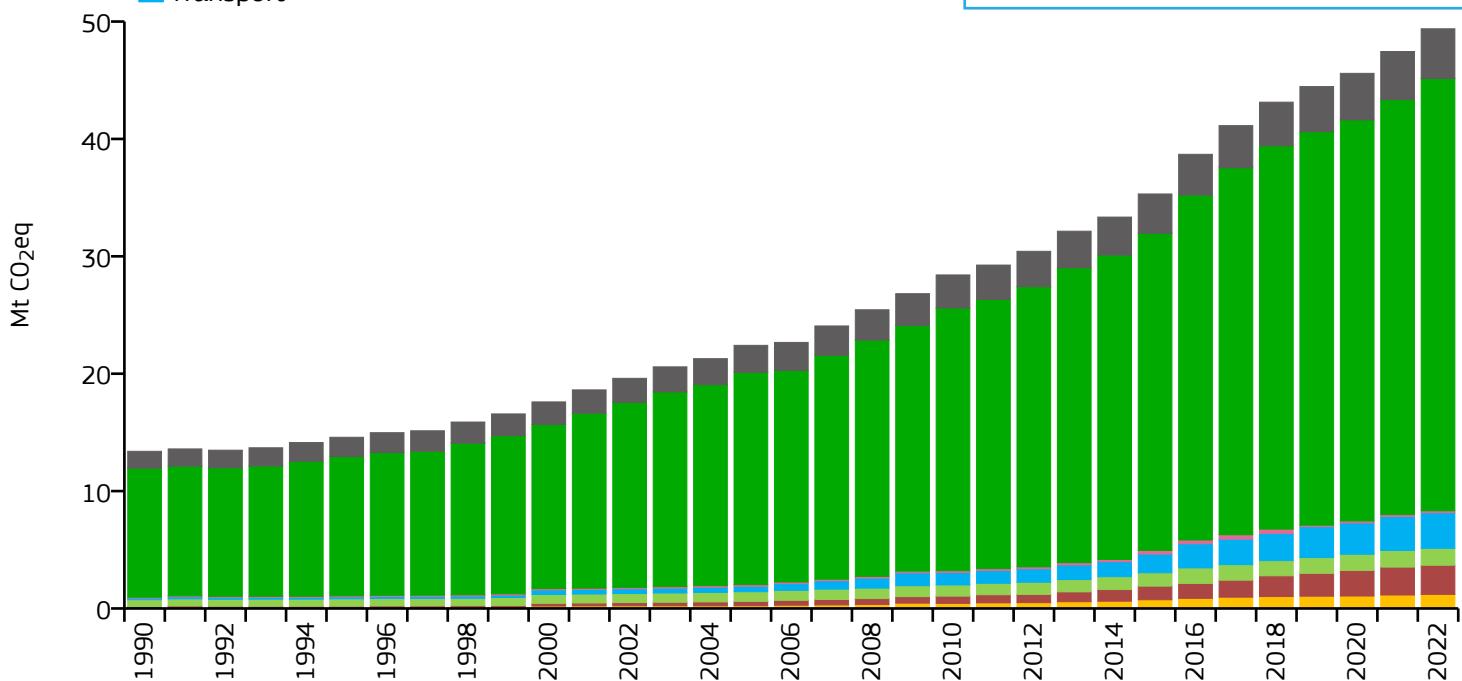
2022 vs 2021



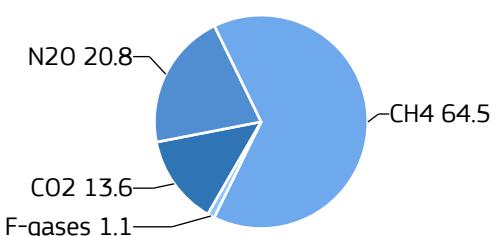
Mali

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 49.383 | 2.295 | 1.025 | 21.515M |
| 2015 | 35.311 | 2.021 | 0.946 | 17.468M |
| 2005 | 22.415 | 1.751 | 0.896 | 12.799M |
| 1990 | 13.389 | 1.582 | 1.120 | 8.465M |

2022 vs 1990

2022 vs 2005

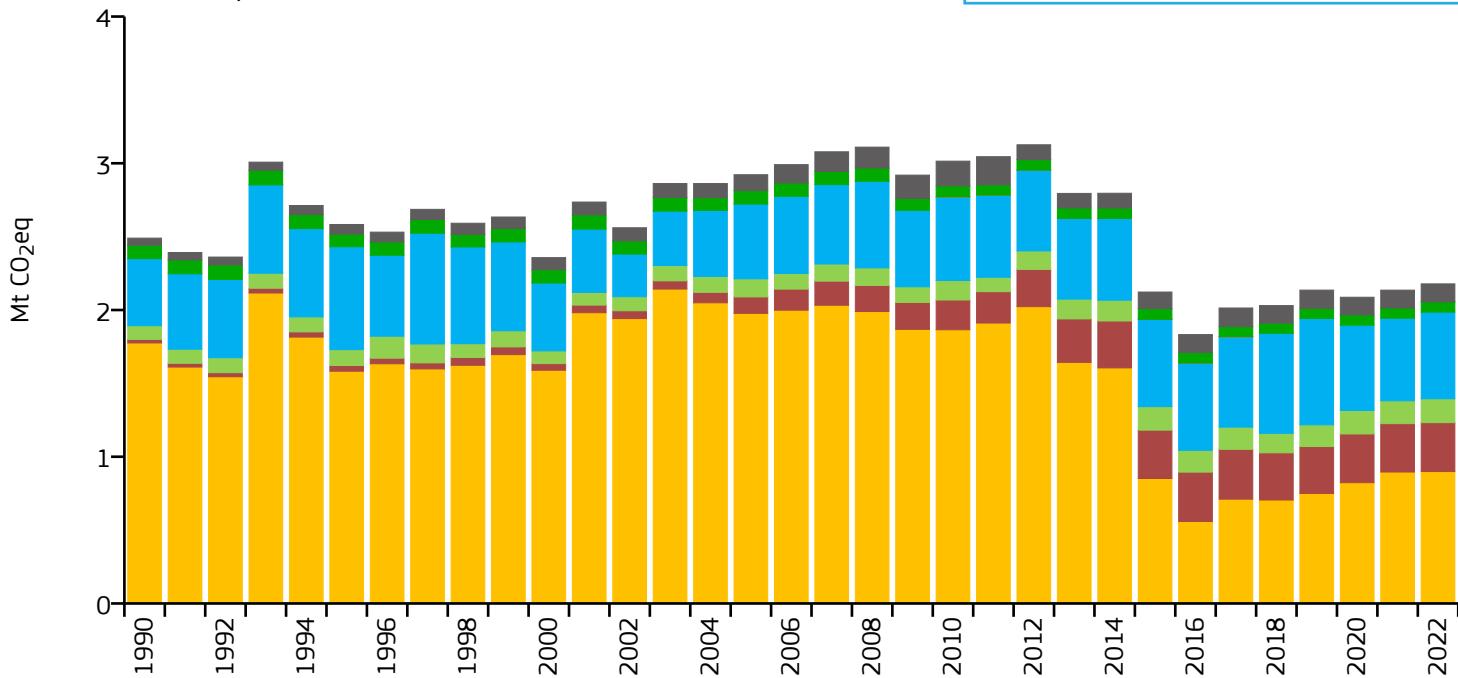
2022 vs 2021



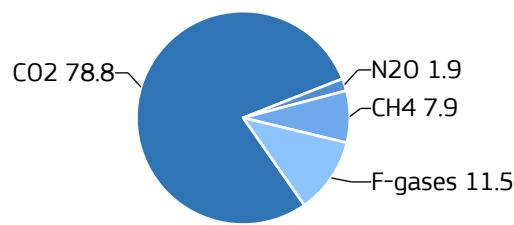
Malta

GHG emissions by sector

- █ Power Industry
- █ Industrial Combustion and Processes
- █ Buildings
- █ Transport
- █ Fuel Exploitation
- █ Agriculture
- █ Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 2.178 | 4.996 | 0.086 | 436.000k |
| 2015 | 2.122 | 4.963 | 0.120 | 427.616k |
| 2005 | 2.922 | 7.183 | 0.249 | 406.787k |
| 1990 | 2.490 | 6.832 | 0.436 | 364.431k |

2022 vs 1990

2022 vs 2005

2022 vs 2021

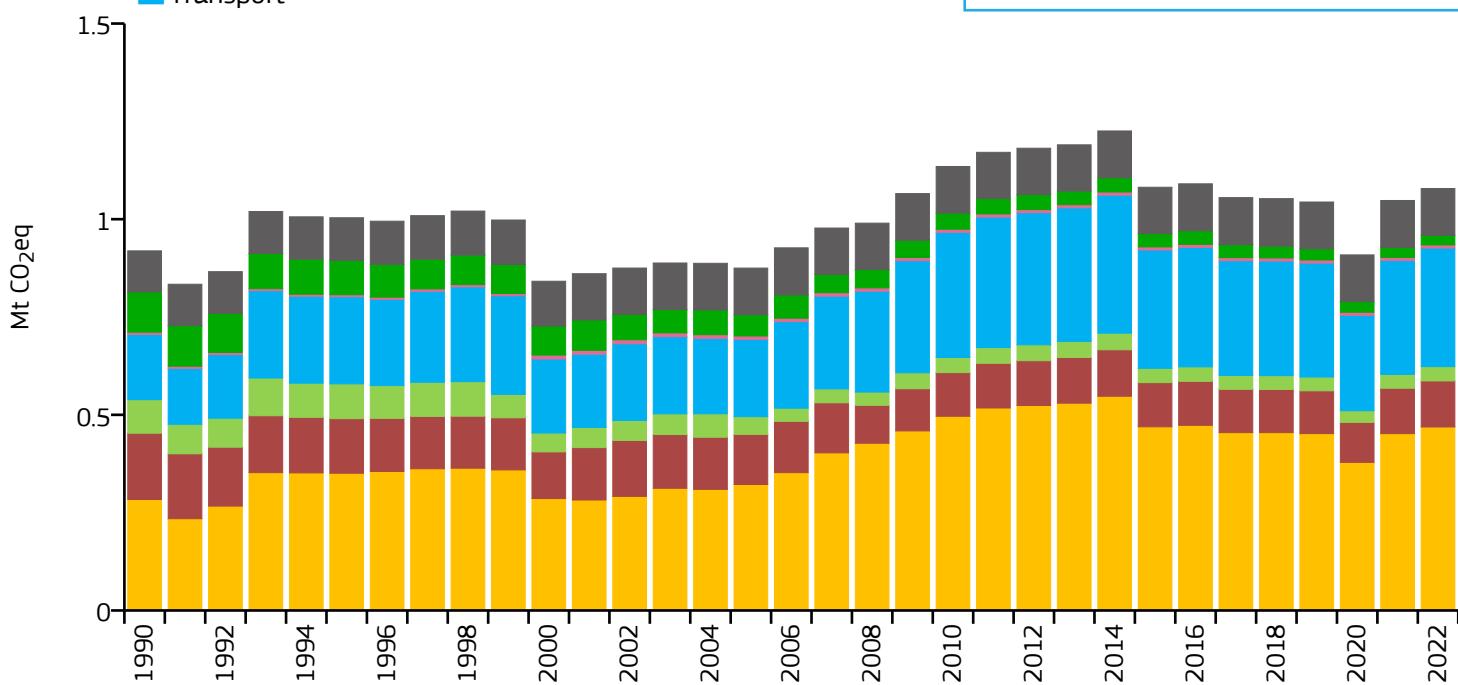
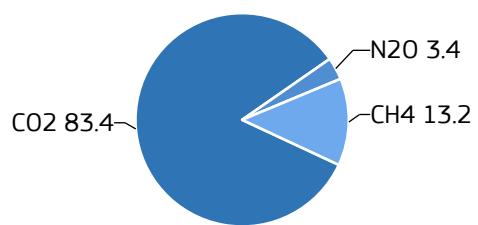


Martinique

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1.078 | 2.801 | n/a | 385.000k |
| 2015 | 1.082 | 2.803 | n/a | 385.842k |
| 2005 | 0.875 | 2.204 | n/a | 397.047k |
| 1990 | 0.919 | 2.564 | n/a | 358.449k |

2022 vs 1990

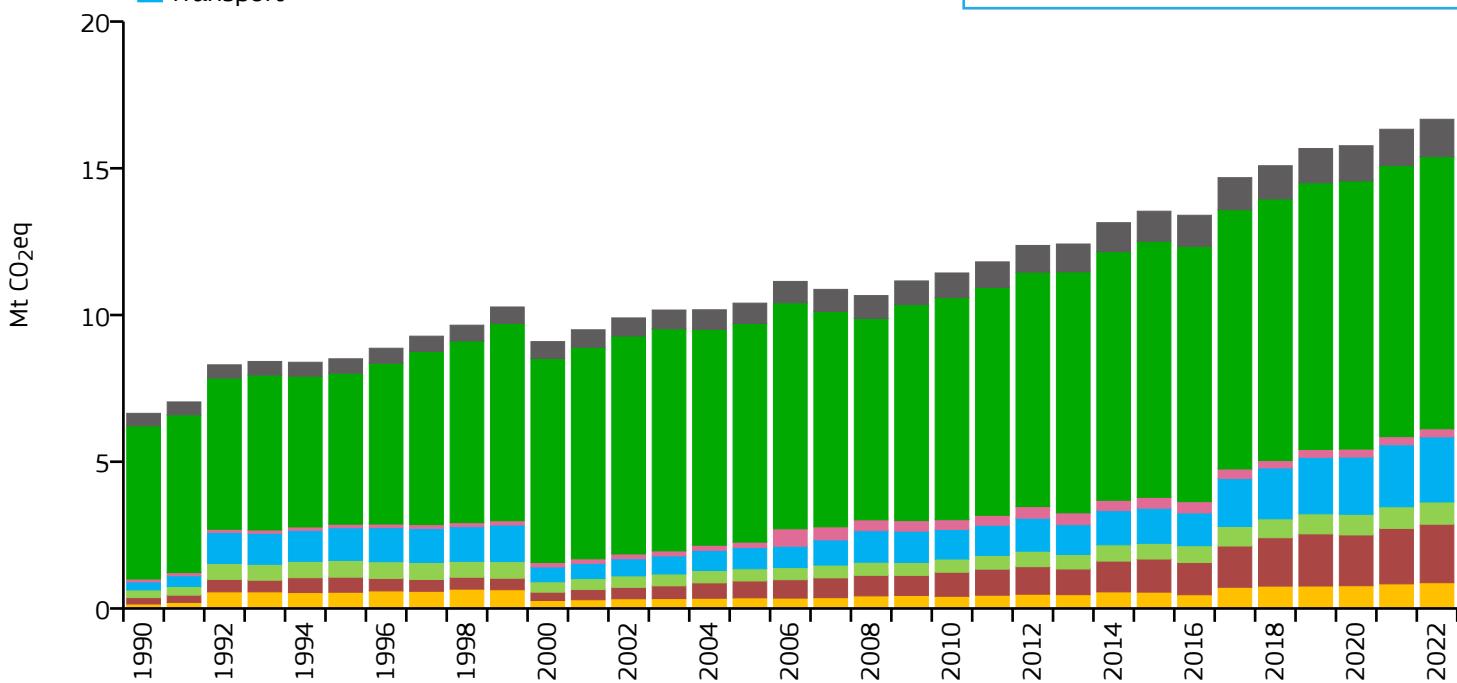
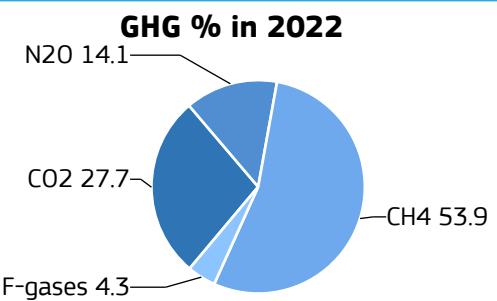
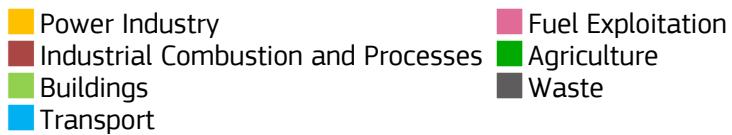
2022 vs 2005

2022 vs 2021



Mauritania

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 16.670 | 3.312 | 0.647 | 5.033M |
| 2015 | 13.538 | 3.237 | 0.666 | 4.182M |
| 2005 | 10.404 | 3.323 | 0.757 | 3.131M |
| 1990 | 6.650 | 3.276 | 0.719 | 2.030M |

2022 vs 1990

2022 vs 2005

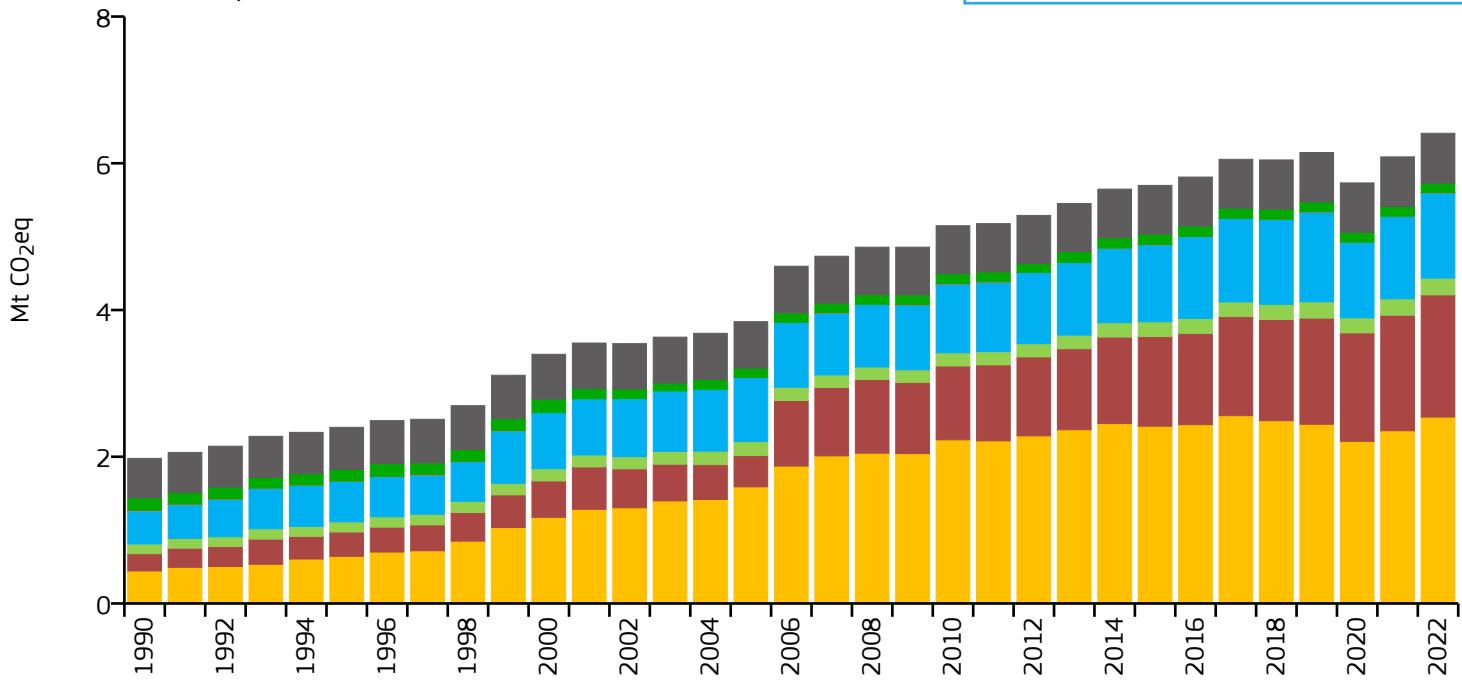
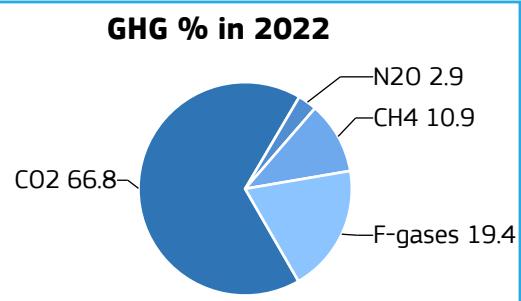
2022 vs 2021



Mauritius

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

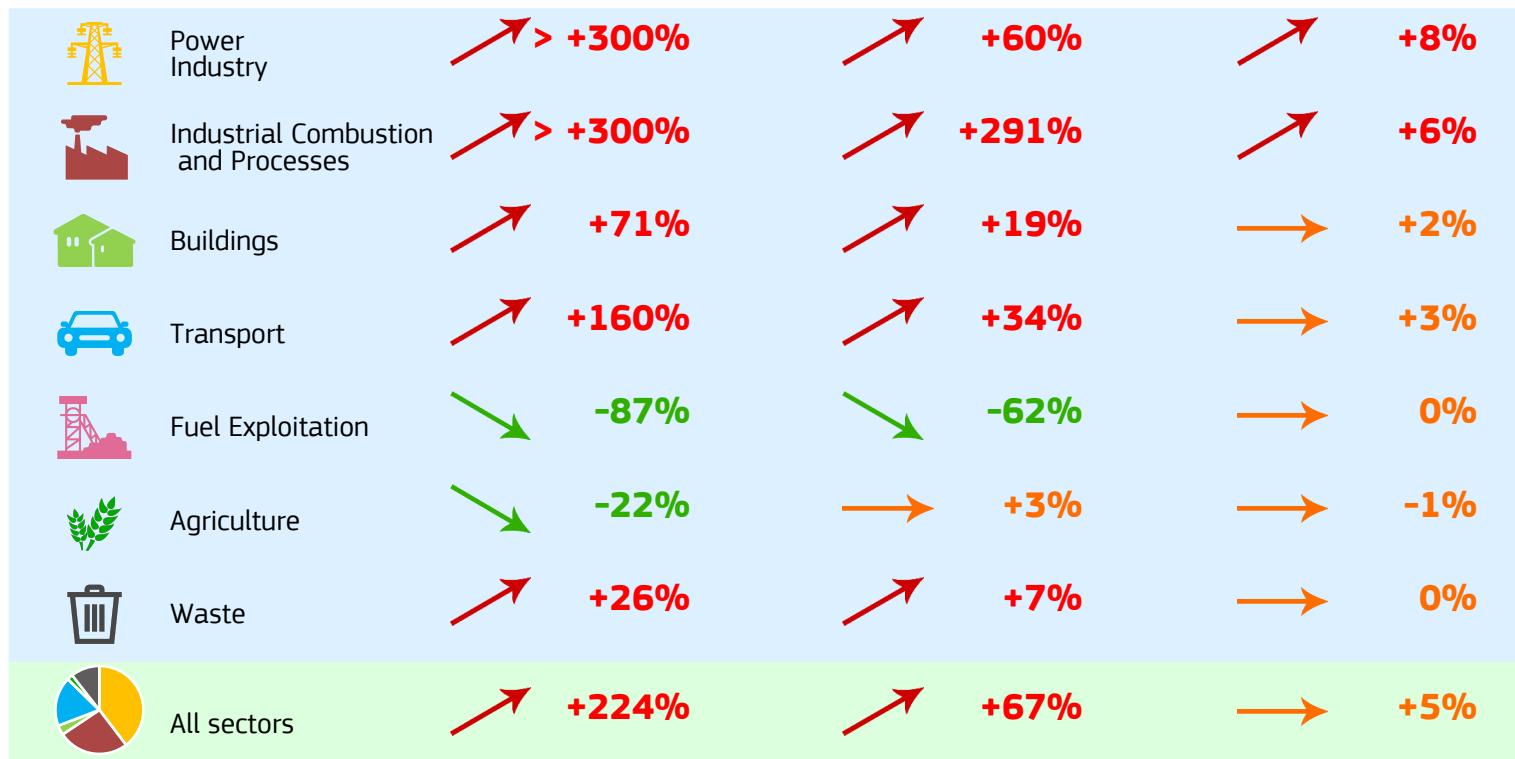


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 6.409 | 5.011 | 0.223 | 1.279M |
| 2015 | 5.699 | 4.525 | 0.220 | 1.259M |
| 2005 | 3.840 | 3.143 | 0.224 | 1.222M |
| 1990 | 1.978 | 1.873 | 0.227 | 1.056M |

2022 vs 1990

2022 vs 2005

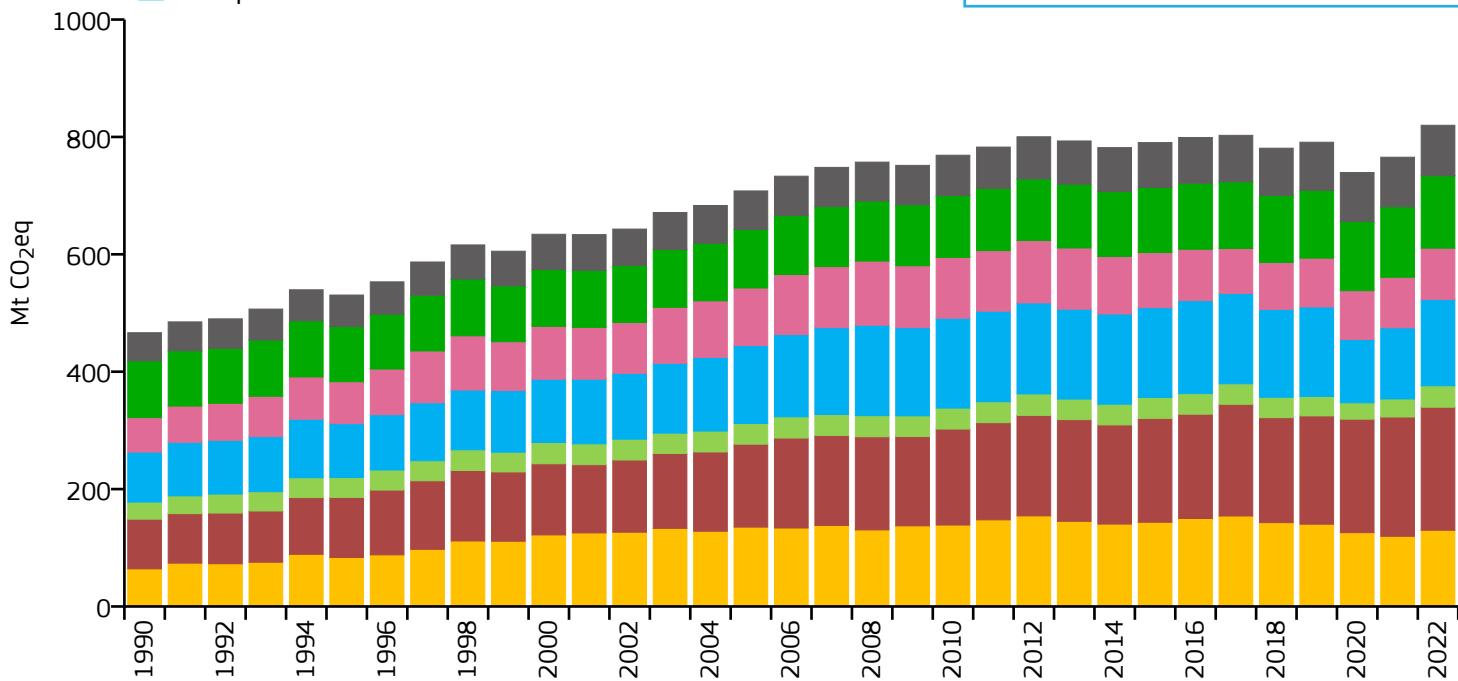
2022 vs 2021



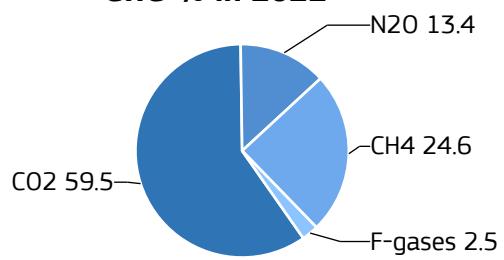
Mexico

GHG emissions by sector

- █ Power Industry
- █ Industrial Combustion and Processes
- █ Buildings
- █ Transport
- █ Fuel Exploitation
- █ Agriculture
- █ Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 819.873 | 5.990 | 0.329 | 136.869M |
| 2015 | 790.363 | 6.278 | 0.337 | 125.891M |
| 2005 | 707.980 | 6.527 | 0.375 | 108.472M |
| 1990 | 466.419 | 5.464 | 0.375 | 85.358M |

2022 vs 1990

2022 vs 2005

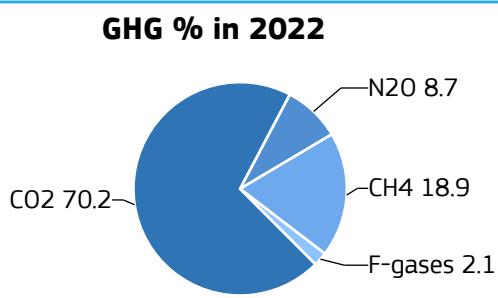
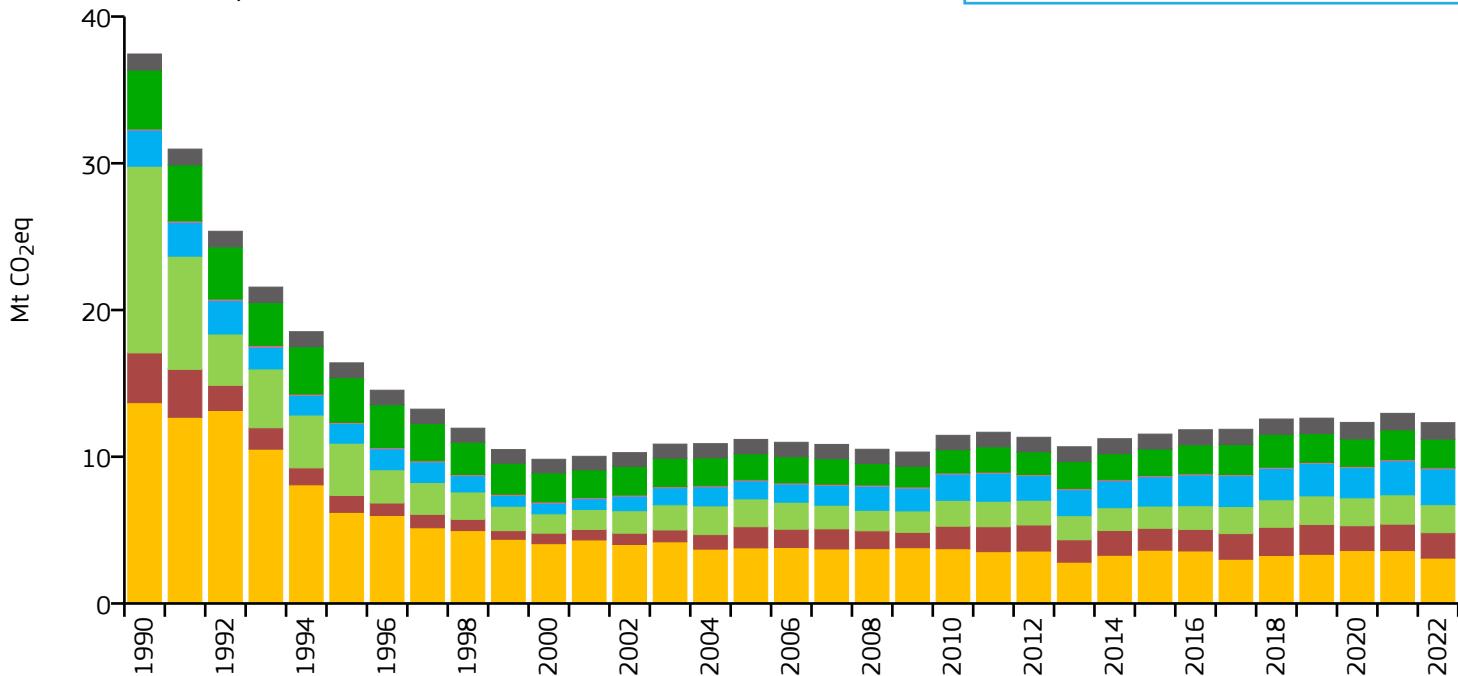
2022 vs 2021



Moldova

GHG emissions by sector

- | | |
|---|---|
|  |  |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 12.320 | 3.087 | 0.368 | 3.991M |
| 2015 | 11.542 | 2.839 | 0.398 | 4.066M |
| 2005 | 11.181 | 2.689 | 0.543 | 4.158M |
| 1990 | 37.447 | 8.581 | 0.894 | 4.364M |

2022 vs 1990

2022 vs 2005

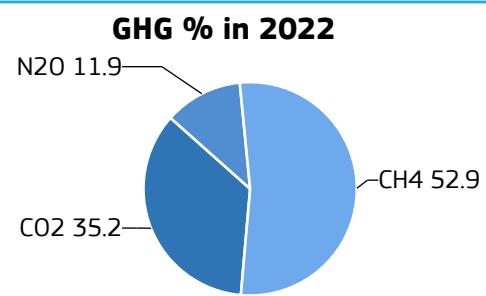
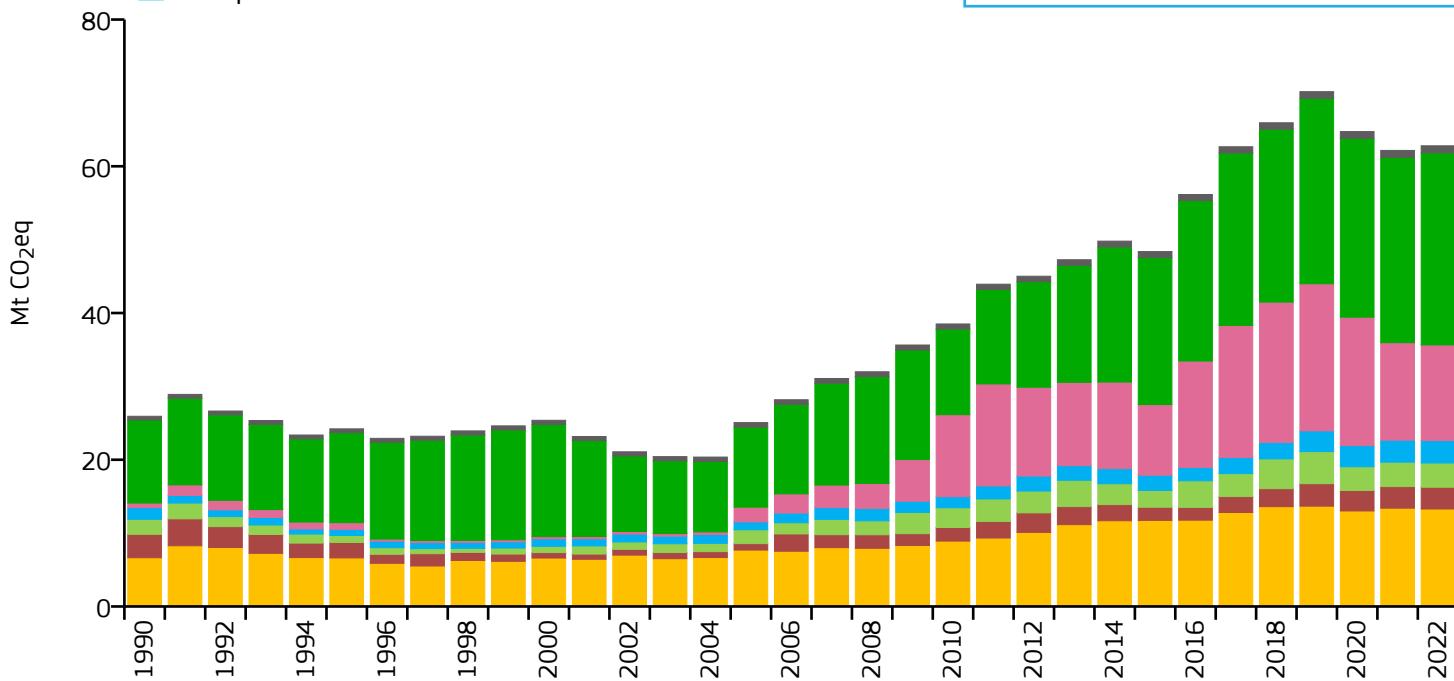
2022 vs 2021



Mongolia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 62.790 | 19.074 | 1.533 | 3.292M |
| 2015 | 48.376 | 16.250 | 1.465 | 2.977M |
| 2005 | 25.064 | 9.920 | 1.688 | 2.526M |
| 1990 | 25.924 | 11.869 | 2.385 | 2.184M |

2022 vs 1990

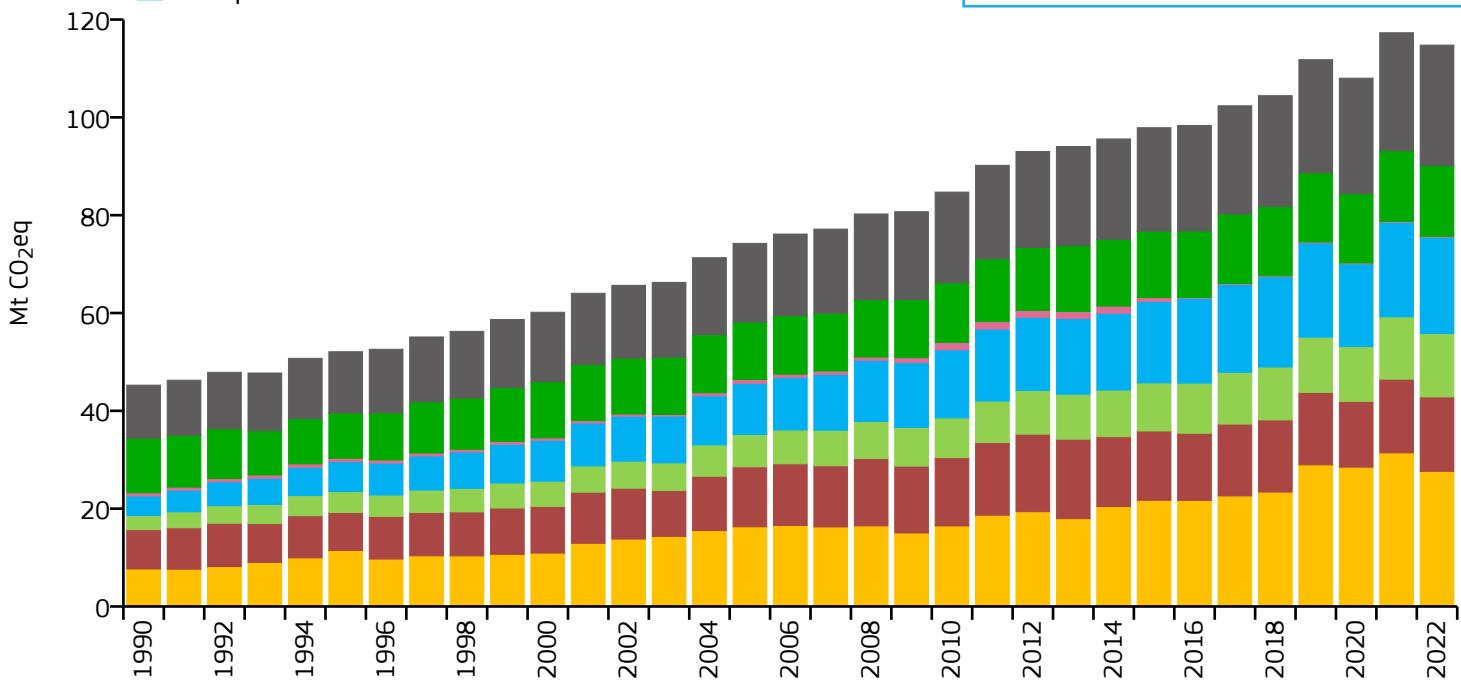
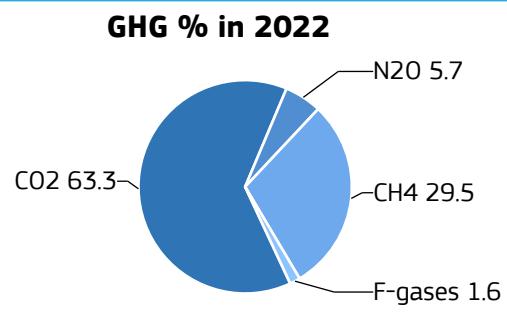
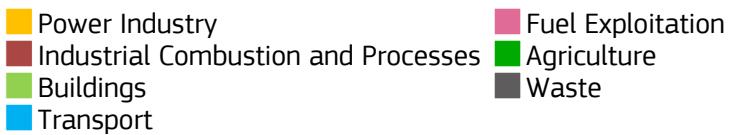
2022 vs 2005

2022 vs 2021



Morocco

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 114.771 | 3.027 | 0.374 | 37.914M |
| 2015 | 97.884 | 2.812 | 0.362 | 34.803M |
| 2005 | 74.238 | 2.432 | 0.422 | 30.521M |
| 1990 | 45.250 | 1.819 | 0.444 | 24.879M |

2022 vs 1990

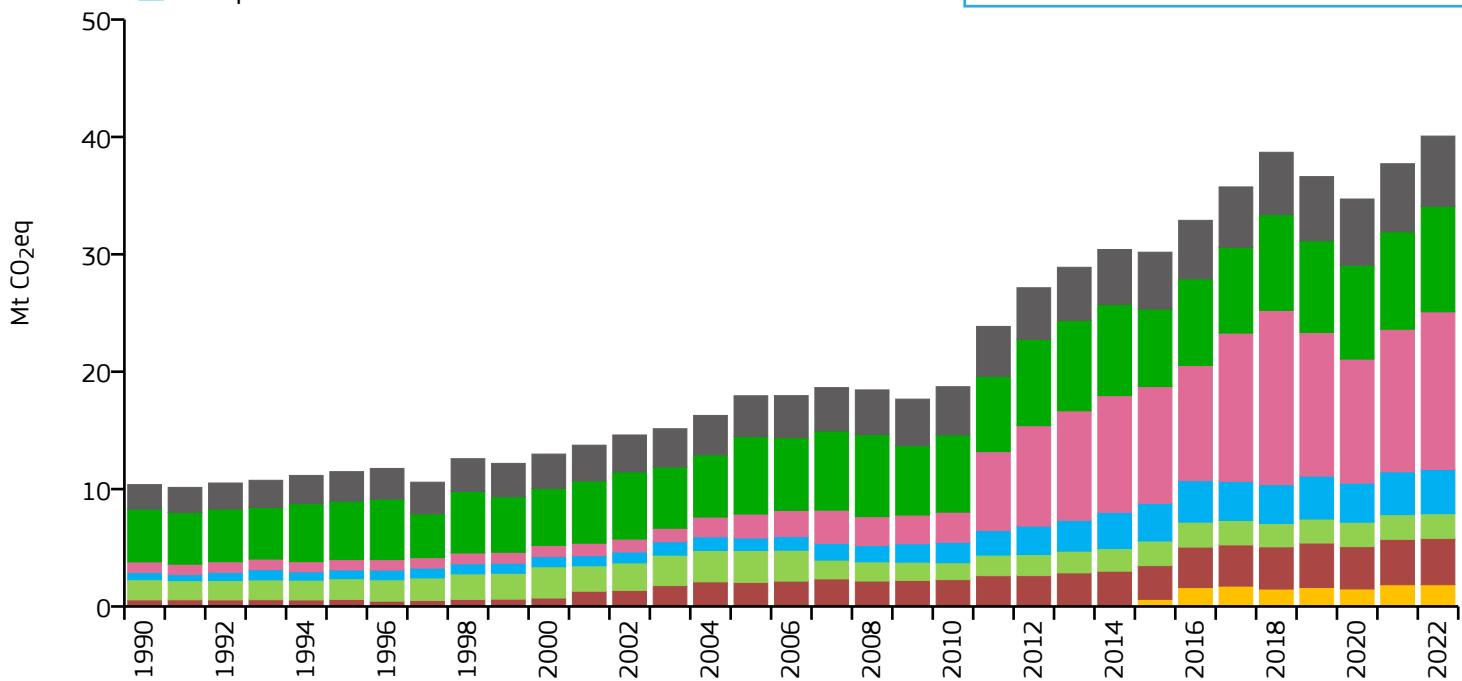
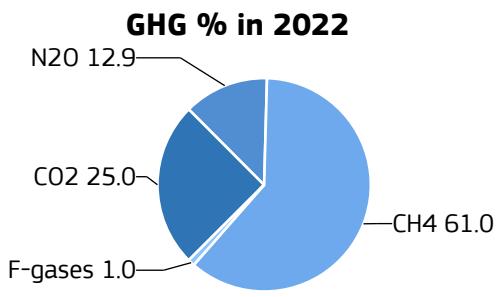
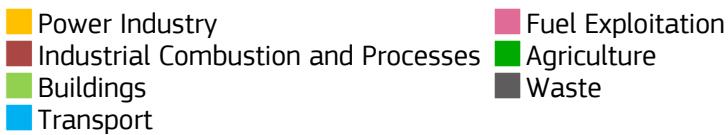
2022 vs 2005

2022 vs 2021



Mozambique

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 40.072 | 1.173 | 0.978 | 34.171M |
| 2015 | 30.181 | 1.077 | 0.884 | 28.011M |
| 2005 | 17.947 | 0.858 | 1.066 | 20.923M |
| 1990 | 10.380 | 0.784 | 1.696 | 13.248M |

2022 vs 1990

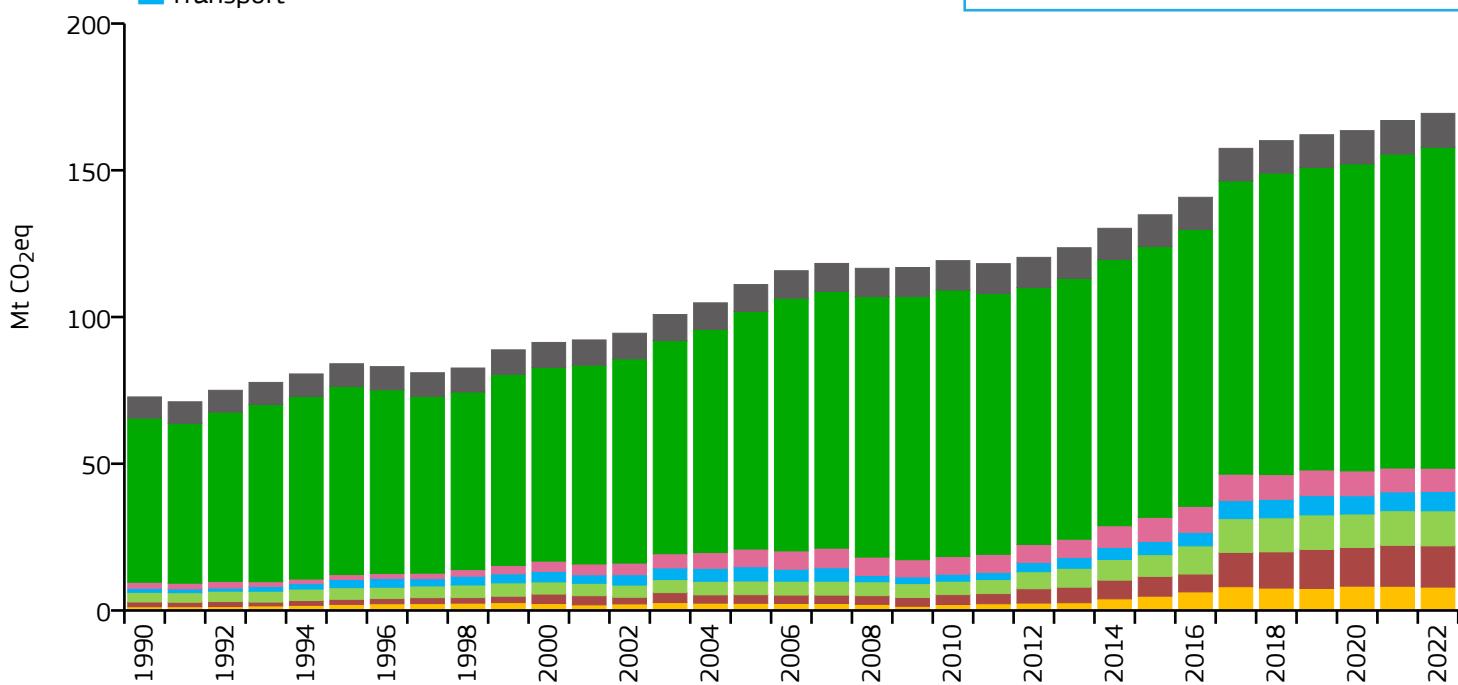
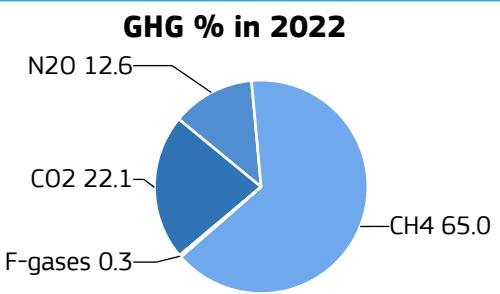
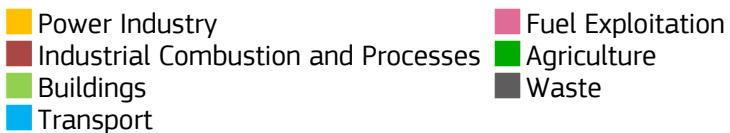
2022 vs 2005

2022 vs 2021



Myanmar/Burma

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 169.387 | 3.040 | 0.758 | 55.719M |
| 2015 | 134.828 | 2.573 | 0.699 | 52.404M |
| 2005 | 111.060 | 2.291 | 1.367 | 48.483M |
| 1990 | 72.767 | 1.791 | 3.120 | 40.626M |

2022 vs 1990

2022 vs 2005

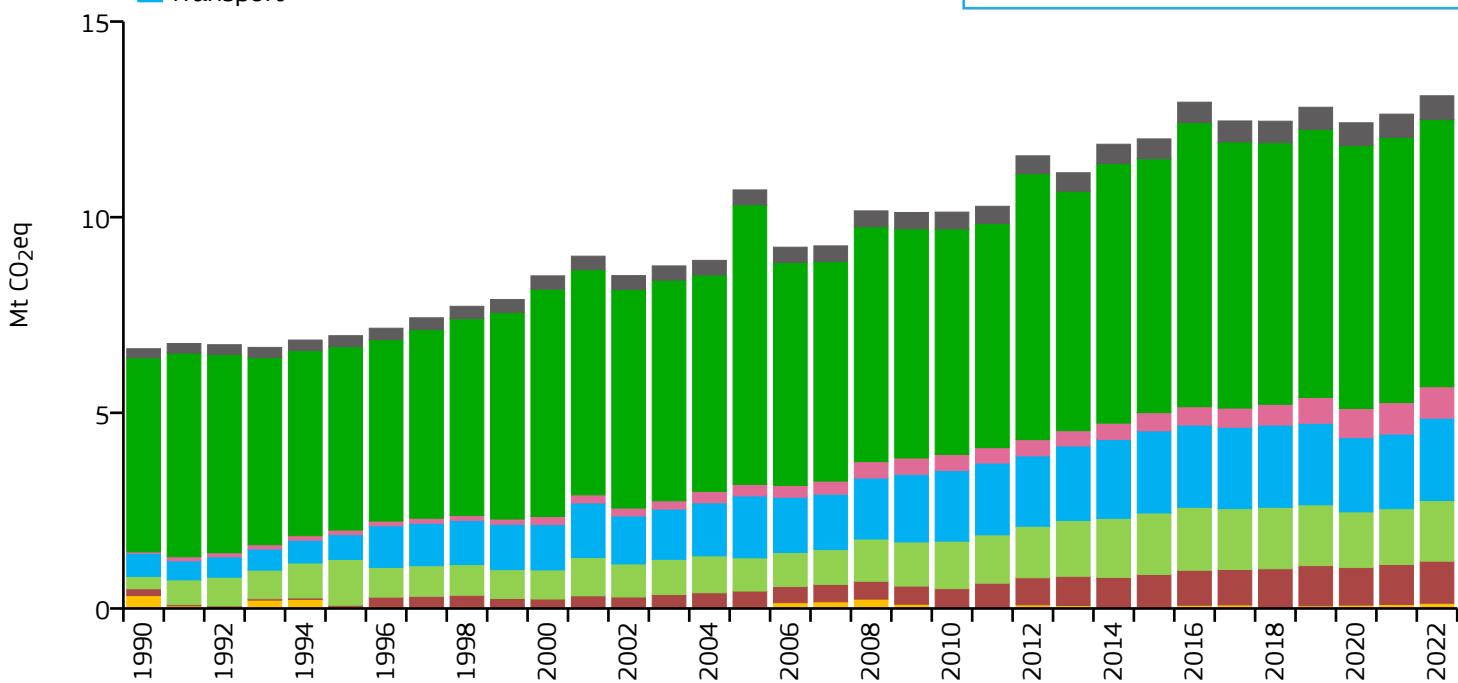
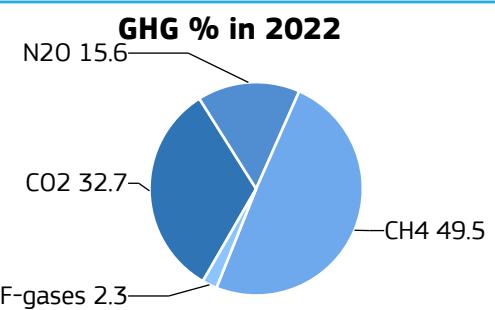
2022 vs 2021



Namibia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 13.103 | 4.670 | 0.538 | 2.806M |
| 2015 | 12.000 | 4.948 | 0.486 | 2.426M |
| 2005 | 10.697 | 5.264 | 0.689 | 2.032M |
| 1990 | 6.638 | 4.692 | 0.779 | 1.415M |

2022 vs 1990

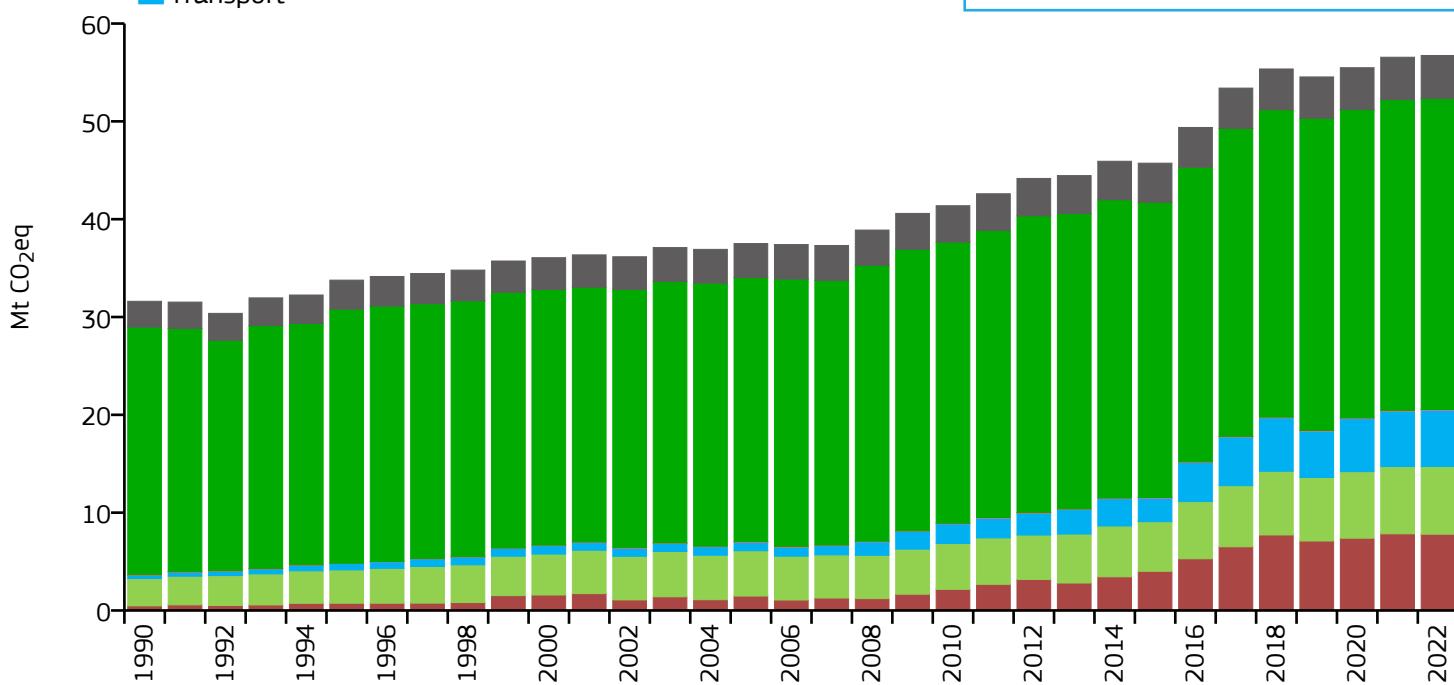
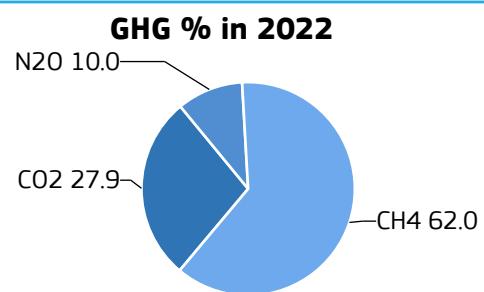
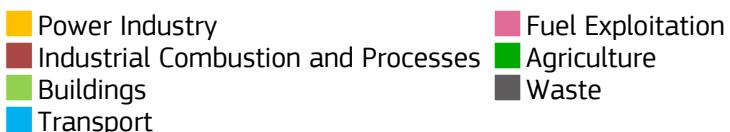
2022 vs 2005

2022 vs 2021



Nepal

GHG emissions by sector

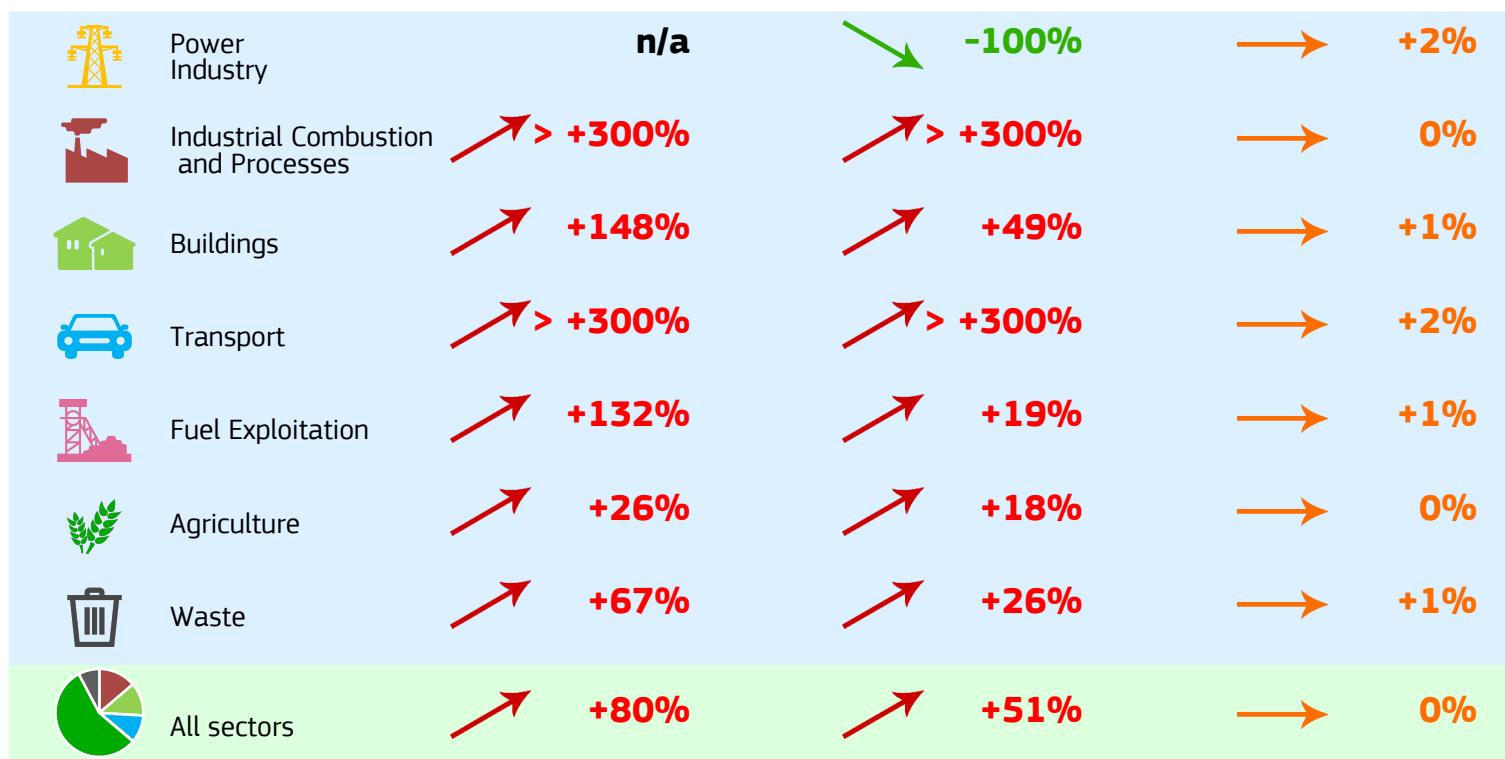


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 56.735 | 1.836 | 0.464 | 30.895M |
| 2015 | 45.726 | 1.596 | 0.508 | 28.656M |
| 2005 | 37.509 | 1.463 | 0.640 | 25.640M |
| 1990 | 31.605 | 1.686 | 1.036 | 18.749M |

2022 vs 1990

2022 vs 2005

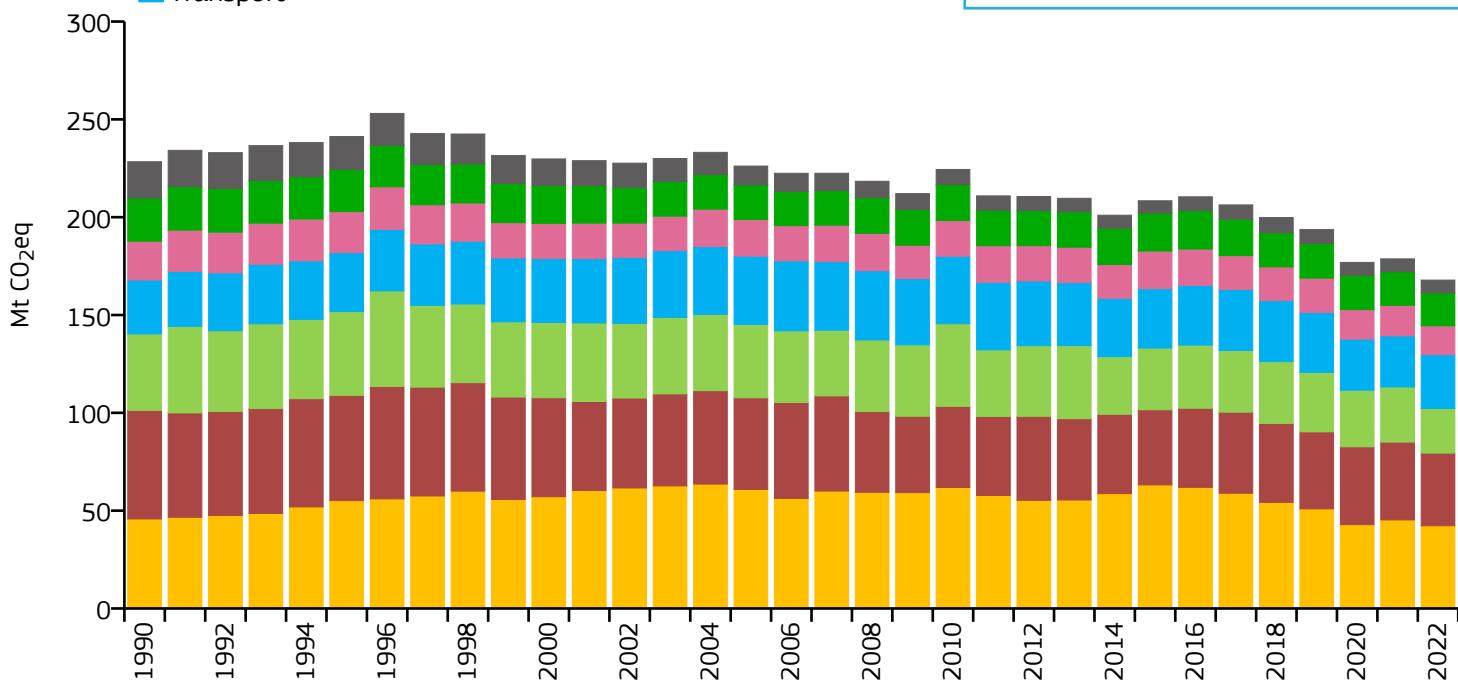
2022 vs 2021



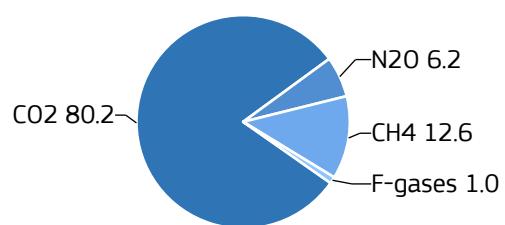
Netherlands

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 167.847 | 9.715 | 0.162 | 17.277M |
| 2015 | 208.383 | 12.302 | 0.232 | 16.938M |
| 2005 | 226.131 | 13.816 | 0.280 | 16.367M |
| 1990 | 228.342 | 15.258 | 0.419 | 14.965M |

2022 vs 1990

2022 vs 2005

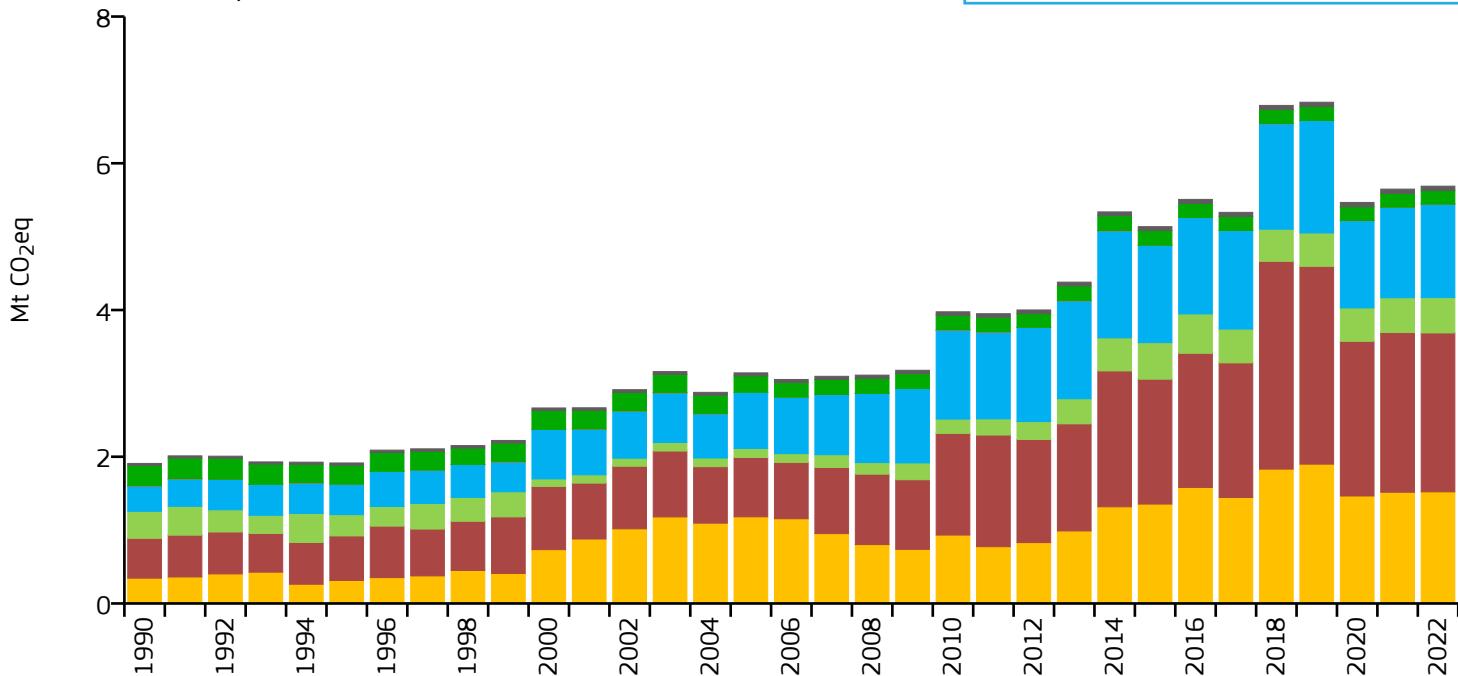
2022 vs 2021



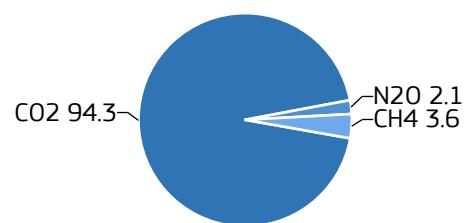
New Caledonia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 5.688 | 19.347 | 0.674 | 294.000k |
| 2015 | 5.136 | 19.086 | 0.568 | 269.091k |
| 2005 | 3.143 | 13.508 | 0.468 | 232.686k |
| 1990 | 1.909 | 11.242 | 0.410 | 169.787k |

2022 vs 1990

2022 vs 2005

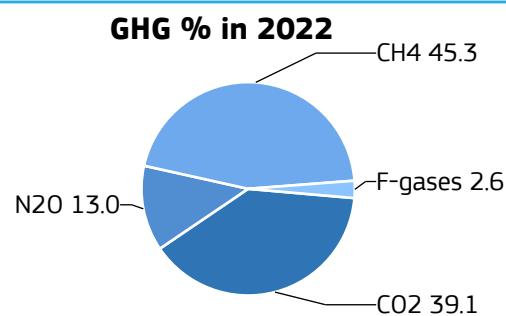
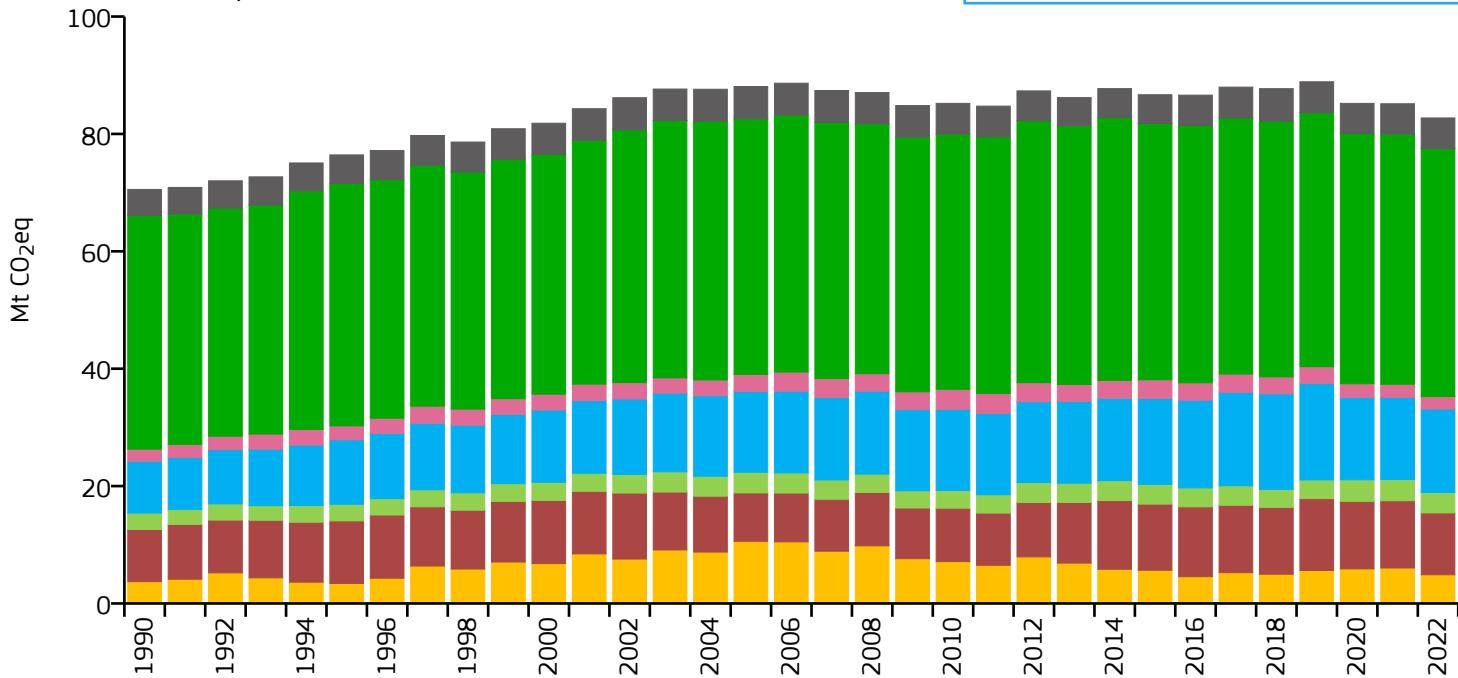
2022 vs 2021



New Zealand

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

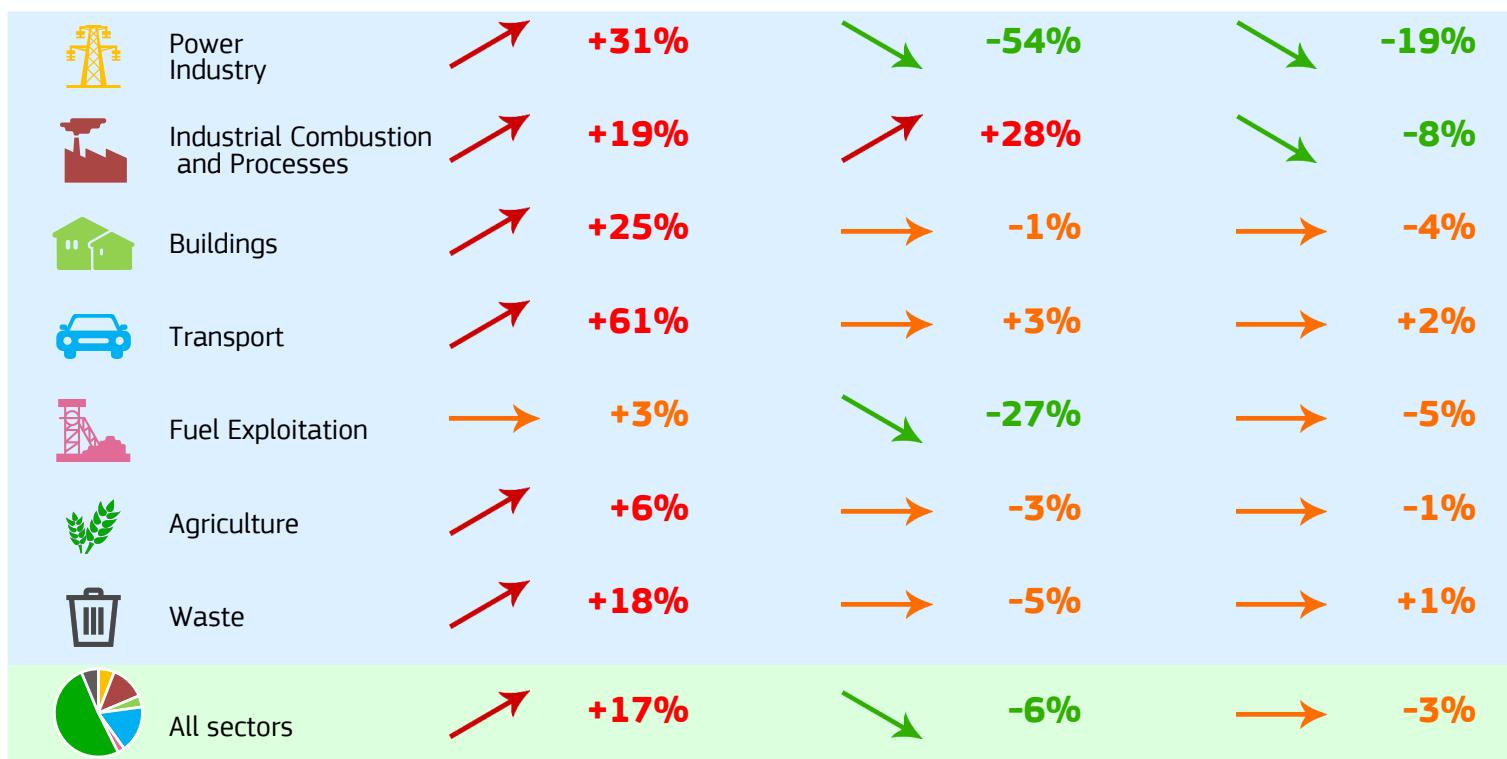


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 82.720 | 16.827 | 0.360 | 4.916M |
| 2015 | 86.677 | 18.784 | 0.458 | 4.615M |
| 2005 | 88.082 | 21.300 | 0.572 | 4.135M |
| 1990 | 70.544 | 20.760 | 0.757 | 3.398M |

2022 vs 1990

2022 vs 2005

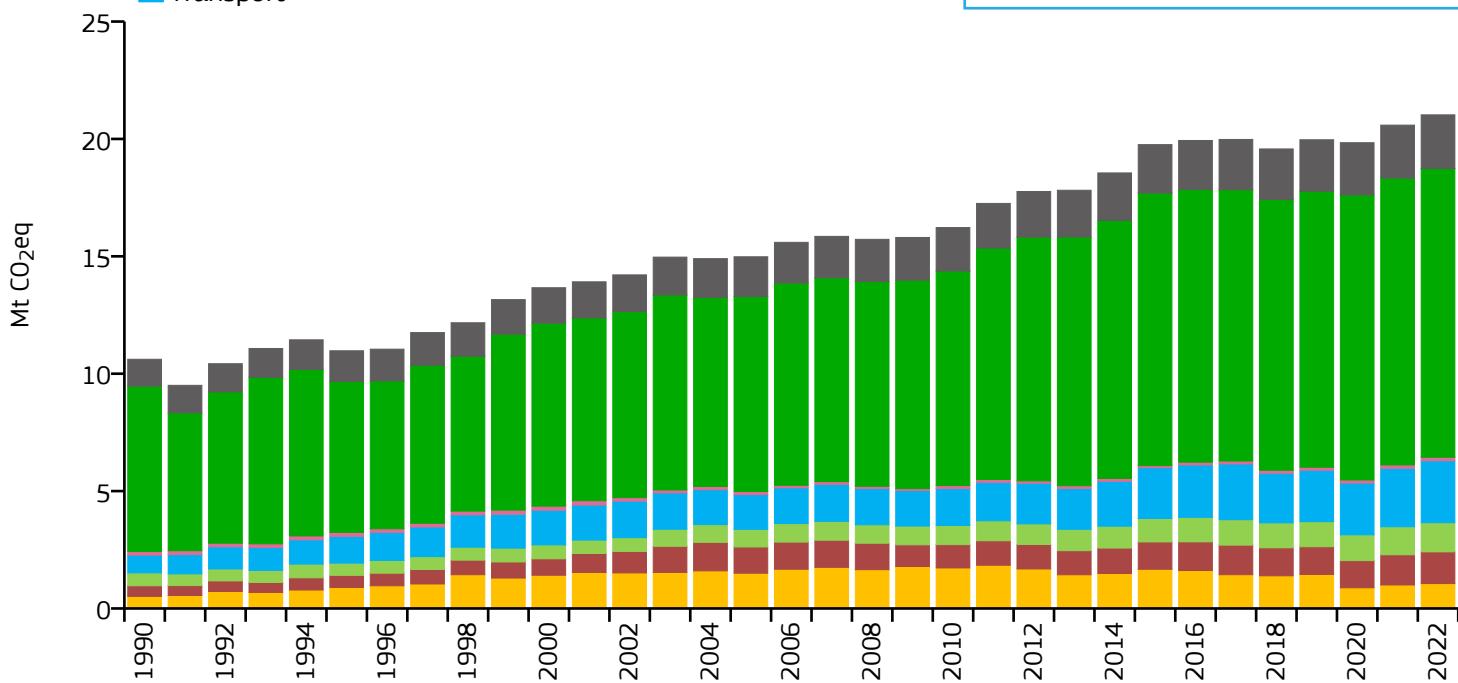
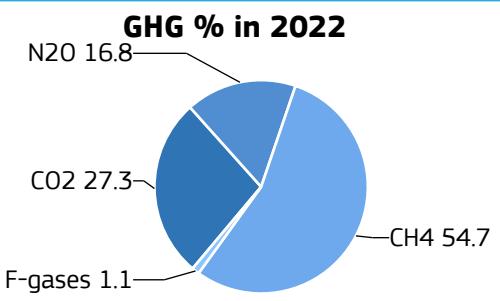
2022 vs 2021



Nicaragua

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

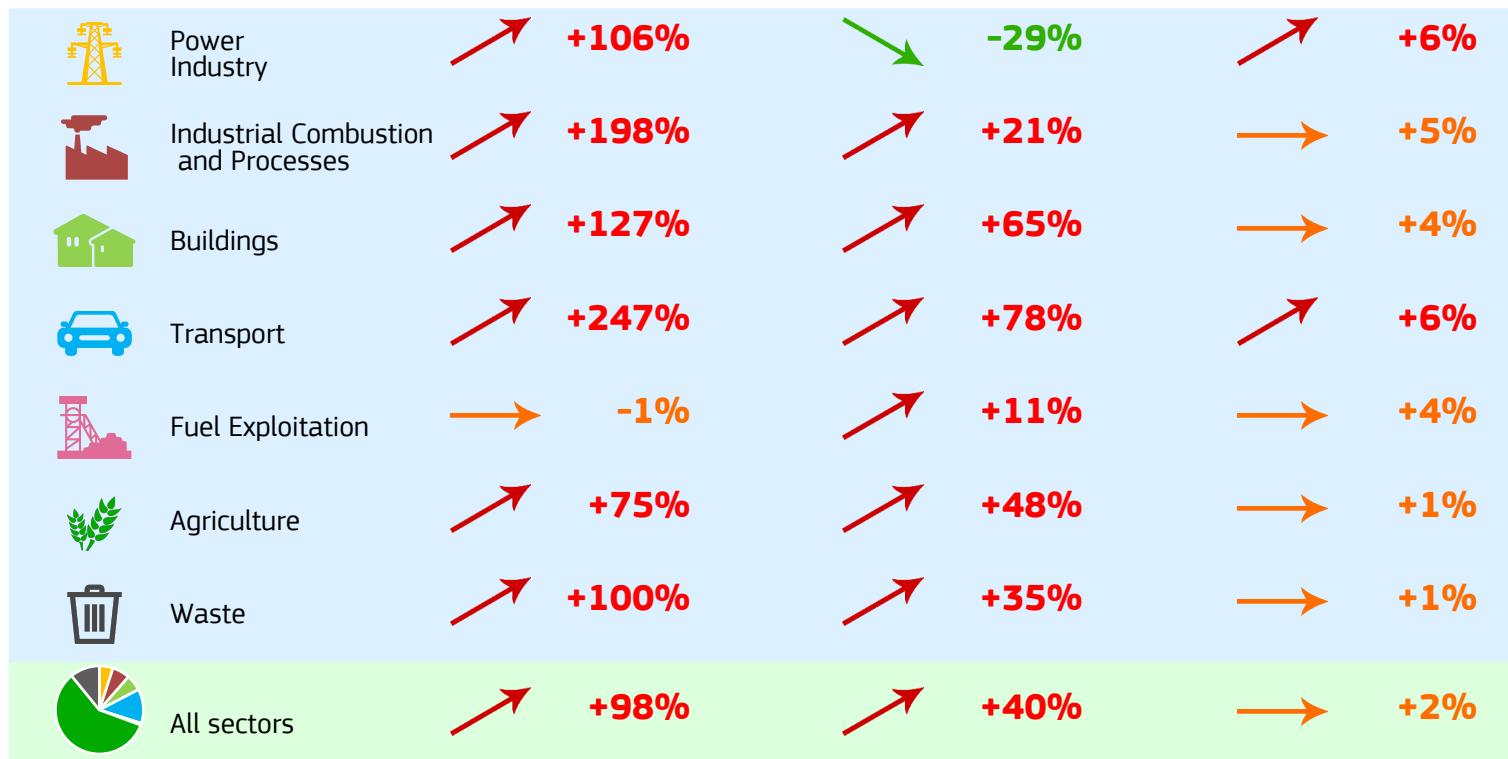


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 21.025 | 3.213 | 0.520 | 6.544M |
| 2015 | 19.757 | 3.248 | 0.564 | 6.082M |
| 2005 | 14.980 | 2.785 | 0.637 | 5.379M |
| 1990 | 10.614 | 2.561 | 0.736 | 4.145M |

2022 vs 1990

2022 vs 2005

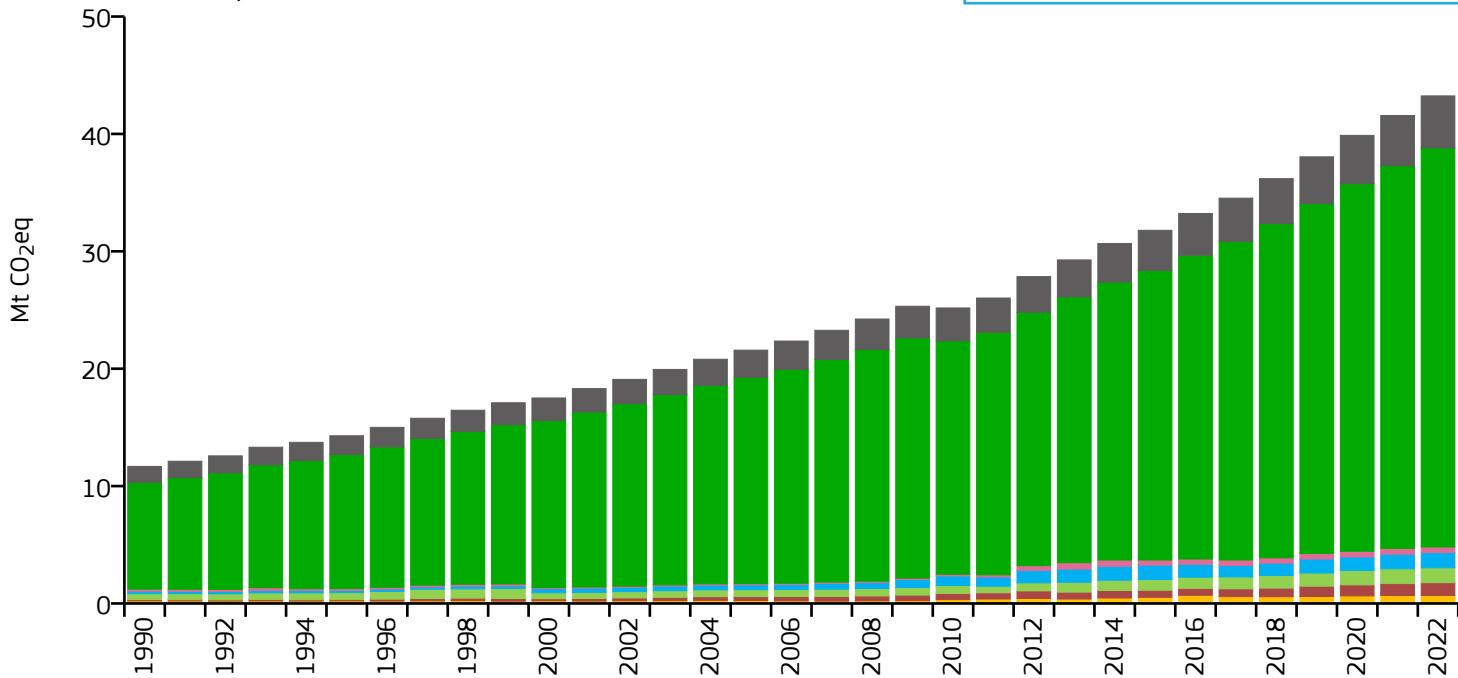
2022 vs 2021



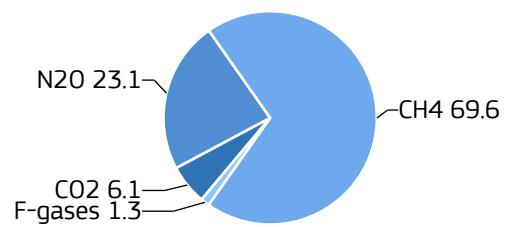
Niger

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 43.240 | 1.665 | 1.294 | 25.972M |
| 2015 | 31.791 | 1.598 | 1.405 | 19.897M |
| 2005 | 21.581 | 1.585 | 1.649 | 13.618M |
| 1990 | 11.679 | 1.458 | 1.294 | 8.013M |

2022 vs 1990

2022 vs 2005

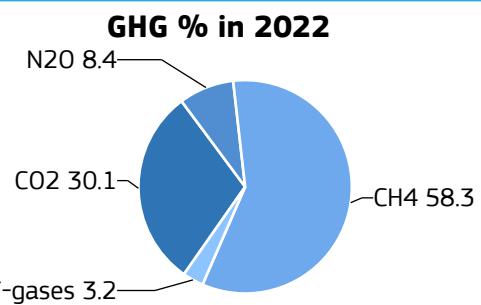
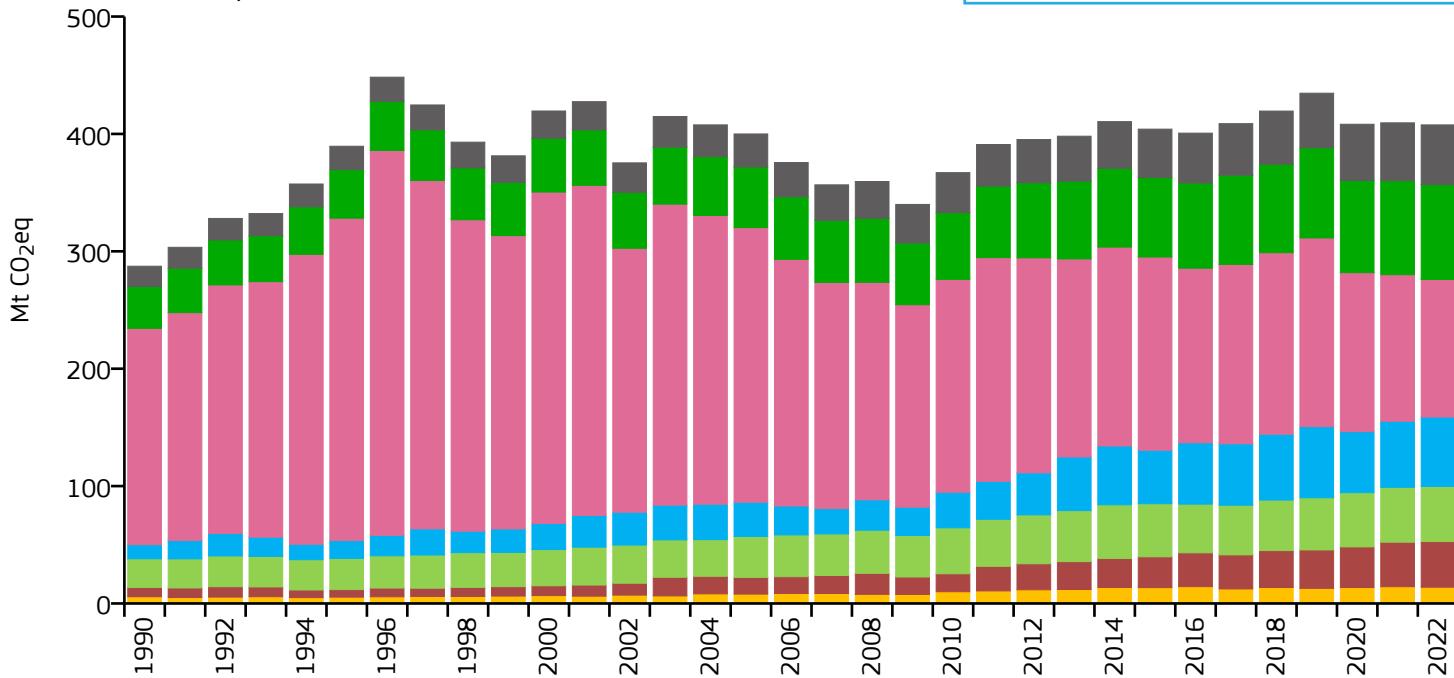
2022 vs 2021



Nigeria

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 407.690 | 1.880 | 0.376 | 216.844M |
| 2015 | 404.084 | 2.230 | 0.405 | 181.182M |
| 2005 | 399.979 | 2.879 | 0.721 | 138.939M |
| 1990 | 287.314 | 3.016 | 0.926 | 95.270M |

2022 vs 1990

2022 vs 2005

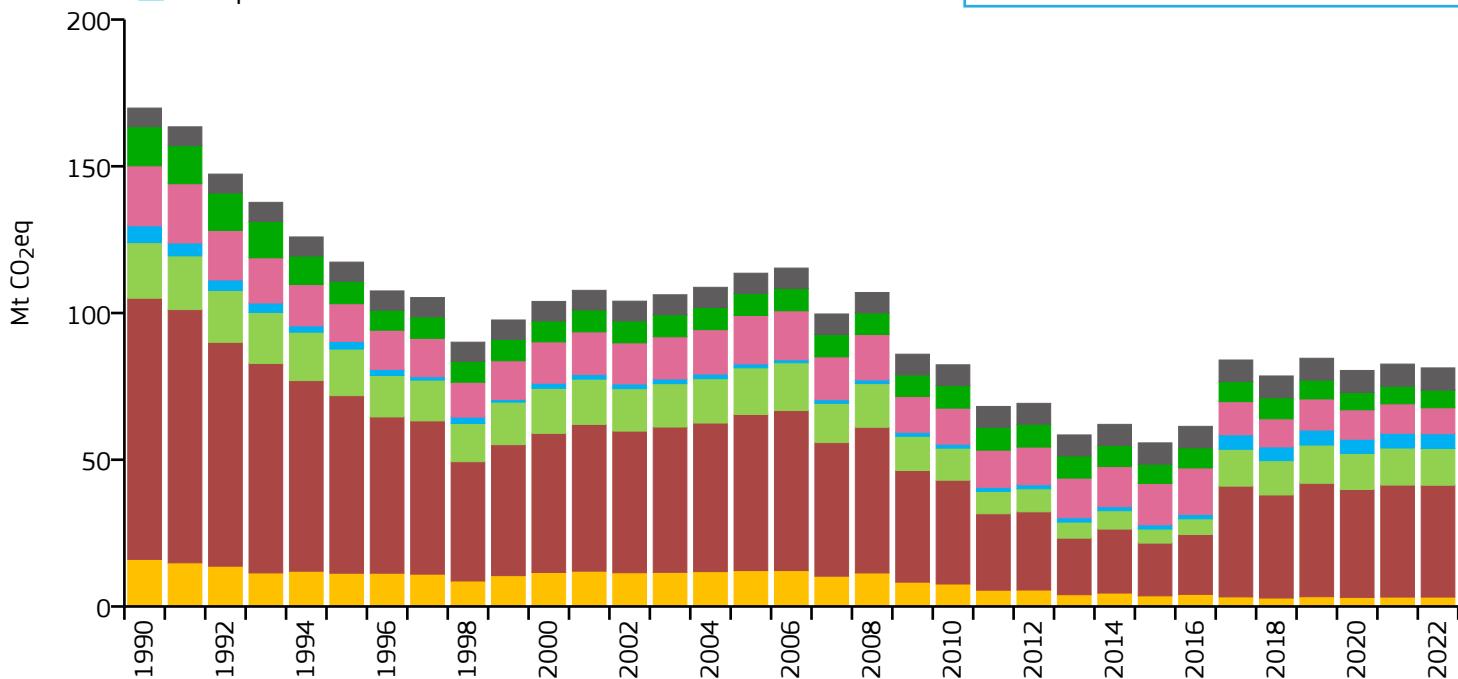
2022 vs 2021



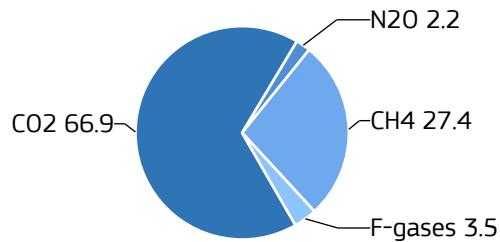
North Korea

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 81.293 | 3.120 | 0.664 | 26.057M |
| 2015 | 55.746 | 2.208 | 0.519 | 25.244M |
| 2005 | 113.563 | 4.751 | 1.178 | 23.904M |
| 1990 | 169.836 | 8.369 | 1.639 | 20.293M |

2022 vs 1990

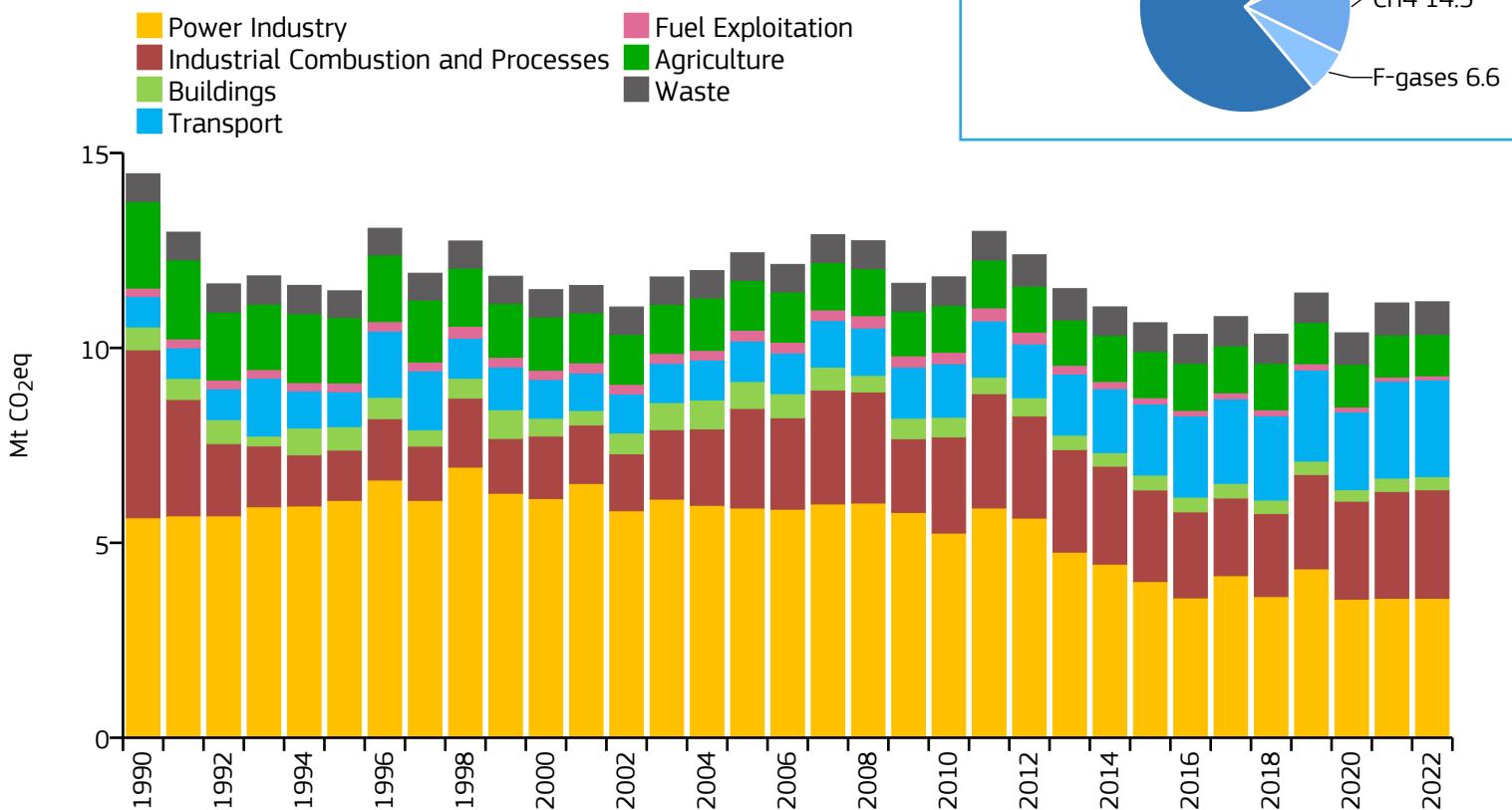
2022 vs 2005

2022 vs 2021



North Macedonia

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 11.184 | 5.354 | 0.317 | 2.089M |
| 2015 | 10.645 | 5.120 | 0.340 | 2.079M |
| 2005 | 12.440 | 6.038 | 0.545 | 2.060M |
| 1990 | 14.469 | 7.248 | 0.637 | 1.996M |

2022 vs 1990

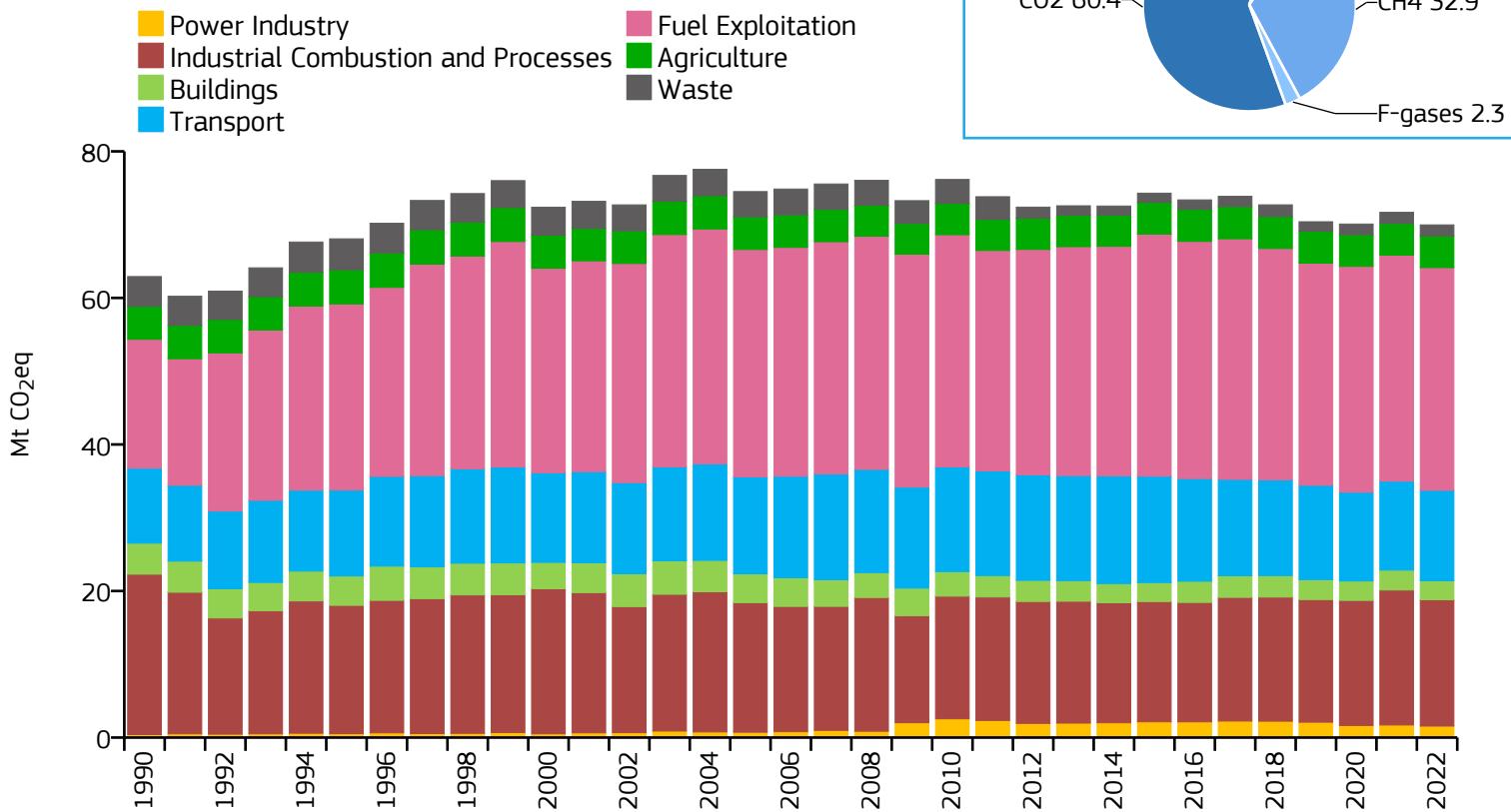
2022 vs 2005

2022 vs 2021

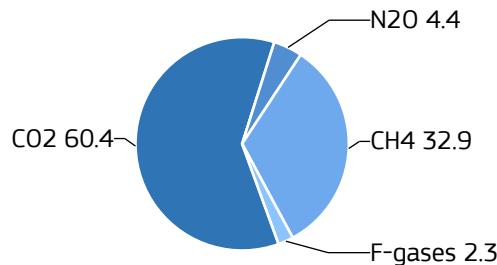


Norway

GHG emissions by sector



GHG % in 2022

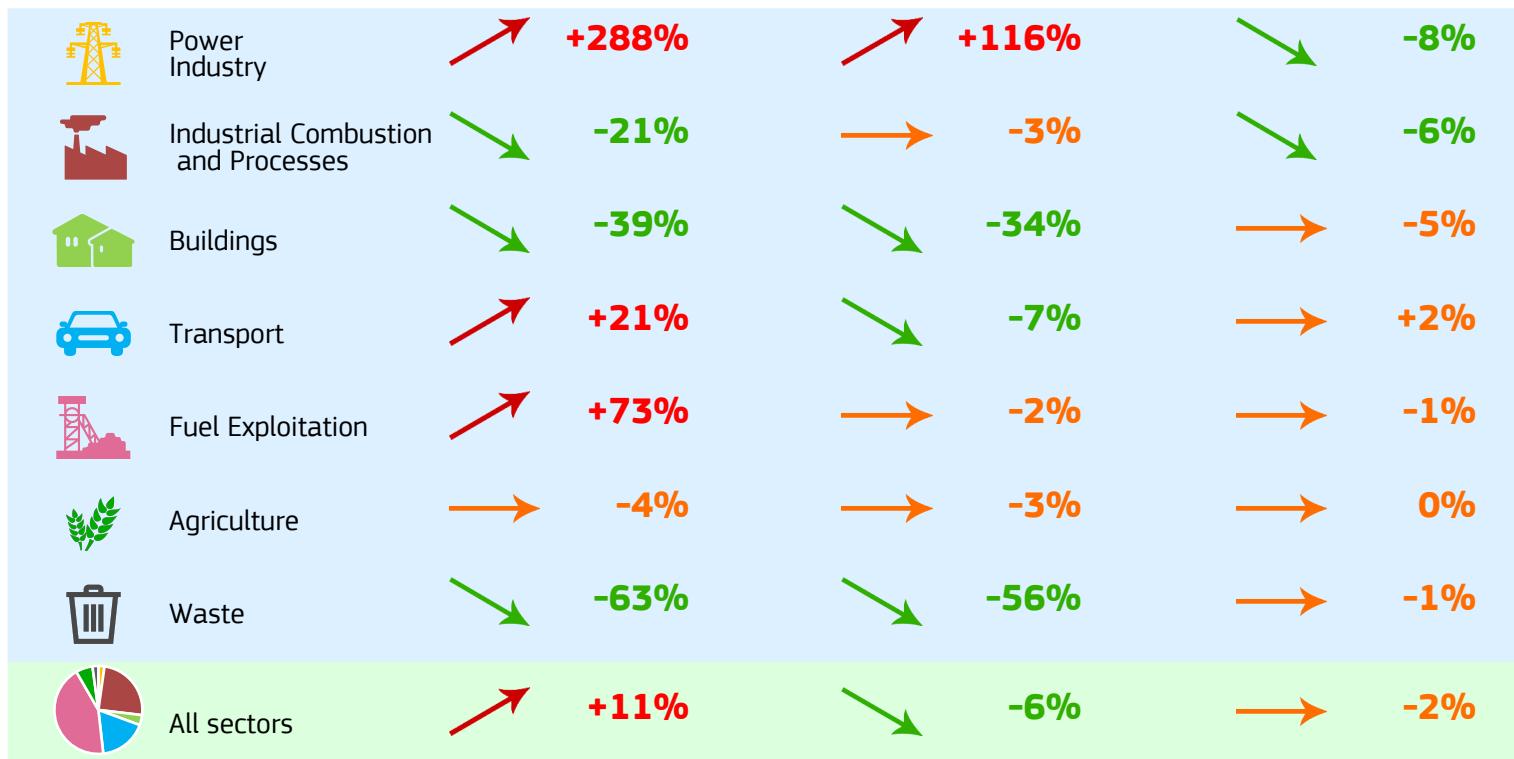


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 69.965 | 12.602 | 0.190 | 5.552M |
| 2015 | 74.296 | 14.288 | 0.226 | 5.200M |
| 2005 | 74.509 | 16.084 | 0.259 | 4.632M |
| 1990 | 62.914 | 14.813 | 0.351 | 4.247M |

2022 vs 1990

2022 vs 2005

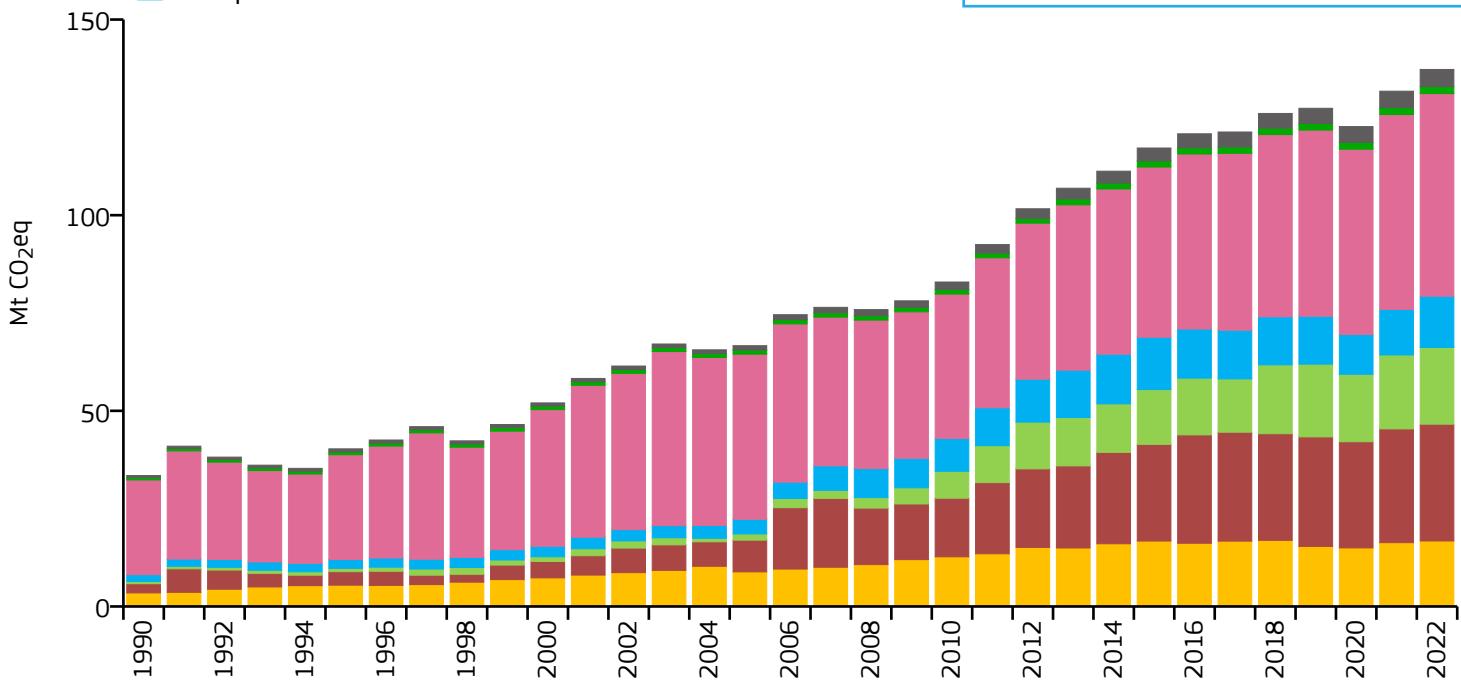
2022 vs 2021



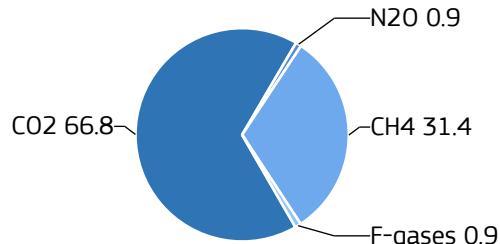
Oman

GHG emissions by sector

- | | |
|---|--|
| ■ Power Industry ■ Industrial Combustion and Processes ■ Buildings ■ Transport | ■ Fuel Exploitation ■ Agriculture ■ Waste |
|---|--|



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 137.244 | 25.586 | 0.849 | 5.364M |
| 2015 | 117.168 | 27.899 | 0.794 | 4.200M |
| 2005 | 66.648 | 26.539 | 0.728 | 2.511M |
| 1990 | 33.465 | 18.467 | 0.609 | 1.812M |

2022 vs 1990

2022 vs 2005

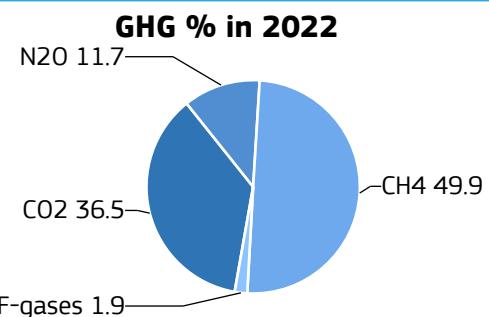
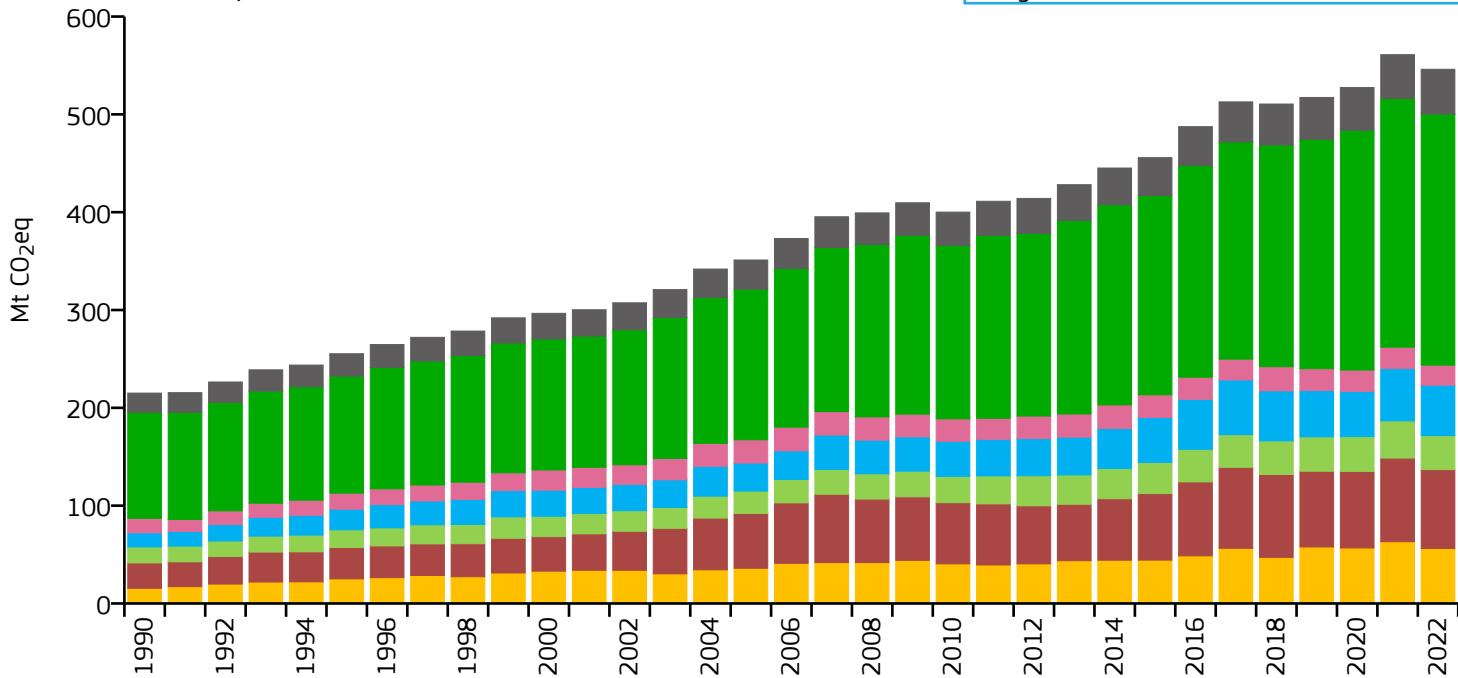
2022 vs 2021



Pakistan

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 546.099 | 2.530 | 0.425 | 215.824M |
| 2015 | 455.753 | 2.407 | 0.475 | 189.381M |
| 2005 | 351.129 | 2.281 | 0.525 | 153.910M |
| 1990 | 215.033 | 1.997 | 0.609 | 107.679M |

2022 vs 1990

2022 vs 2005

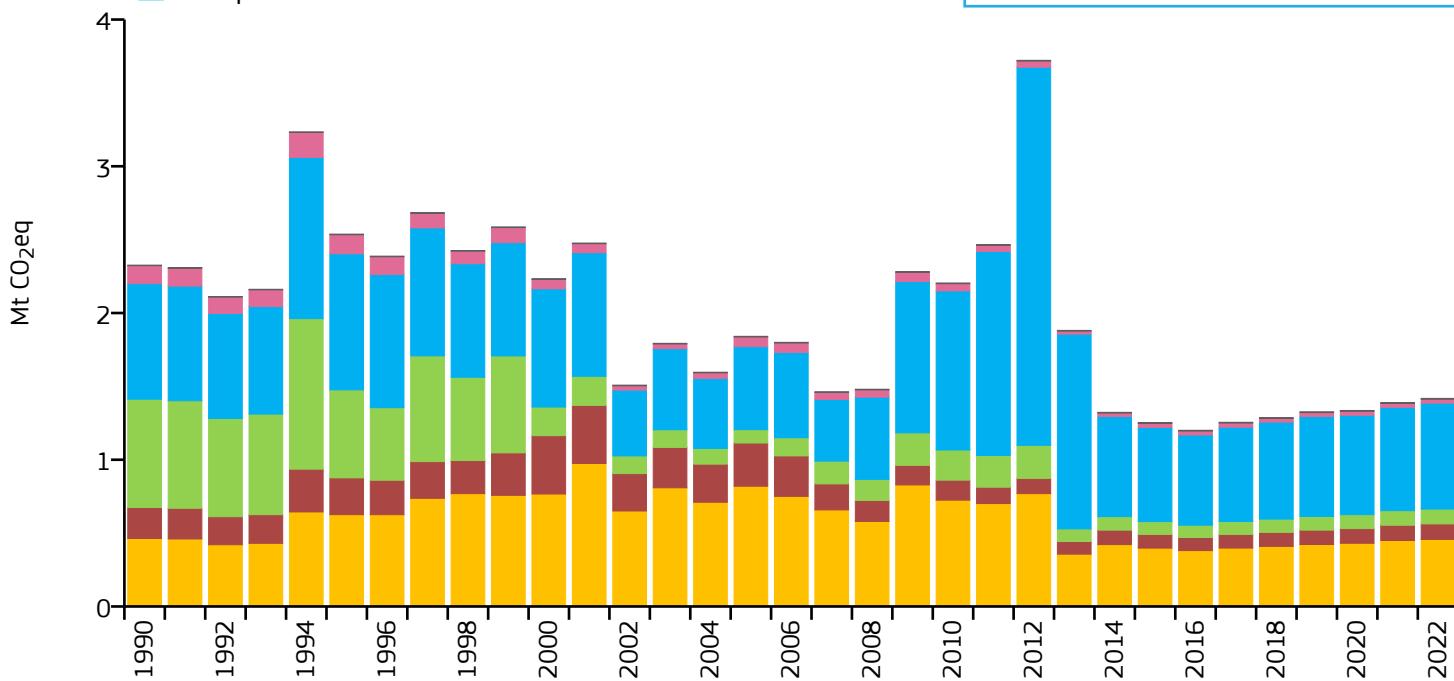
2022 vs 2021



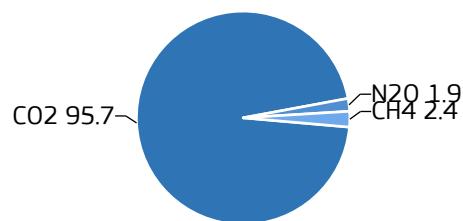
Palau

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1.418 | 61.655 | 6.512 | 23.000k |
| 2015 | 1.253 | 58.867 | 3.827 | 21.288k |
| 2005 | 1.841 | 92.490 | 6.036 | 19.906k |
| 1990 | 2.326 | 154.179 | 10.843 | 15.088k |

2022 vs 1990

2022 vs 2005

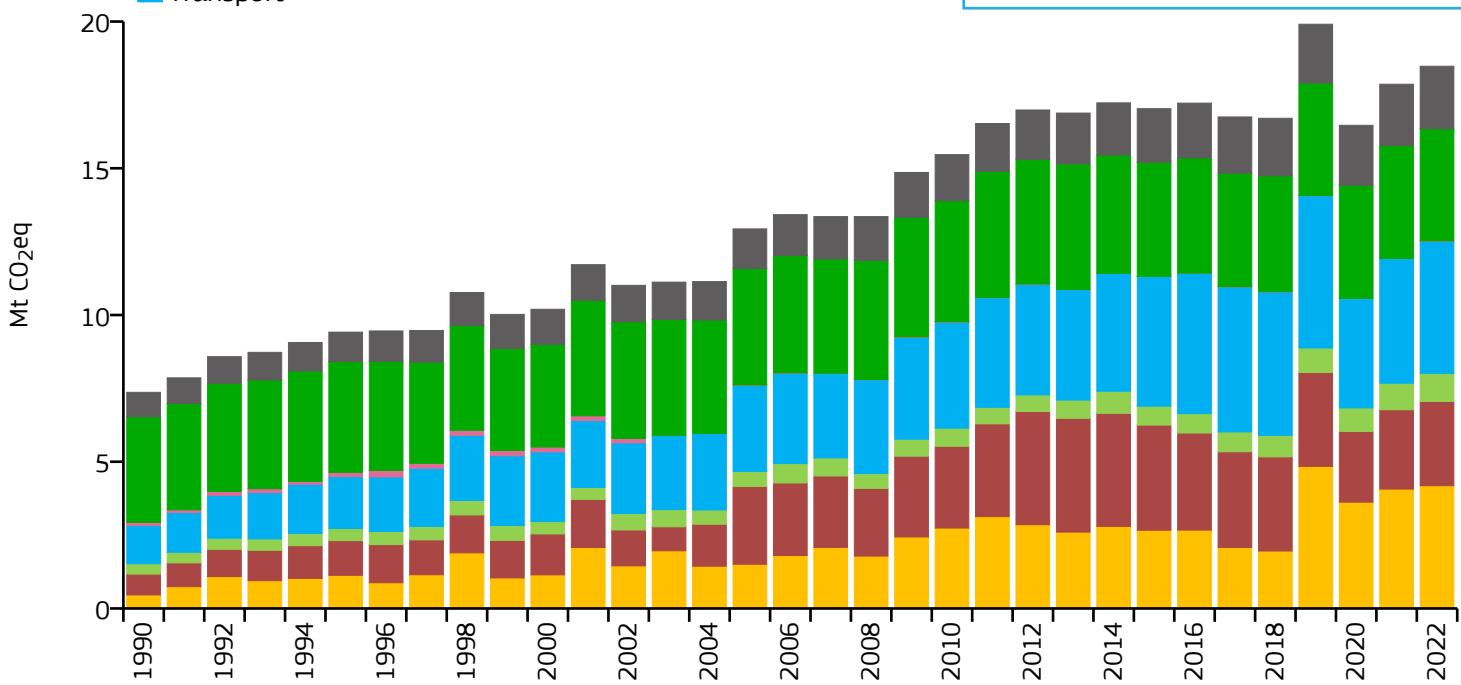
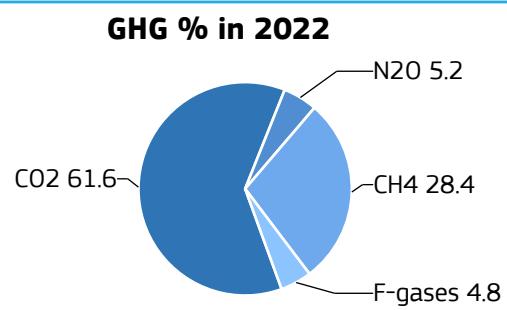
2022 vs 2021



Panama

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 18.478 | 4.186 | 0.126 | 4.414M |
| 2015 | 17.031 | 4.291 | 0.146 | 3.969M |
| 2005 | 12.935 | 3.884 | 0.230 | 3.330M |
| 1990 | 7.366 | 2.981 | 0.268 | 2.471M |

2022 vs 1990

2022 vs 2005

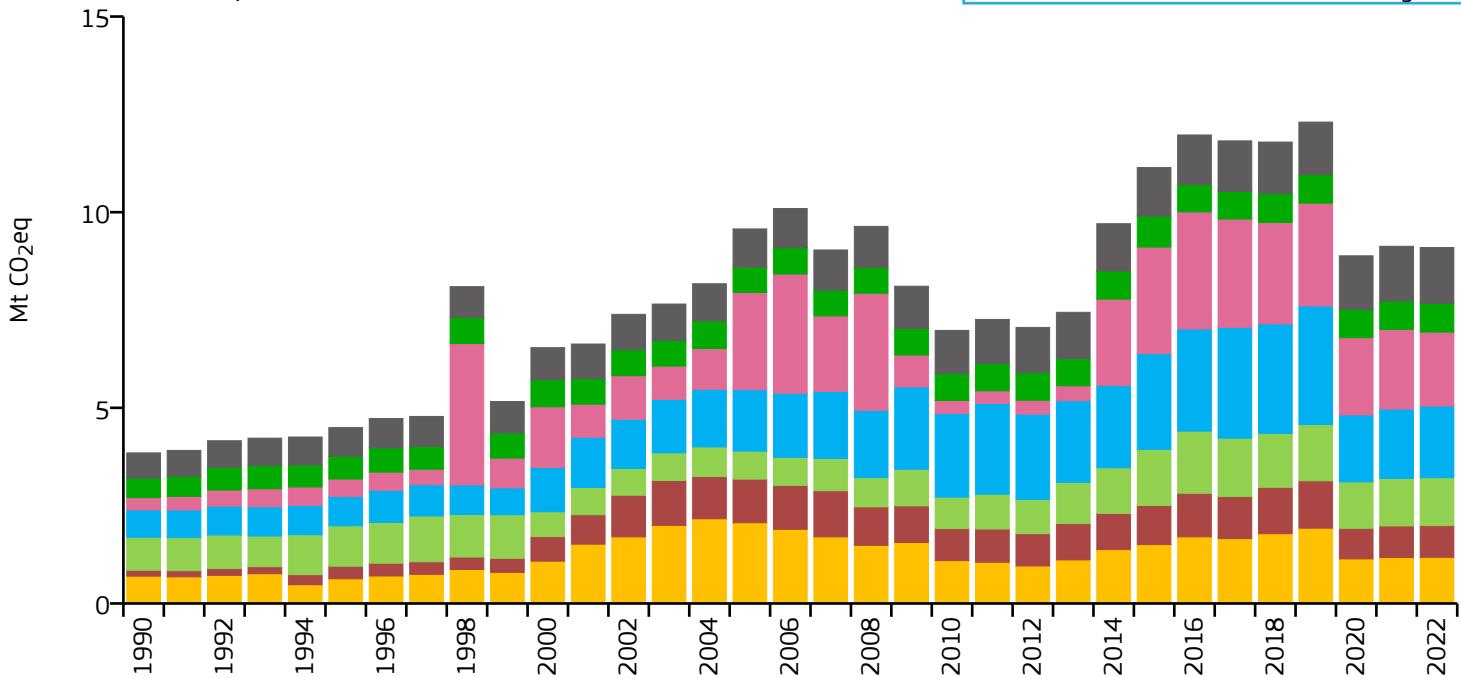
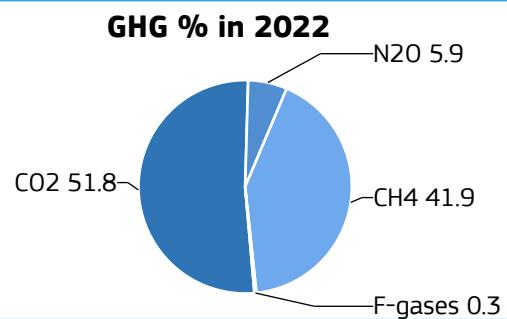
2022 vs 2021



Papua New Guinea

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|

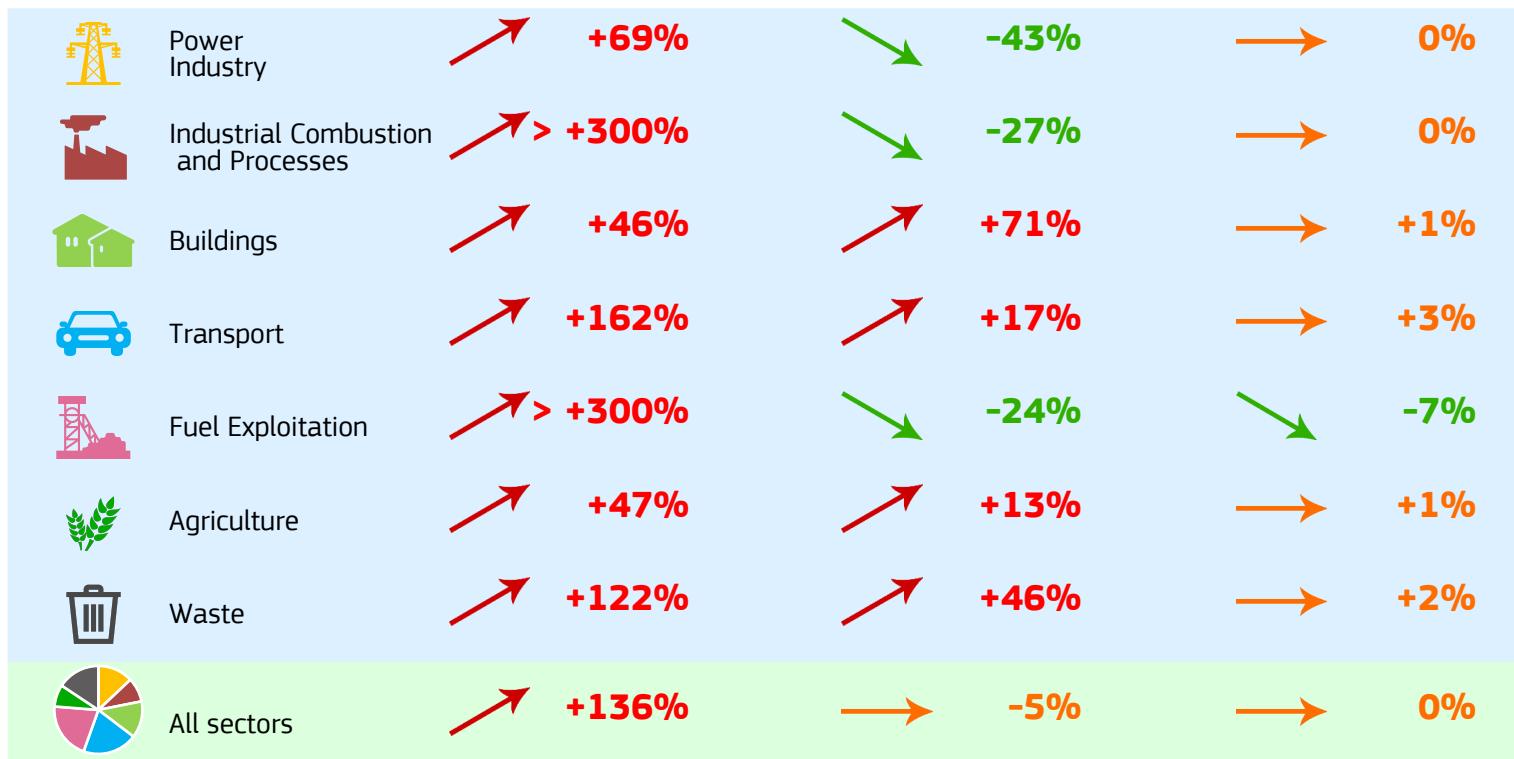


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 9.097 | 1.000 | 0.238 | 9.096M |
| 2015 | 11.140 | 1.407 | 0.336 | 7.920M |
| 2005 | 9.572 | 1.516 | 0.512 | 6.315M |
| 1990 | 3.848 | 0.892 | 0.342 | 4.313M |

2022 vs 1990

2022 vs 2005

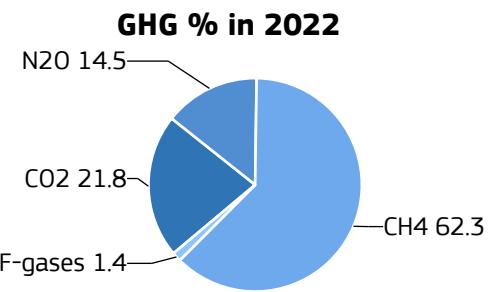
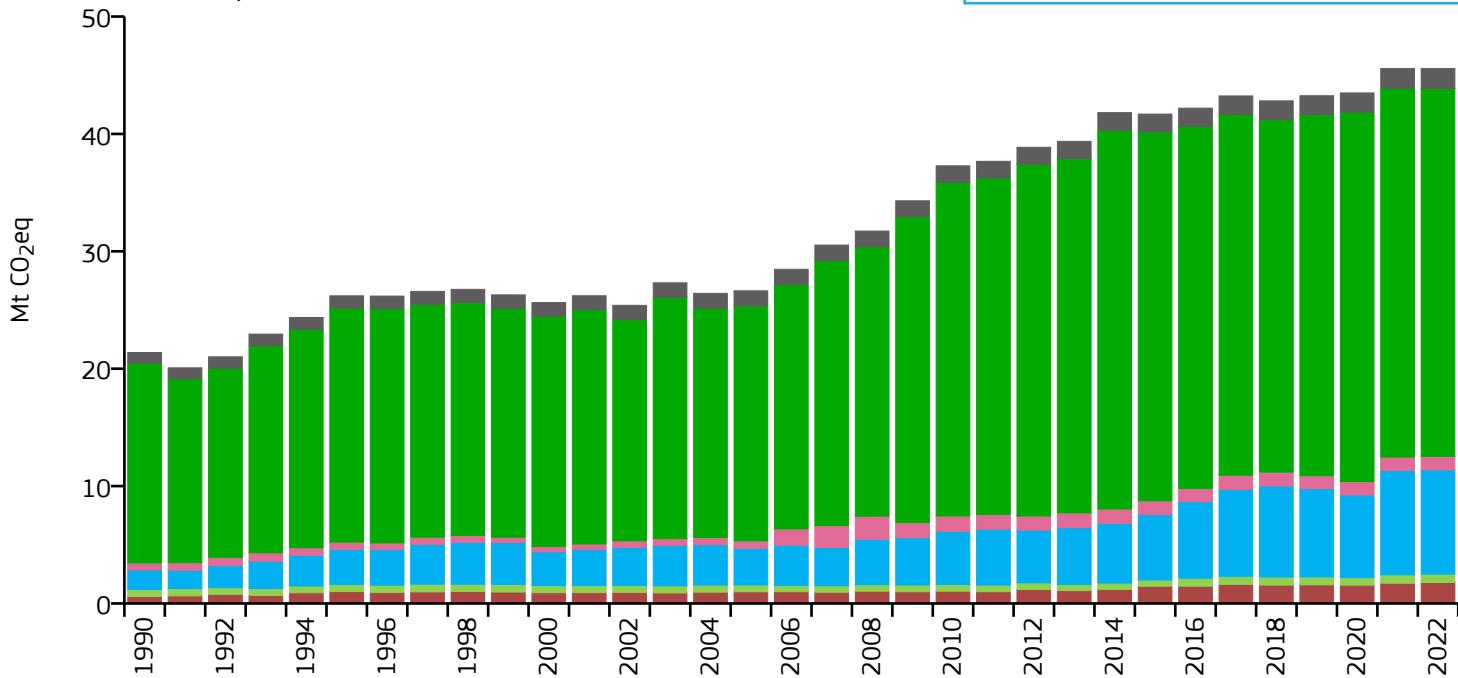
2022 vs 2021



Paraguay

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 45.565 | 6.301 | 0.497 | 7.232M |
| 2015 | 41.691 | 6.280 | 0.527 | 6.639M |
| 2005 | 26.632 | 4.595 | 0.534 | 5.795M |
| 1990 | 21.380 | 5.074 | 0.597 | 4.214M |

2022 vs 1990

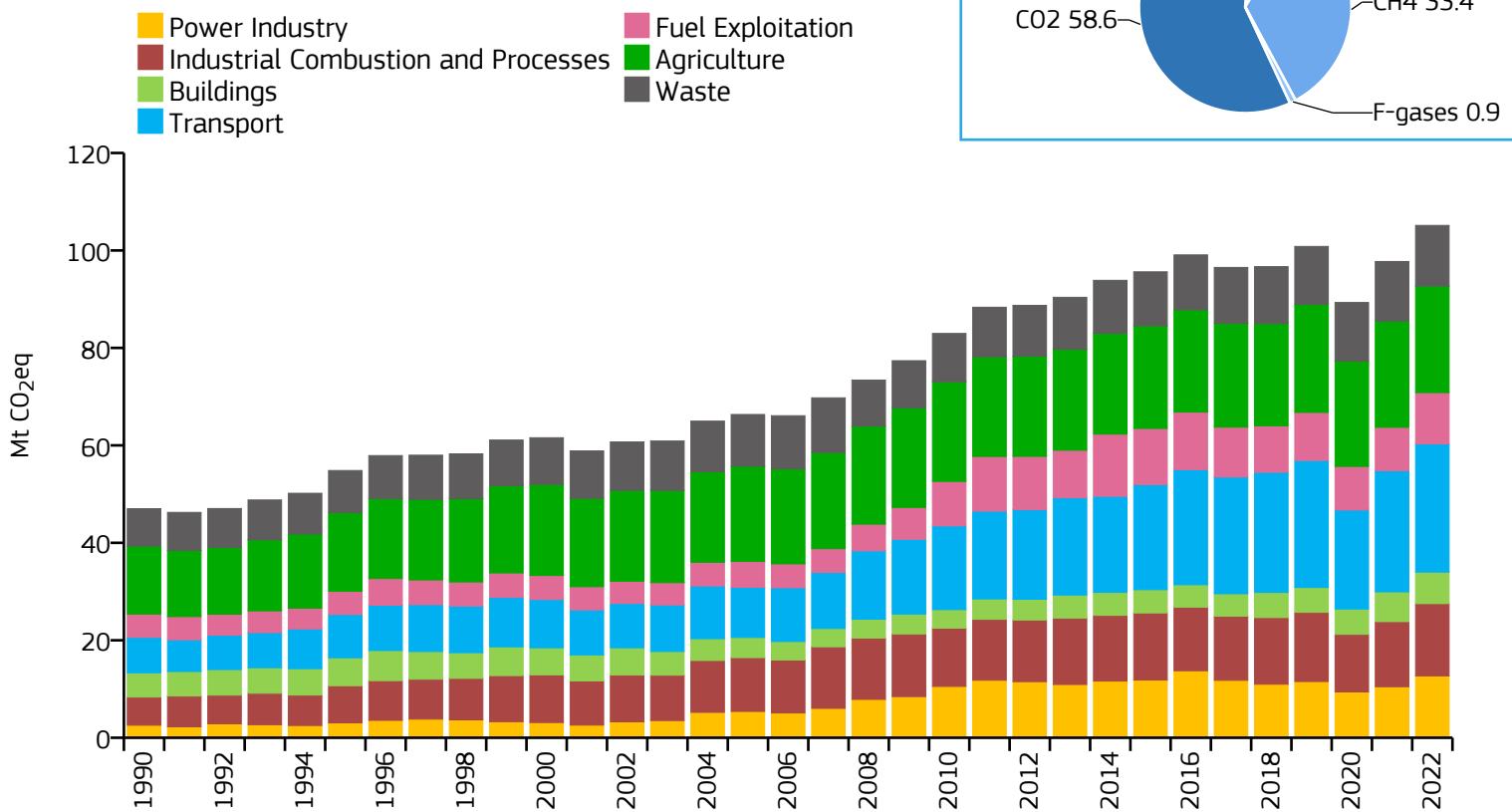
2022 vs 2005

2022 vs 2021



Peru

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 105.139 | 3.087 | 0.242 | 34.055M |
| 2015 | 95.613 | 3.047 | 0.259 | 31.377M |
| 2005 | 66.339 | 2.403 | 0.317 | 27.610M |
| 1990 | 47.003 | 2.153 | 0.406 | 21.827M |

2022 vs 1990

2022 vs 2005

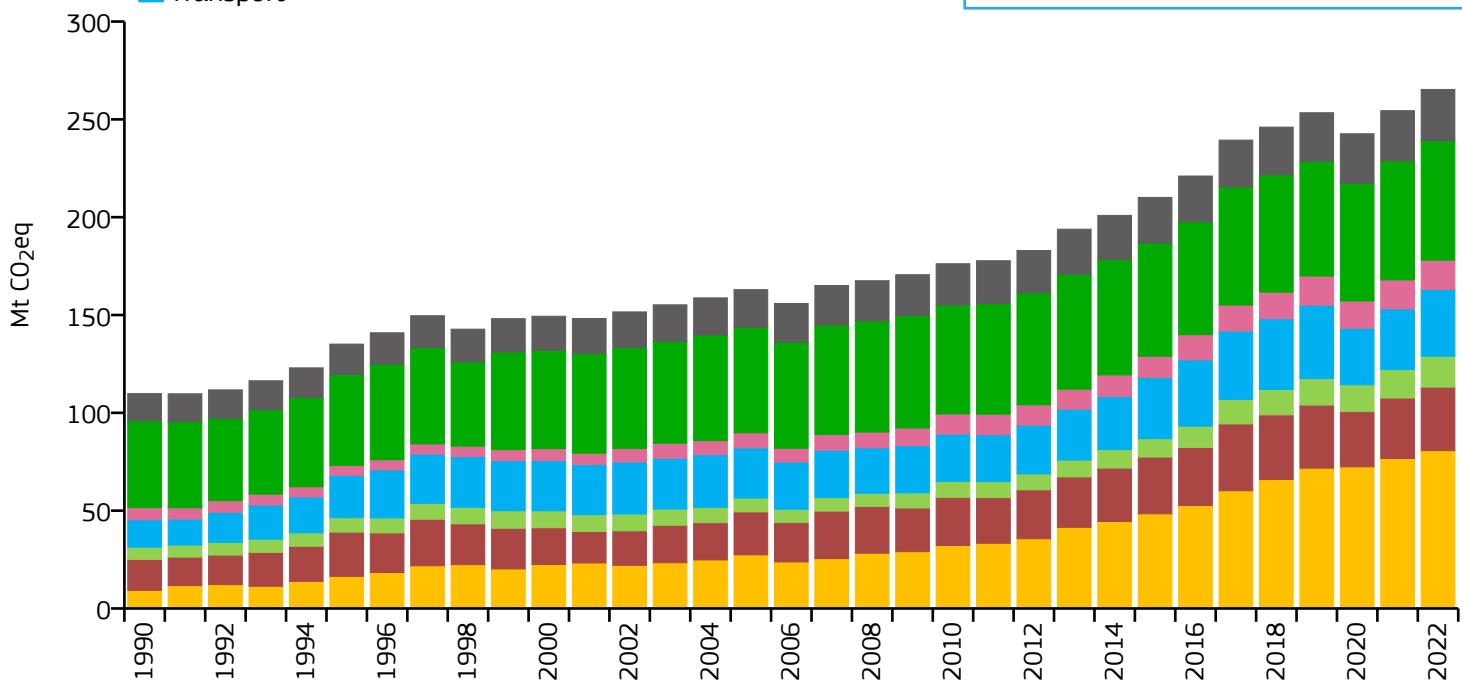
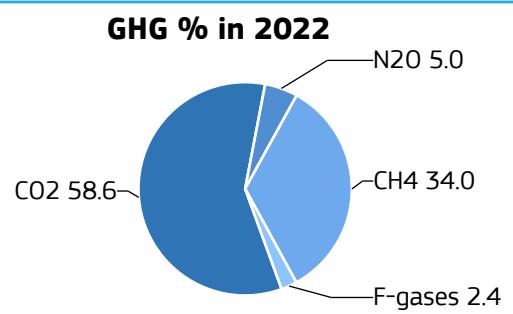
2022 vs 2021



Philippines

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 265.296 | 2.350 | 0.268 | 112.901M |
| 2015 | 210.104 | 2.066 | 0.282 | 101.716M |
| 2005 | 162.958 | 1.889 | 0.373 | 86.274M |
| 1990 | 109.812 | 1.773 | 0.421 | 61.947M |

2022 vs 1990

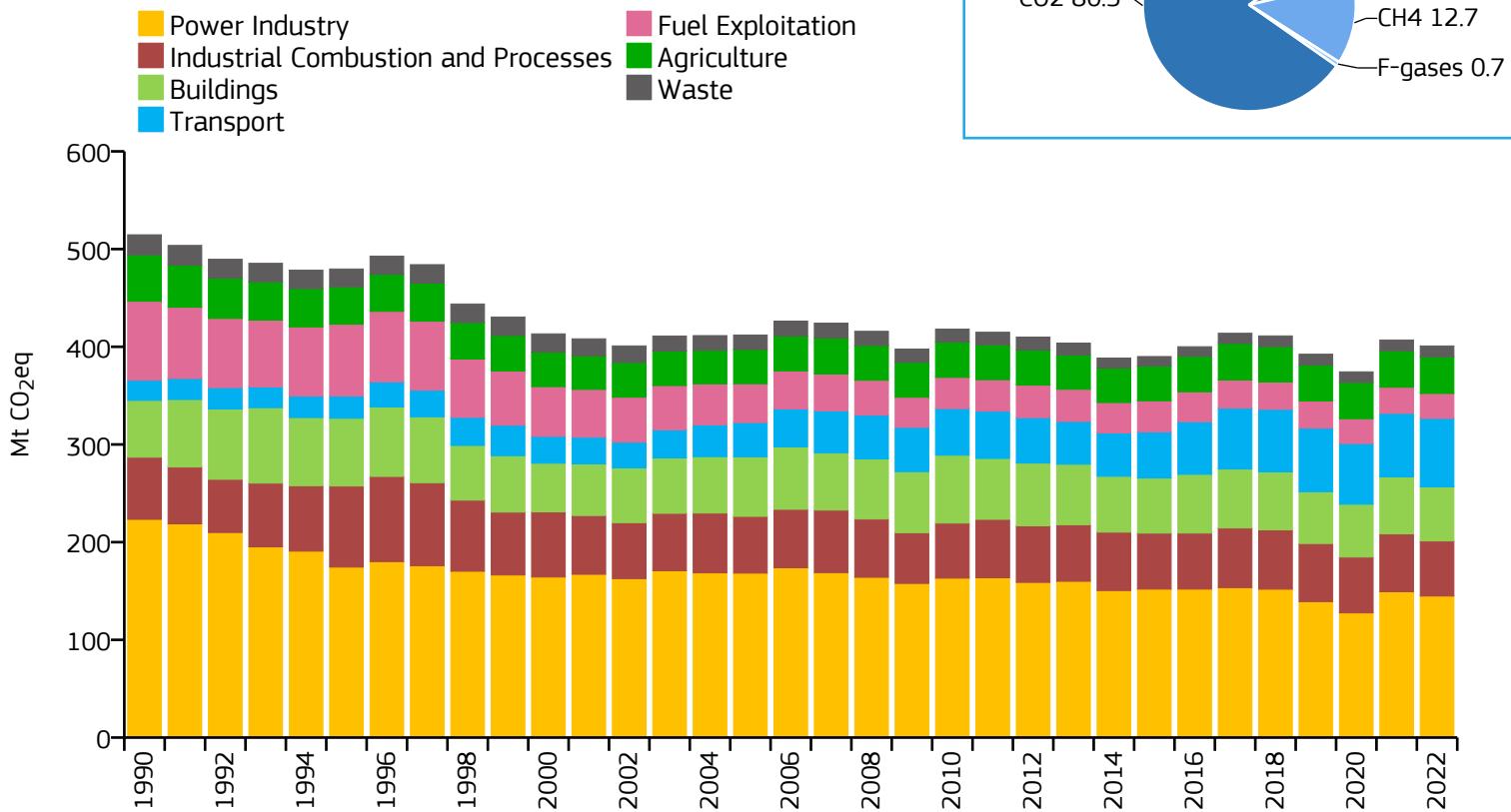
2022 vs 2005

2022 vs 2021



Poland

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 400.824 | 10.620 | 0.290 | 37.741M |
| 2015 | 389.991 | 10.192 | 0.371 | 38.265M |
| 2005 | 412.029 | 10.740 | 0.573 | 38.363M |
| 1990 | 514.613 | 13.559 | 1.199 | 37.955M |

2022 vs 1990

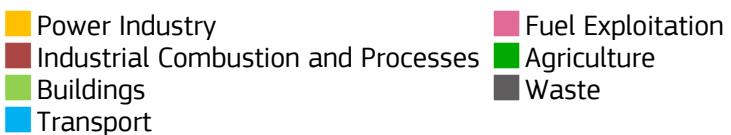
2022 vs 2005

2022 vs 2021

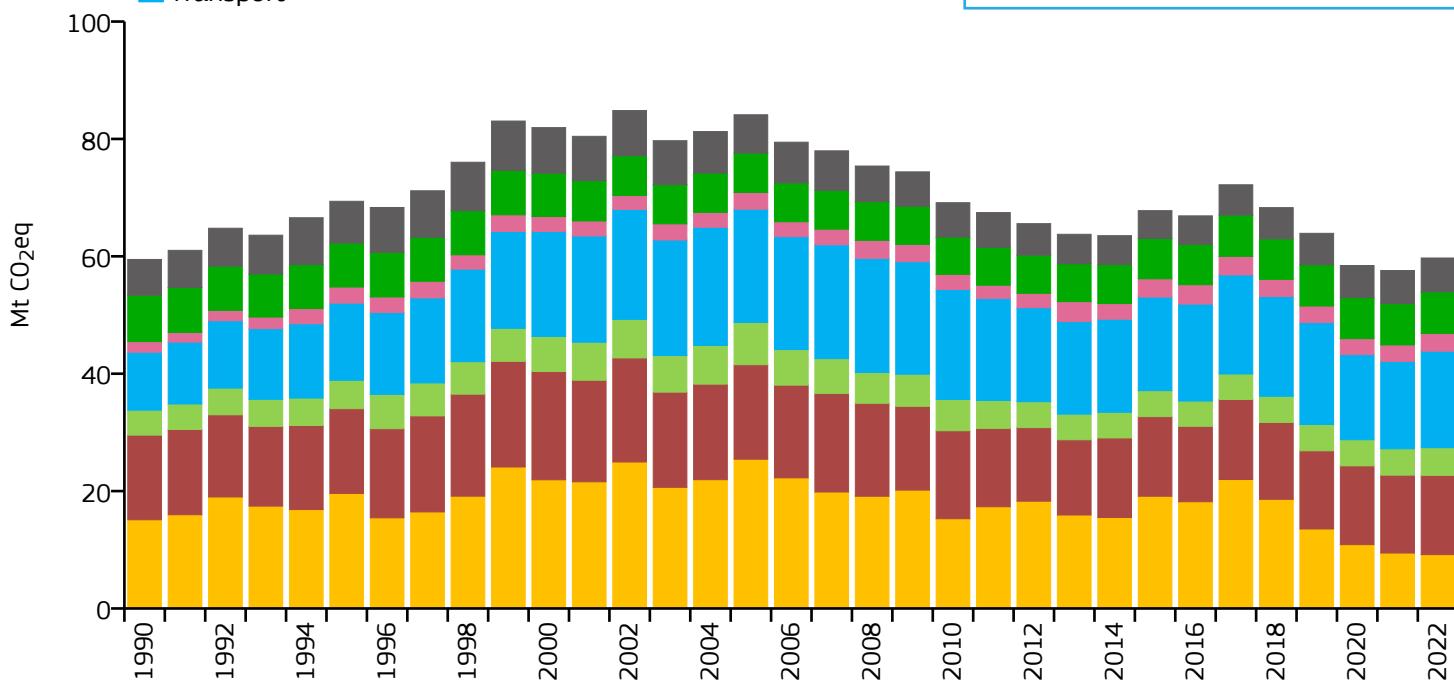
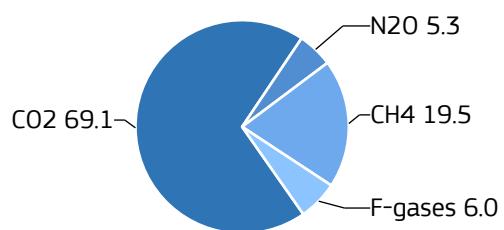


Portugal

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 59.713 | 5.884 | 0.161 | 10.148M |
| 2015 | 67.779 | 6.506 | 0.210 | 10.418M |
| 2005 | 84.118 | 7.961 | 0.258 | 10.566M |
| 1990 | 59.465 | 5.974 | 0.253 | 9.953M |

2022 vs 1990

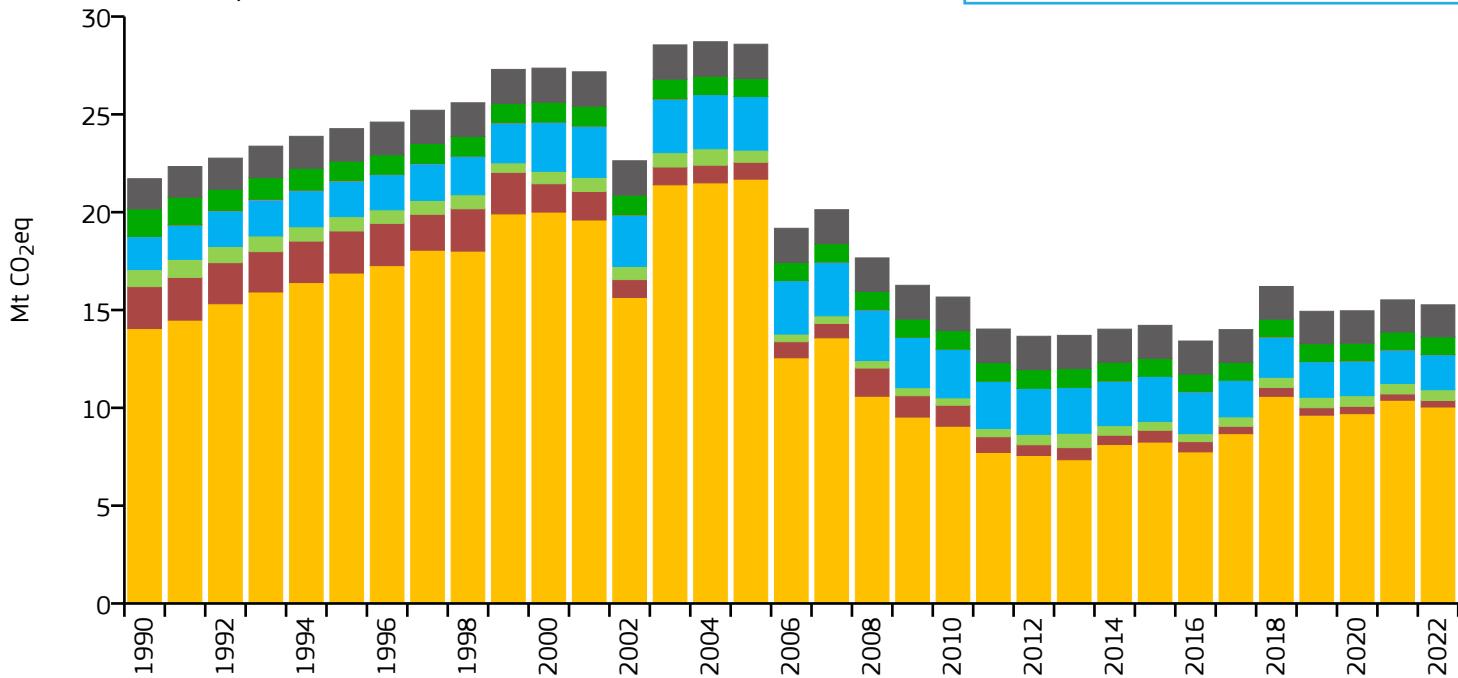
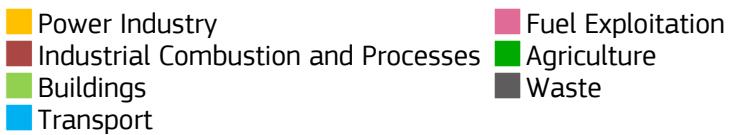
2022 vs 2005

2022 vs 2021

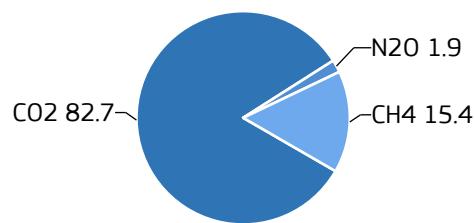


Puerto Rico

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO2eq/yr | GHG emissions per capita t CO2eq/cap/yr | GHG emissions per unit of GDP PPP t CO2eq/kUSD/yr | Population |
|------|------------------------------|--|--|------------|
| 2022 | 15.265 | 4.192 | 0.138 | 3.641M |
| 2015 | 14.215 | 3.869 | 0.119 | 3.674M |
| 2005 | 28.585 | 7.592 | 0.218 | 3.765M |
| 1990 | 21.711 | 6.171 | 0.284 | 3.518M |

2022 vs 1990

2022 vs 2005

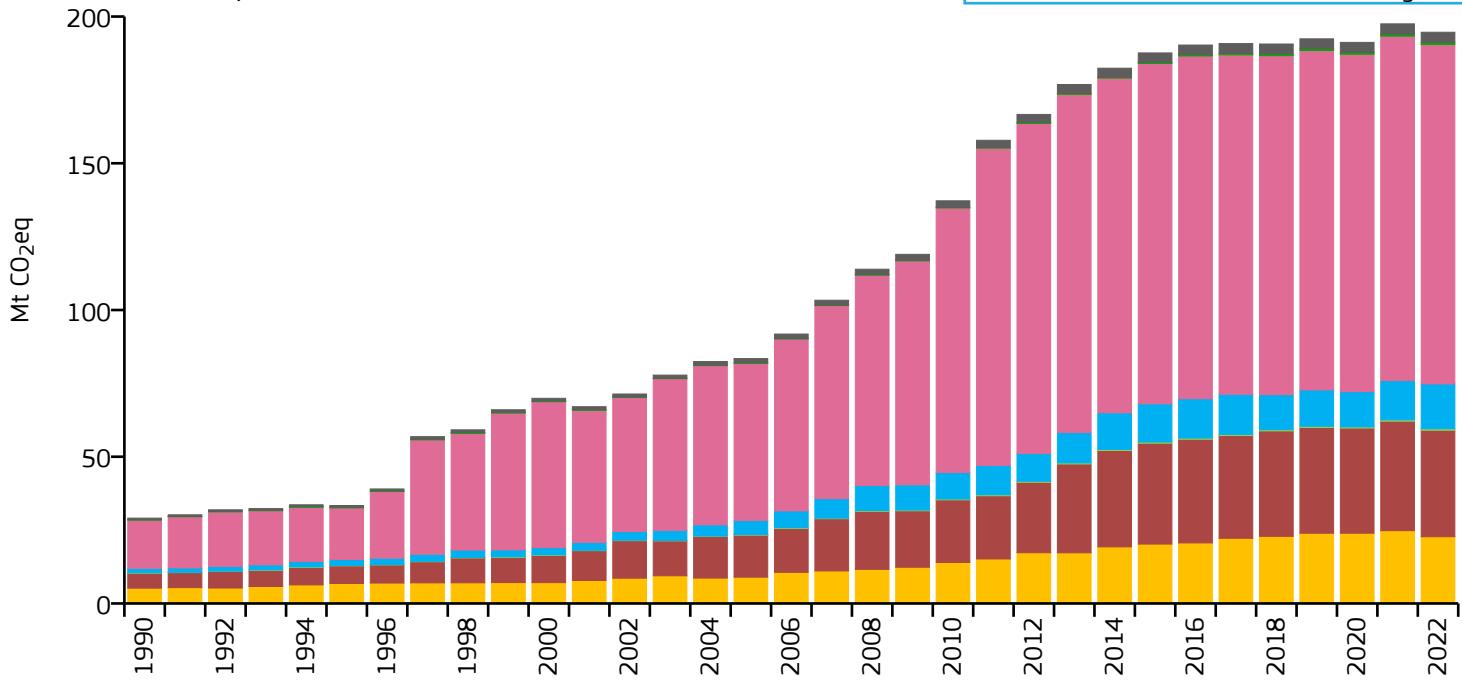
2022 vs 2021



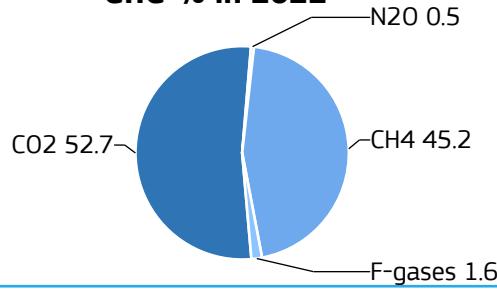
Qatar

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 194.652 | 67.377 | 0.744 | 2.889M |
| 2015 | 187.606 | 75.601 | 0.762 | 2.482M |
| 2005 | 83.445 | 96.484 | 1.099 | 864.863k |
| 1990 | 29.081 | 61.037 | 1.018 | 476.445k |

2022 vs 1990

2022 vs 2005

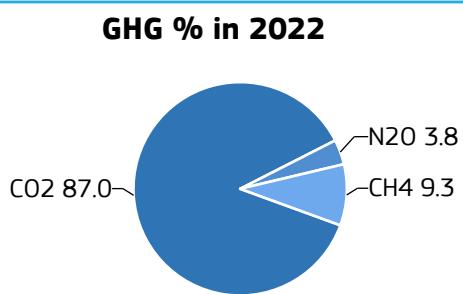
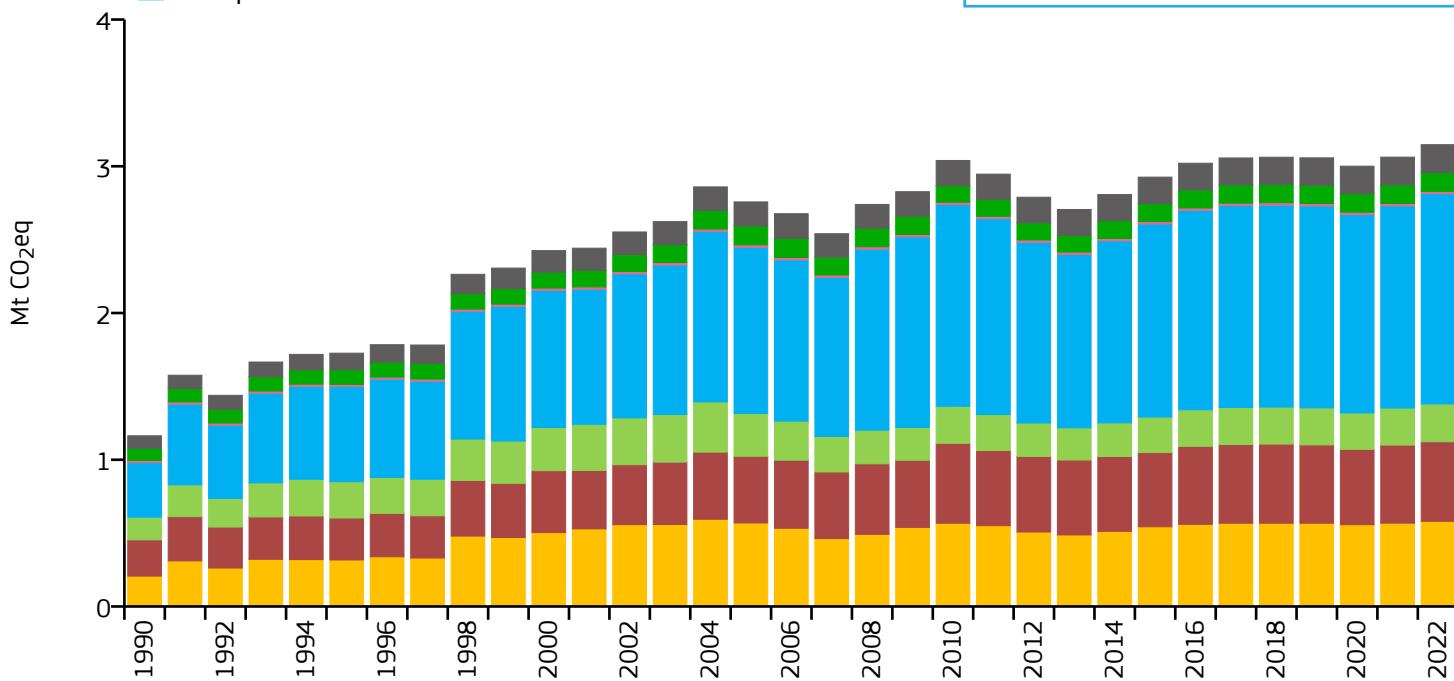
2022 vs 2021



Réunion

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

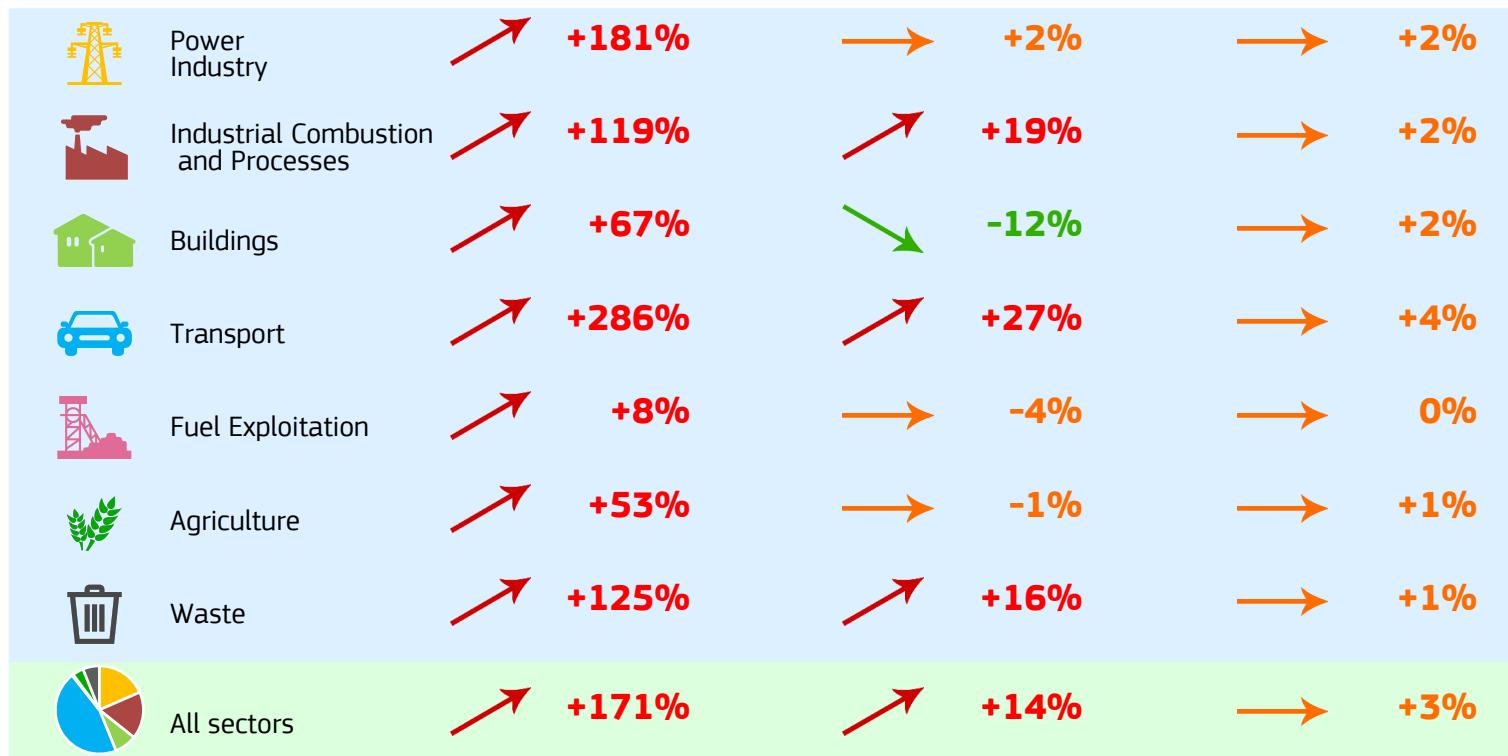


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 3.147 | 3.462 | n/a | 909.000k |
| 2015 | 2.926 | 3.389 | n/a | 863.363k |
| 2005 | 2.757 | 3.483 | n/a | 791.598k |
| 1990 | 1.163 | 1.905 | n/a | 610.582k |

2022 vs 1990

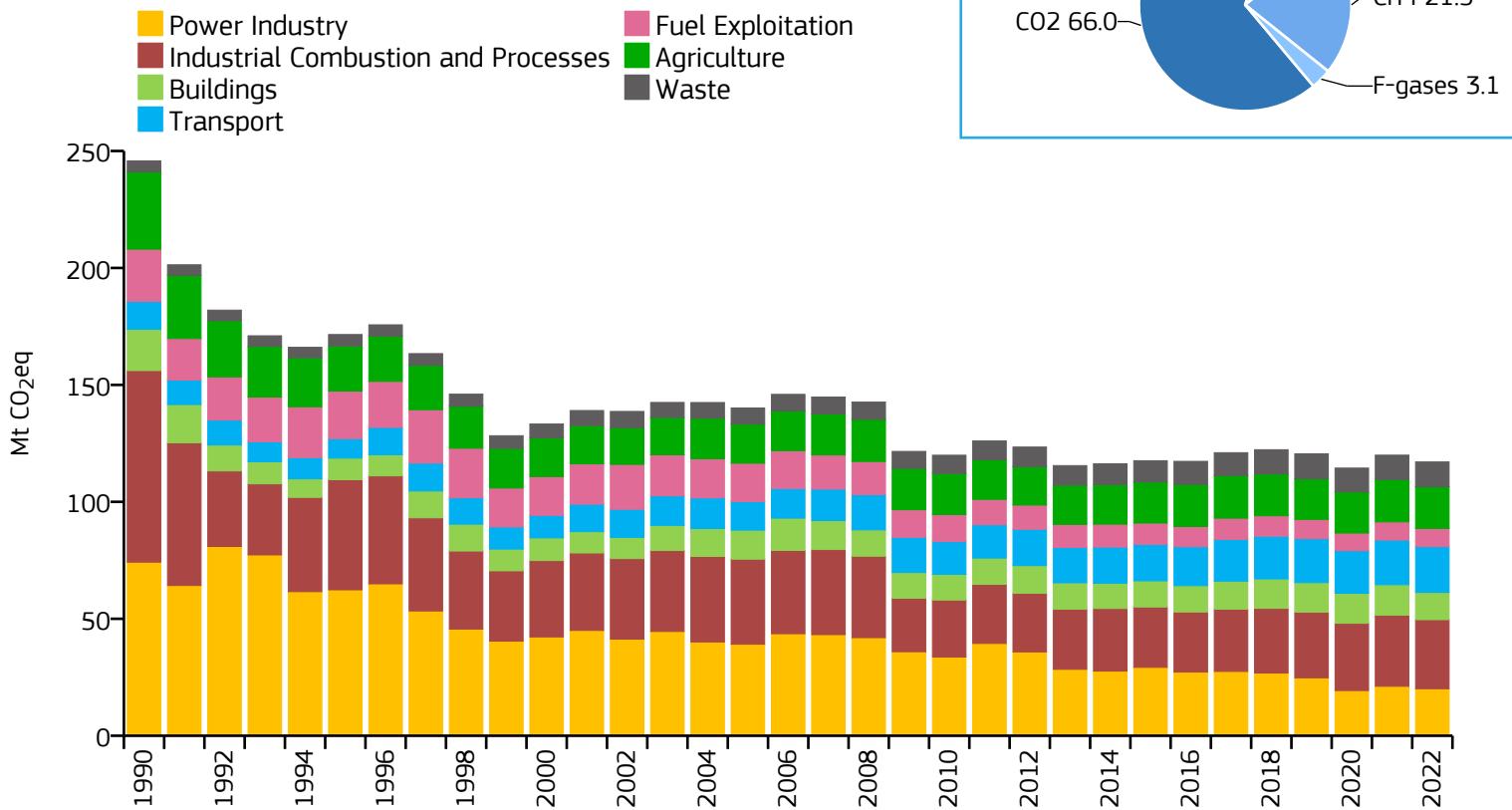
2022 vs 2005

2022 vs 2021



Romania

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 117.061 | 6.096 | 0.189 | 19.202M |
| 2015 | 117.596 | 5.916 | 0.248 | 19.877M |
| 2005 | 140.123 | 6.538 | 0.390 | 21.431M |
| 1990 | 245.774 | 10.463 | 0.792 | 23.489M |

2022 vs 1990

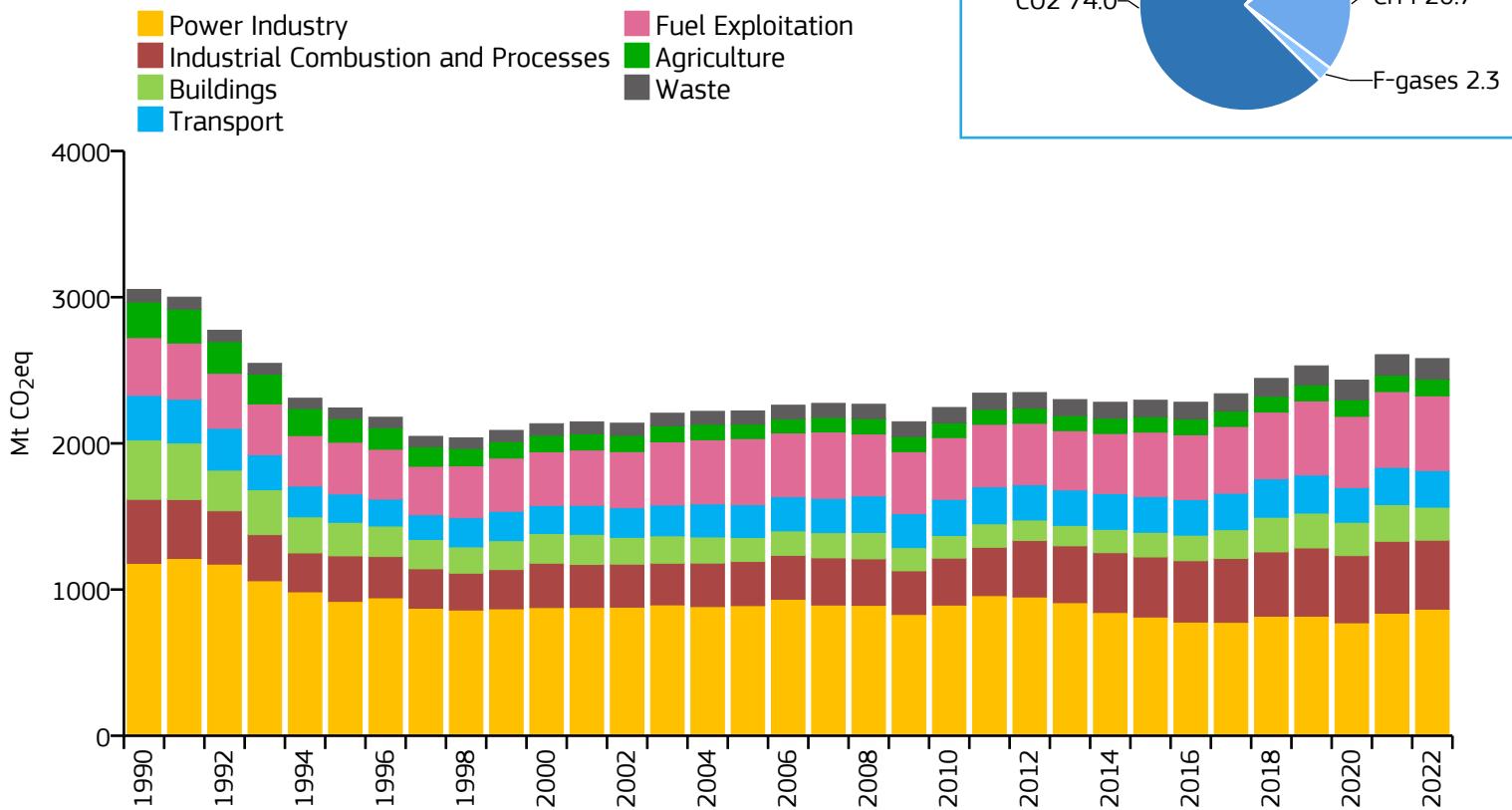
2022 vs 2005

2022 vs 2021

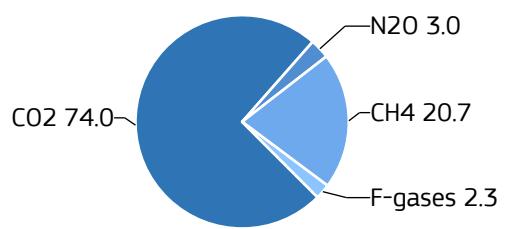


Russia

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 2579.798 | 17.985 | 0.641 | 143.441M |
| 2015 | 2294.777 | 15.948 | 0.615 | 143.888M |
| 2005 | 2221.773 | 15.470 | 0.772 | 143.618M |
| 1990 | 3053.150 | 20.690 | 0.960 | 147.564M |

2022 vs 1990

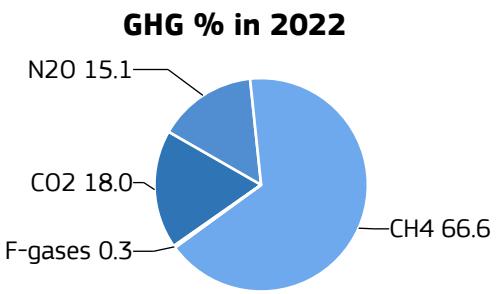
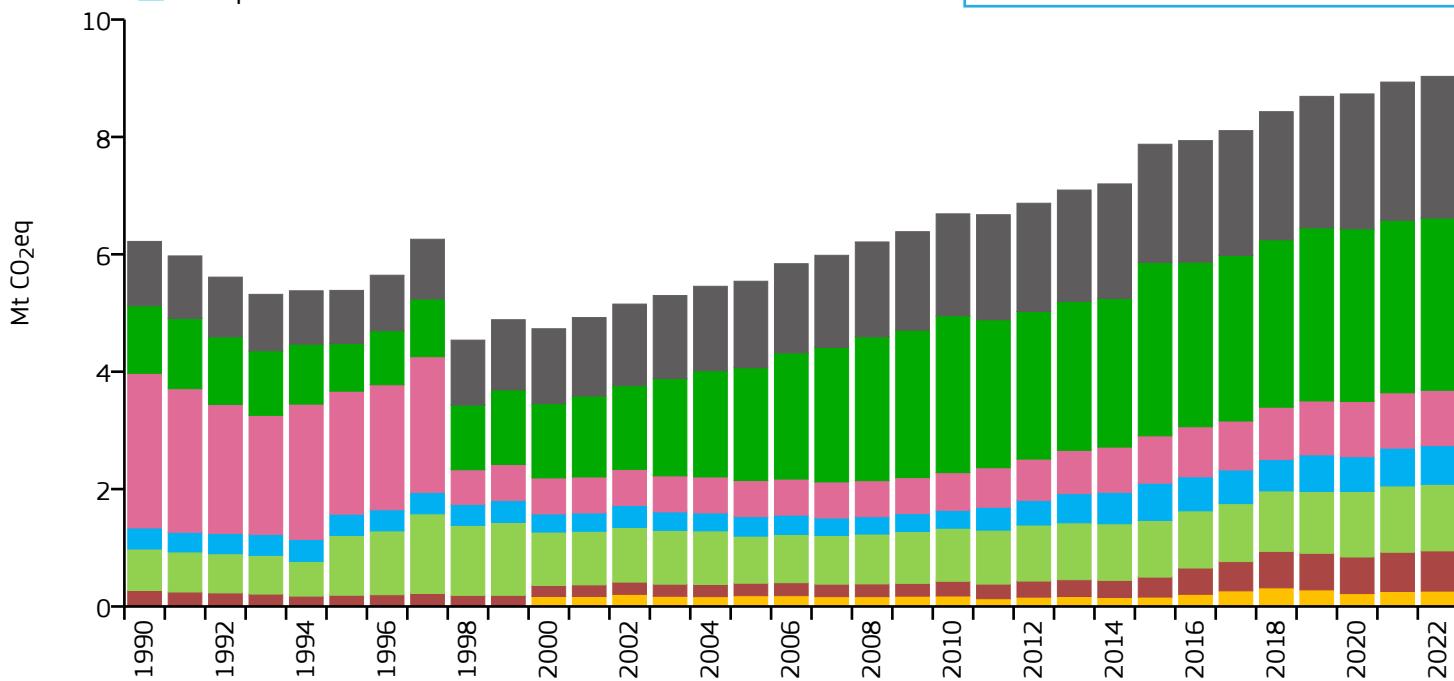
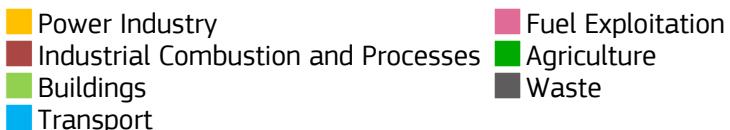
2022 vs 2005

2022 vs 2021



Rwanda

GHG emissions by sector

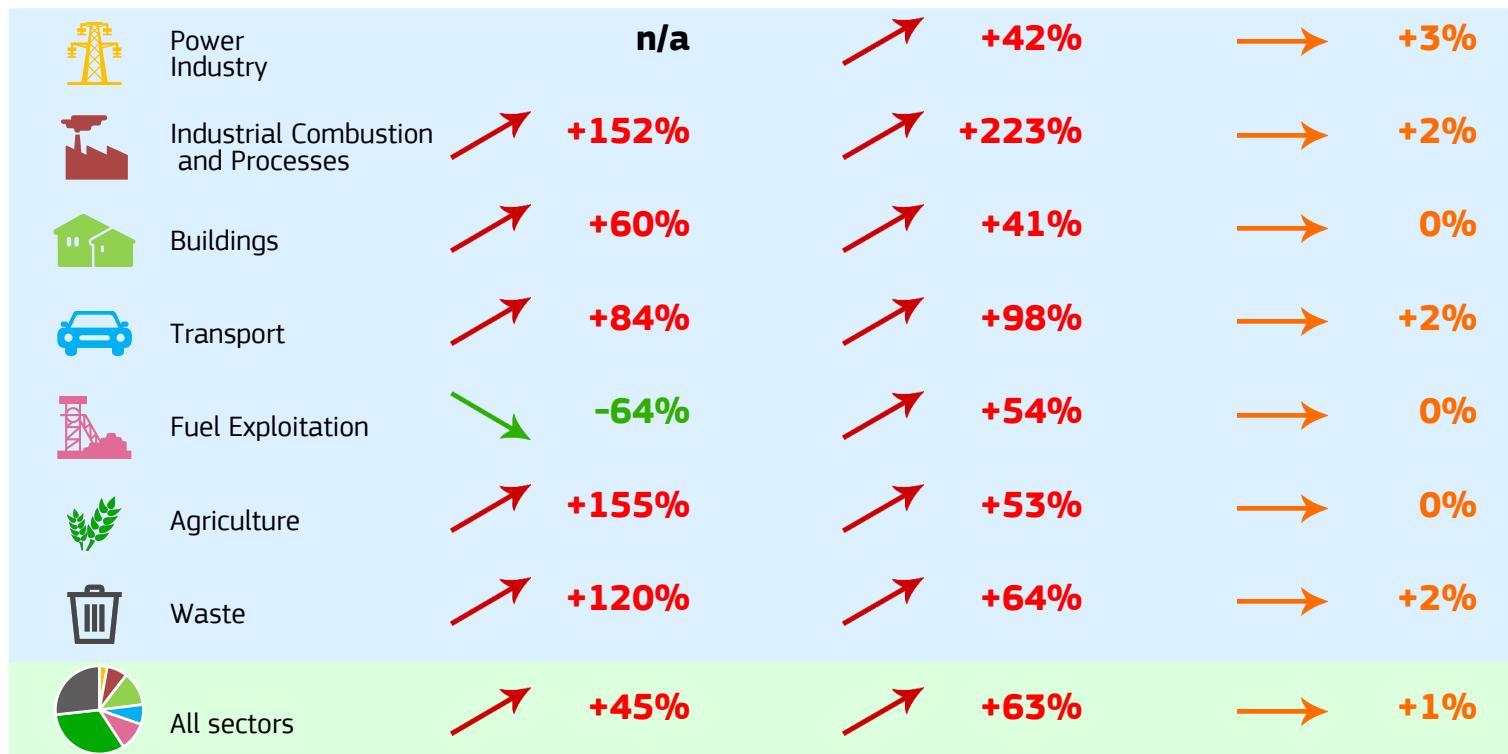


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 9.032 | 0.661 | 0.277 | 13.669M |
| 2015 | 7.875 | 0.677 | 0.367 | 11.630M |
| 2005 | 5.541 | 0.616 | 0.546 | 8.992M |
| 1990 | 6.220 | 0.860 | 0.911 | 7.236M |

2022 vs 1990

2022 vs 2005

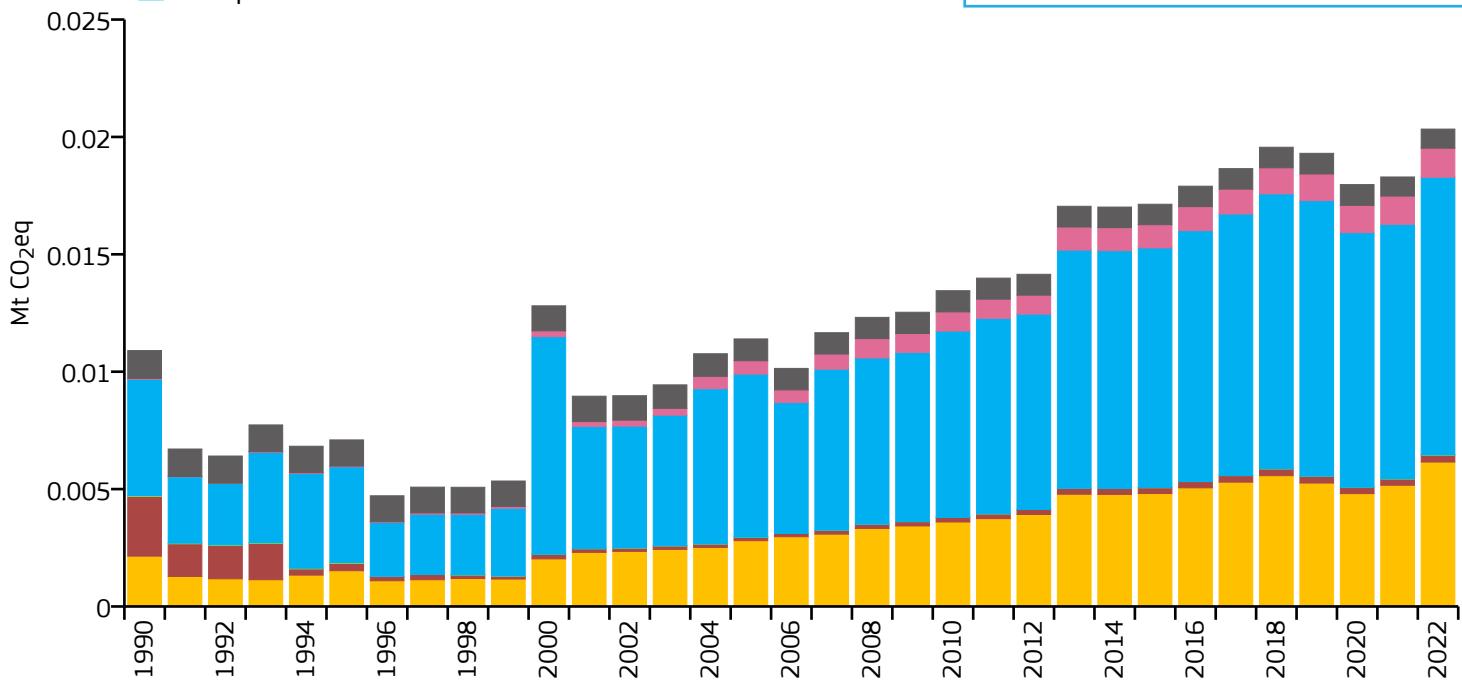
2022 vs 2021



Saint Helena, Ascension and Tristan

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.020 | 5.084 | n/a | 4.000k |
| 2015 | 0.017 | 4.247 | n/a | 4.034k |
| 2005 | 0.011 | 2.666 | n/a | 4.275k |
| 1990 | 0.011 | 1.969 | n/a | 5.535k |

2022 vs 1990

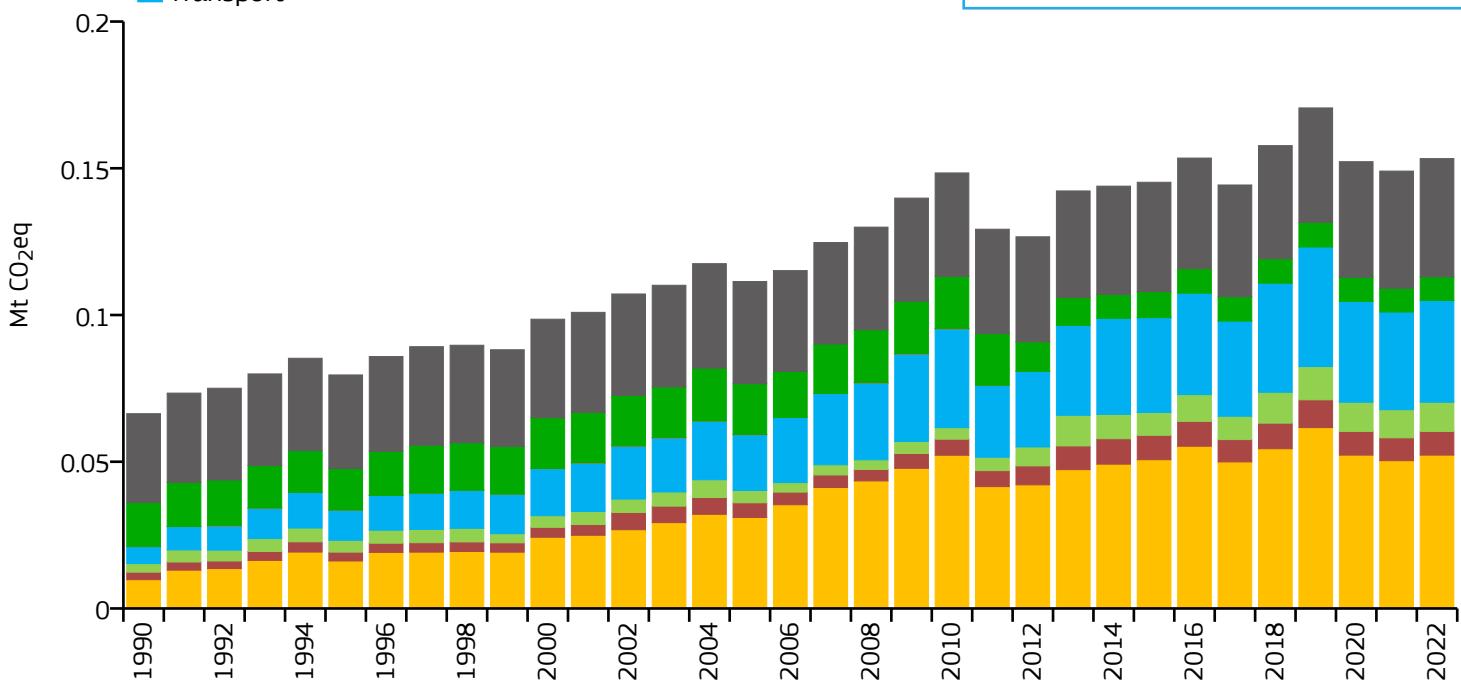
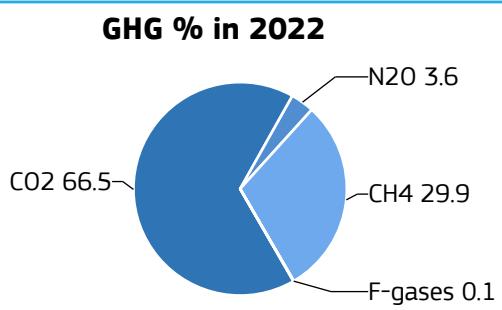
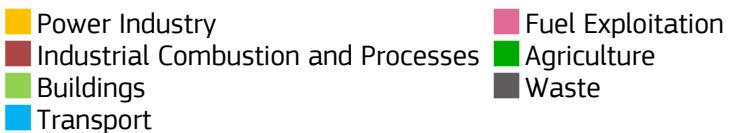
2022 vs 2005

2022 vs 2021



Saint Kitts and Nevis

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.153 | 2.643 | 0.112 | 58.000k |
| 2015 | 0.145 | 2.675 | 0.108 | 54.288k |
| 2005 | 0.111 | 2.292 | 0.107 | 48.611k |
| 1990 | 0.066 | 1.625 | 0.115 | 40.834k |

2022 vs 1990

2022 vs 2005

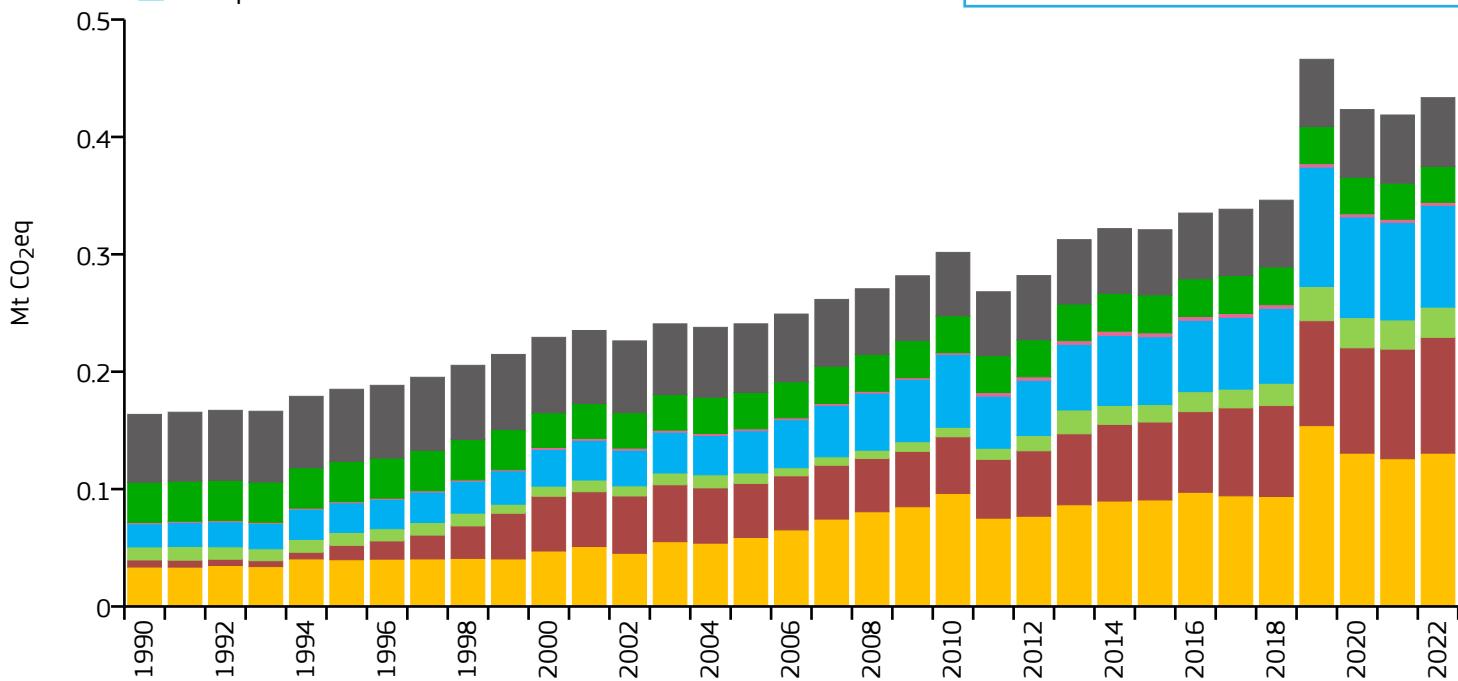
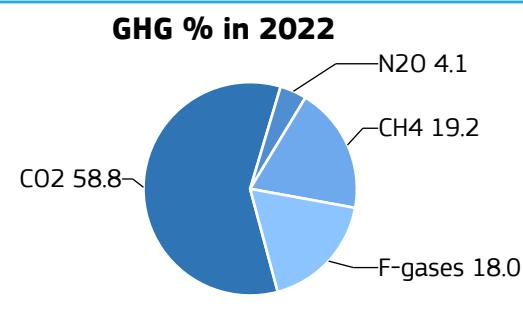
2022 vs 2021



Saint Lucia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.433 | 2.369 | 0.160 | 183.000k |
| 2015 | 0.321 | 1.811 | 0.127 | 177.206k |
| 2005 | 0.241 | 1.471 | 0.109 | 163.714k |
| 1990 | 0.164 | 1.184 | 0.101 | 138.185k |

2022 vs 1990

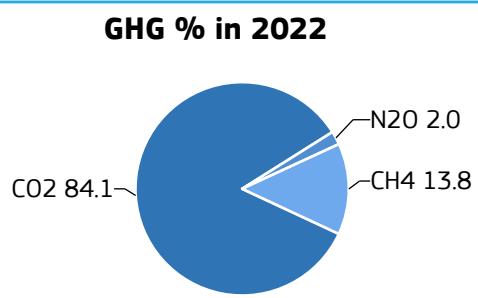
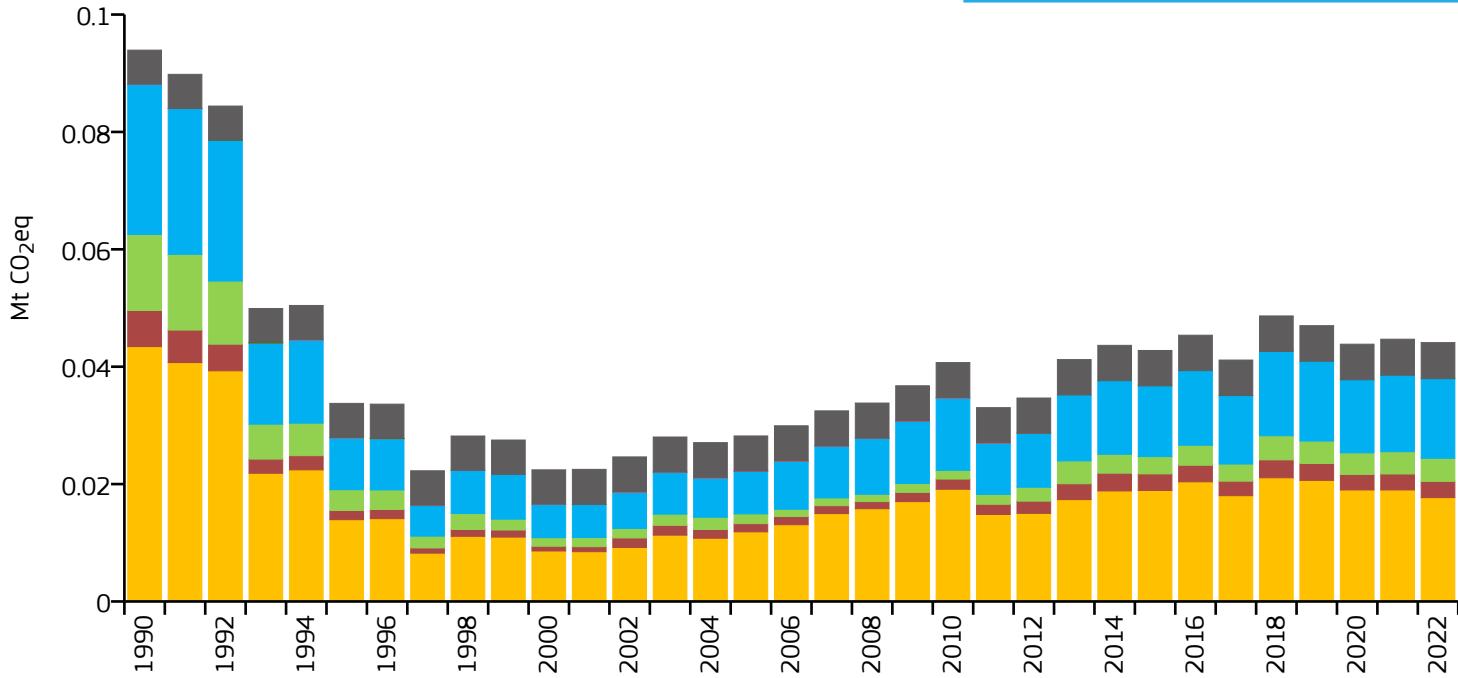
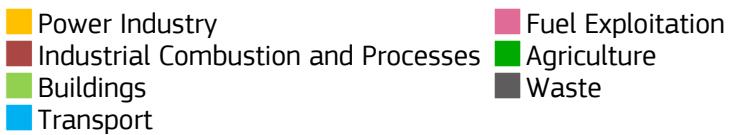
2022 vs 2005

2022 vs 2021



Saint Pierre and Miquelon

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.044 | 6.301 | n/a | 7.000k |
| 2015 | 0.043 | 6.799 | n/a | 6.290k |
| 2005 | 0.028 | 4.504 | n/a | 6.261k |
| 1990 | 0.094 | 14.968 | n/a | 6.276k |

2022 vs 1990

2022 vs 2005

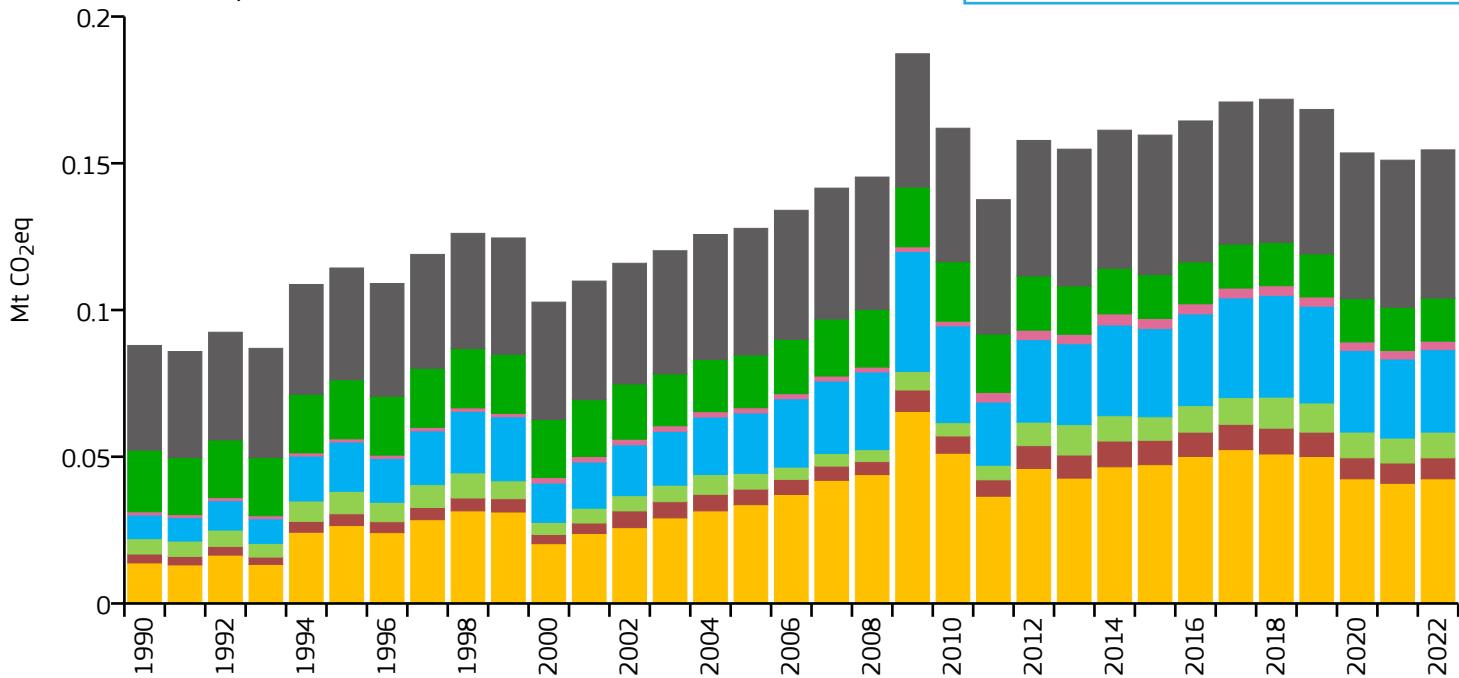
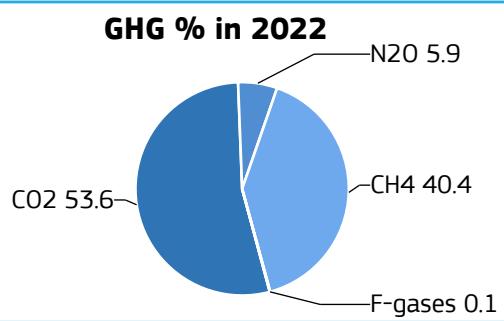
2022 vs 2021



Saint Vincent and the Grenadines

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.155 | 1.393 | 0.102 | 111.000k |
| 2015 | 0.160 | 1.458 | 0.118 | 109.455k |
| 2005 | 0.128 | 1.175 | 0.106 | 108.744k |
| 1990 | 0.088 | 0.818 | 0.121 | 107.505k |

2022 vs 1990

2022 vs 2005

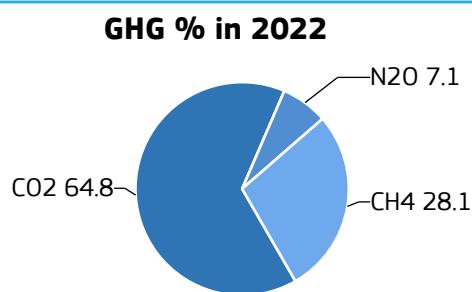
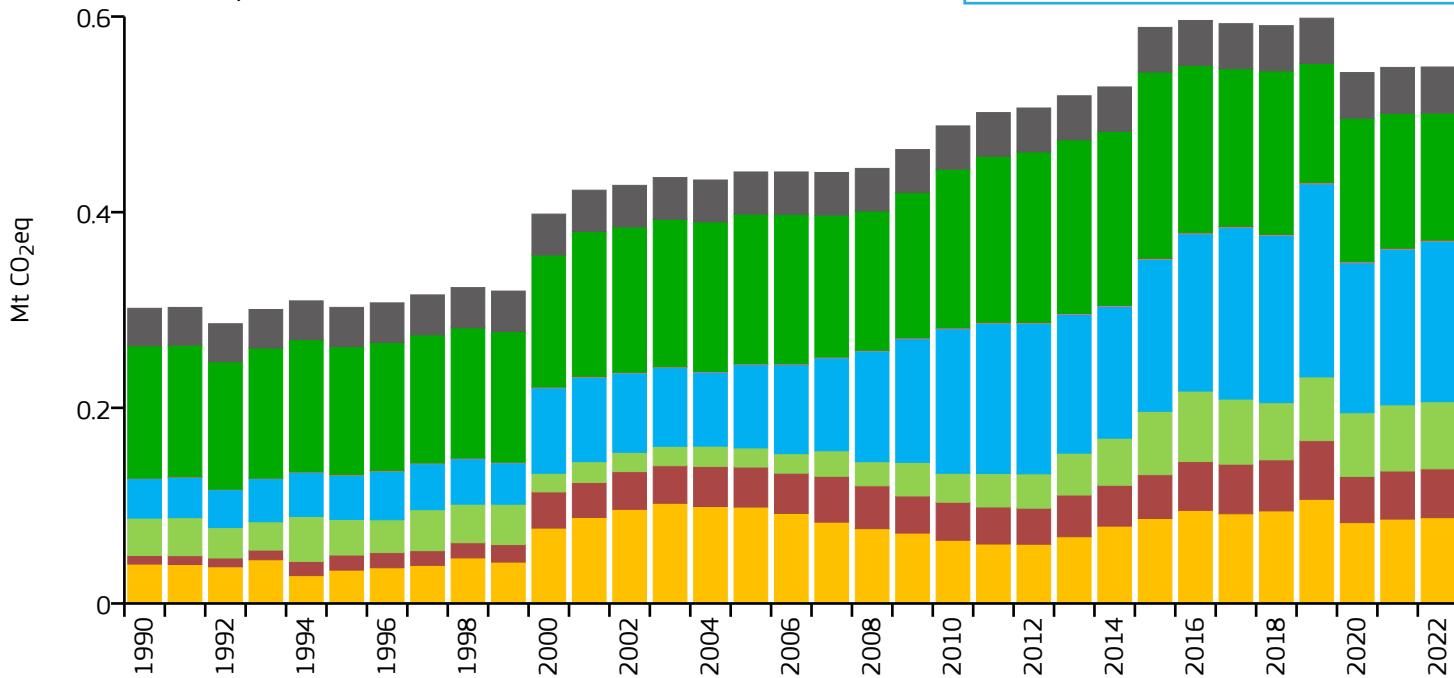
2022 vs 2021



Samoa

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

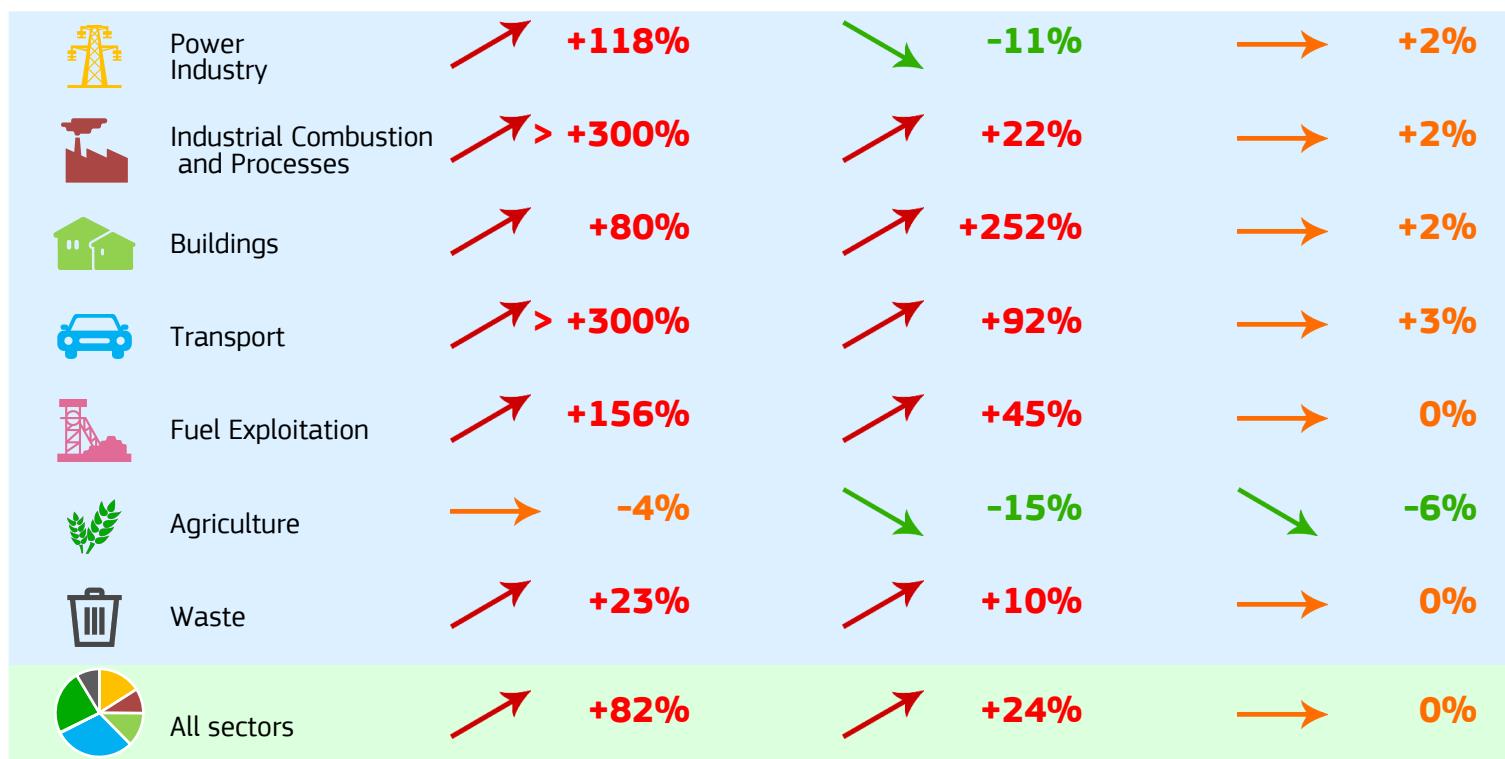


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.548 | 2.702 | 0.482 | 203.000k |
| 2015 | 0.589 | 3.039 | 0.498 | 193.759k |
| 2005 | 0.441 | 2.452 | 0.438 | 179.929k |
| 1990 | 0.302 | 1.853 | 0.491 | 162.866k |

2022 vs 1990

2022 vs 2005

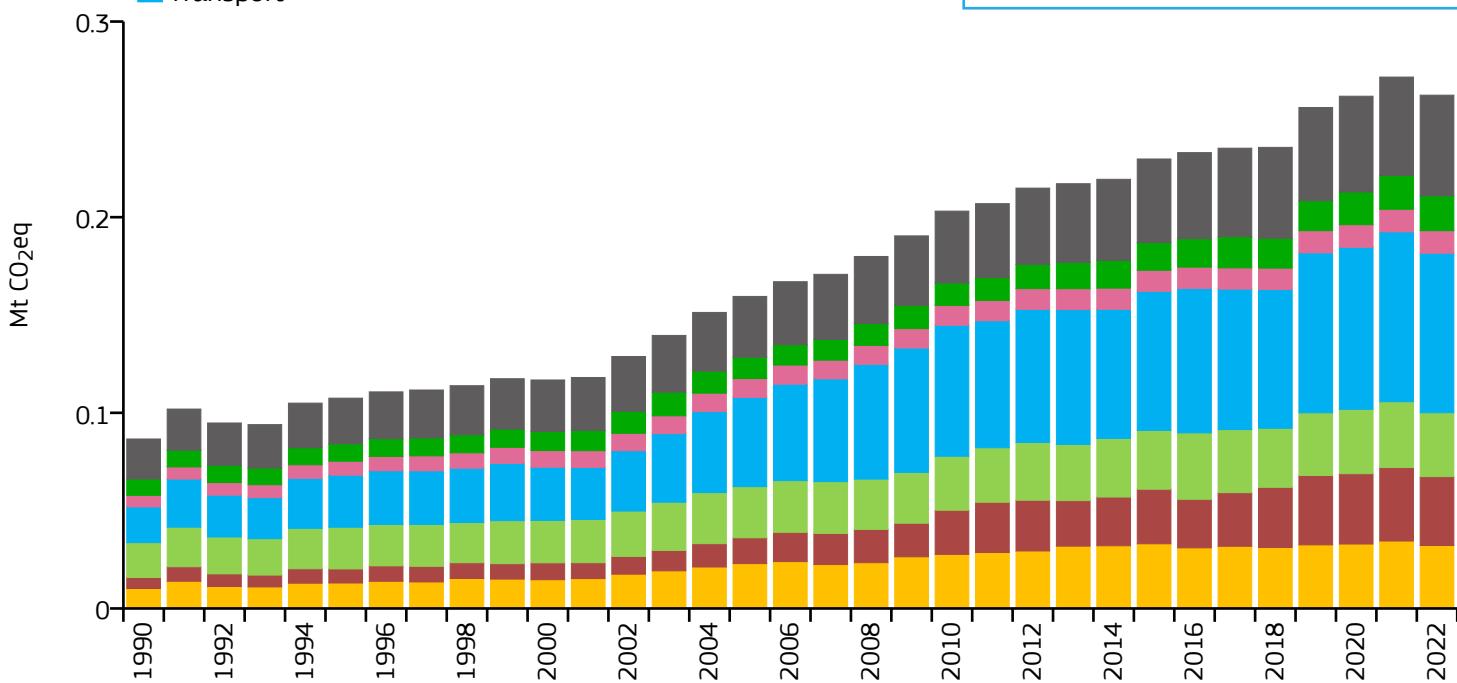
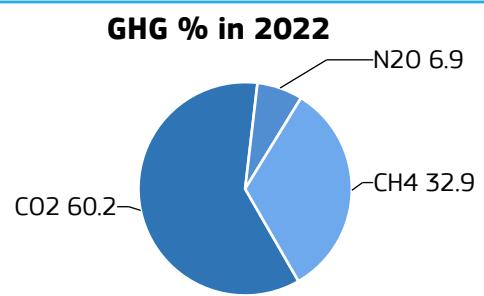
2022 vs 2021



São Tomé and Príncipe

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.262 | 1.156 | 0.288 | 227.000k |
| 2015 | 0.230 | 1.175 | 0.304 | 195.553k |
| 2005 | 0.159 | 1.025 | 0.345 | 155.630k |
| 1990 | 0.087 | 0.761 | 0.361 | 113.893k |

2022 vs 1990

2022 vs 2005

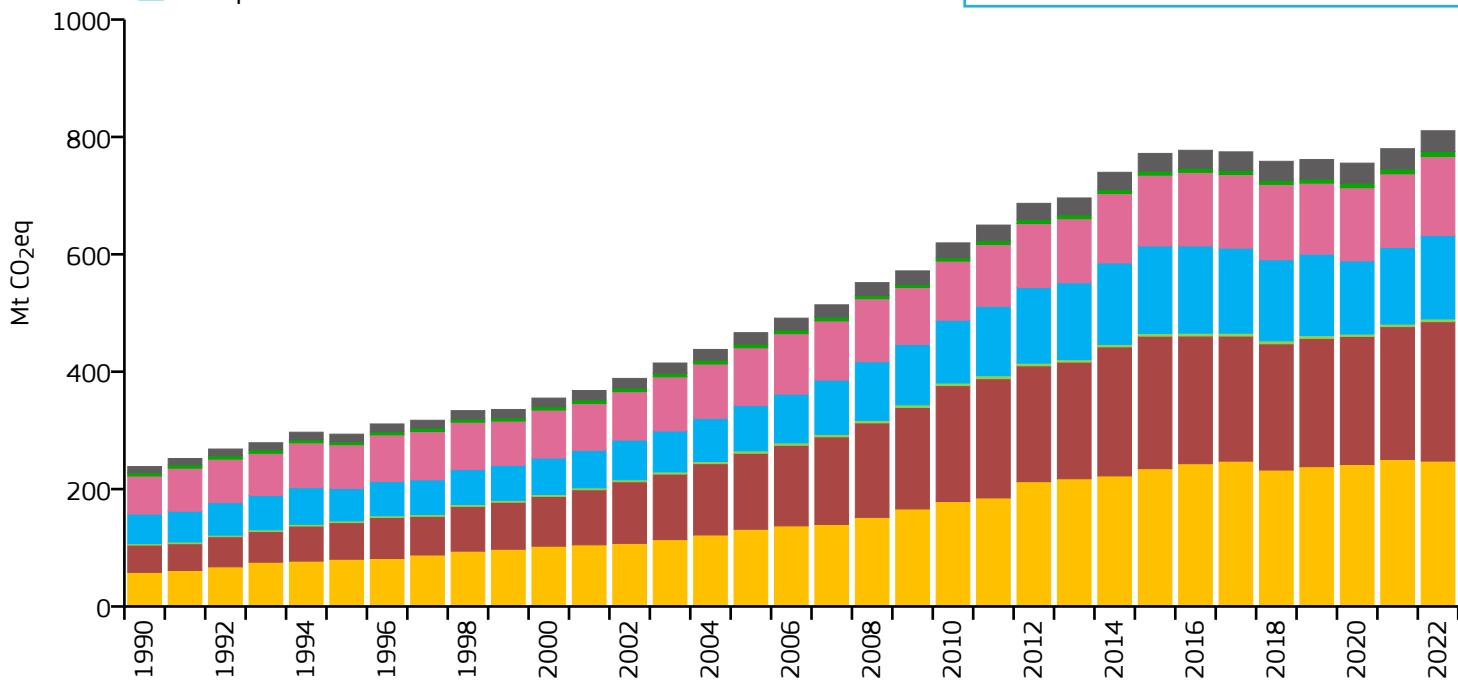
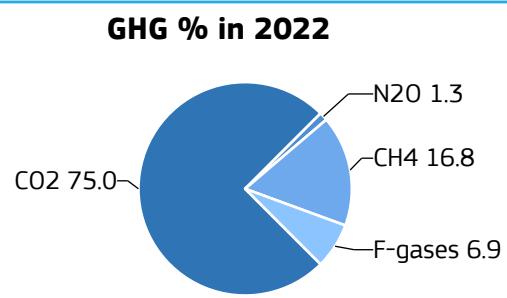
2022 vs 2021



Saudi Arabia

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 810.512 | 22.643 | 0.445 | 35.796M |
| 2015 | 771.904 | 24.461 | 0.486 | 31.557M |
| 2005 | 466.494 | 19.514 | 0.440 | 23.906M |
| 1990 | 238.391 | 14.601 | 0.353 | 16.327M |

2022 vs 1990

2022 vs 2005

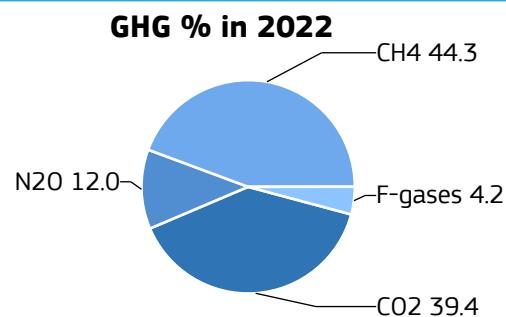
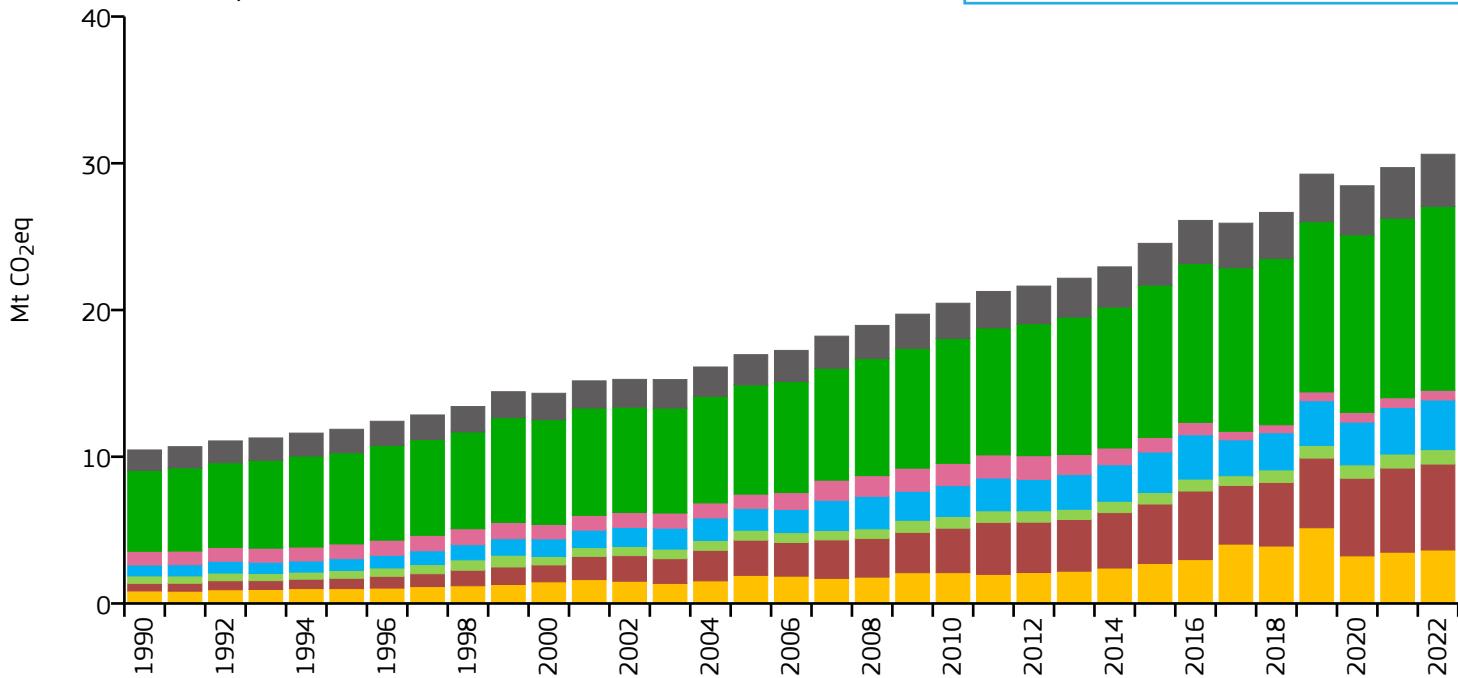
2022 vs 2021



Senegal

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 30.615 | 1.688 | 0.496 | 18.132M |
| 2015 | 24.542 | 1.639 | 0.568 | 14.977M |
| 2005 | 16.956 | 1.507 | 0.554 | 11.251M |
| 1990 | 10.462 | 1.385 | 0.562 | 7.556M |

2022 vs 1990

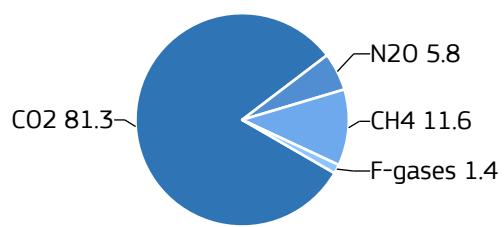
2022 vs 2005

2022 vs 2021



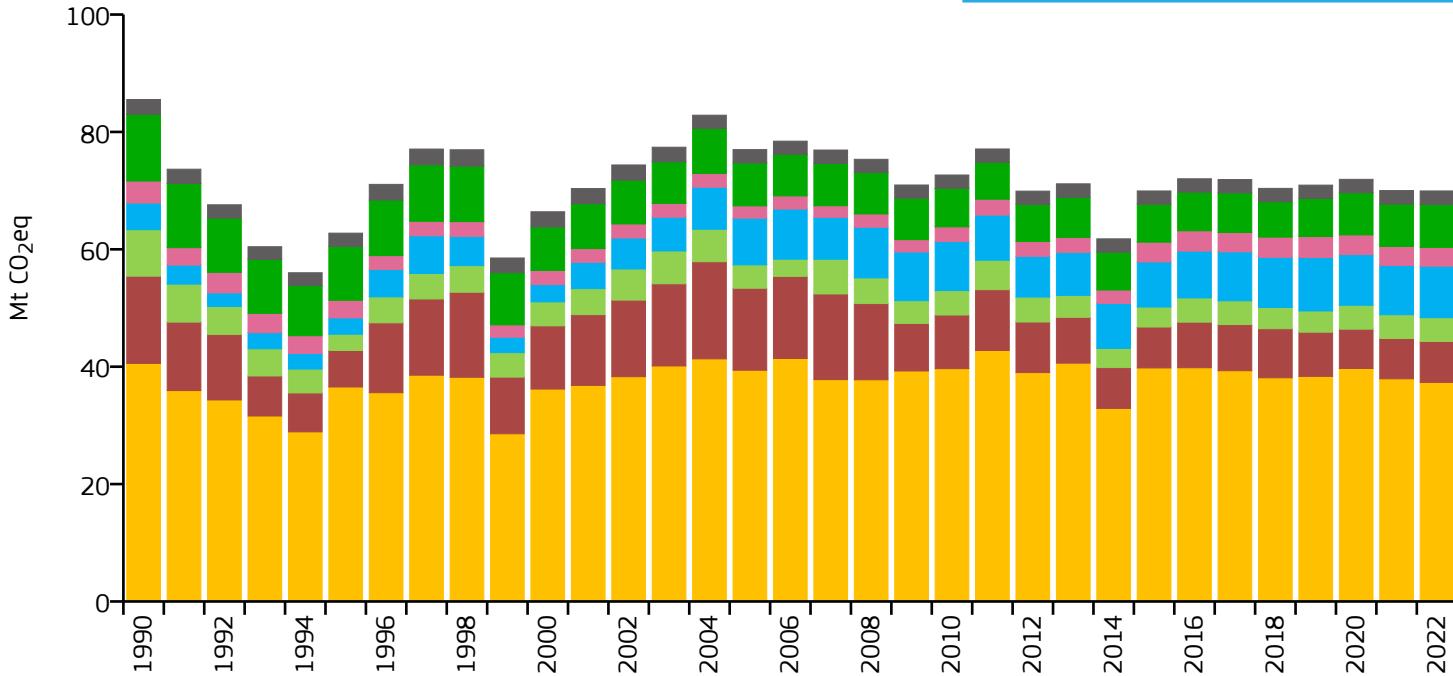
Serbia and Montenegro

GHG % in 2022



GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 69.945 | 7.544 | 0.402 | 9.271M |
| 2015 | 69.943 | 7.379 | 0.504 | 9.479M |
| 2005 | 76.988 | 7.831 | 0.770 | 9.831M |
| 1990 | 85.526 | 8.441 | 1.073 | 10.132M |

2022 vs 1990

2022 vs 2005

2022 vs 2021

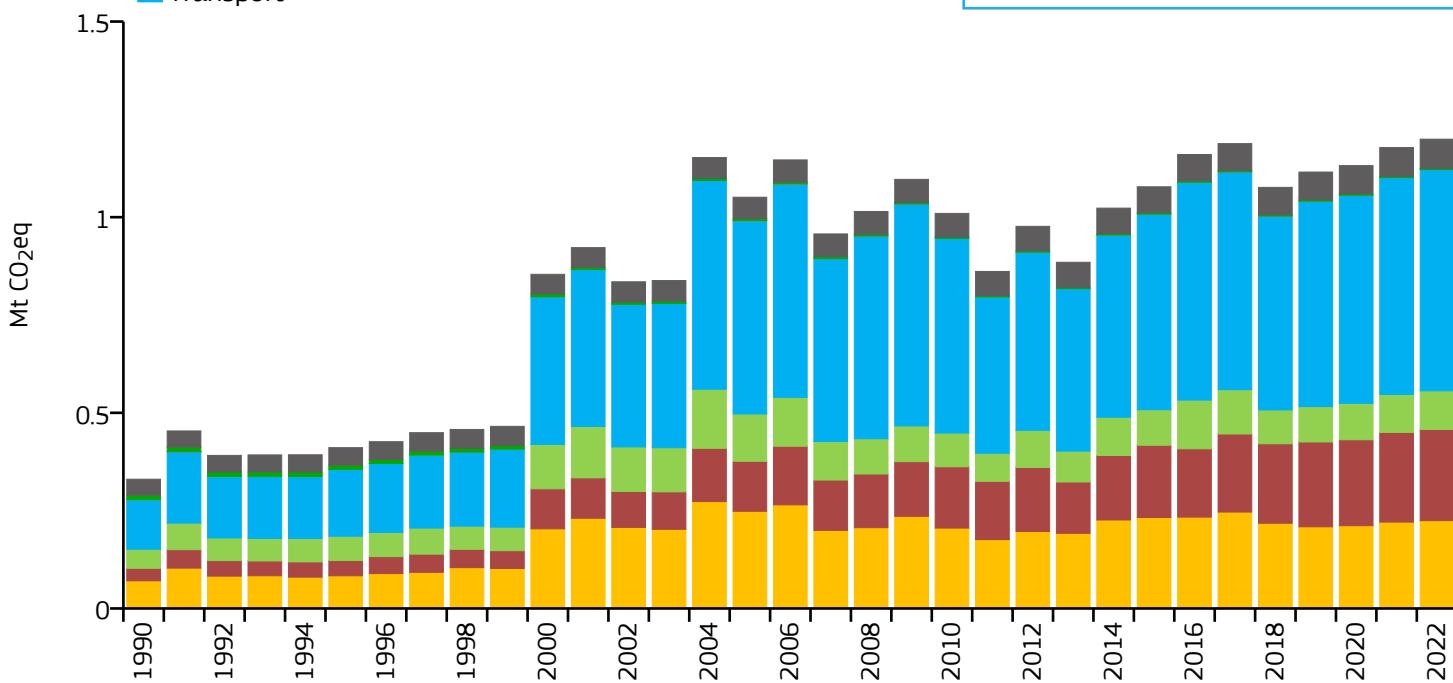
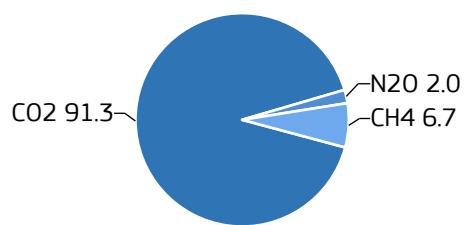


Seychelles

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

GHG % in 2022

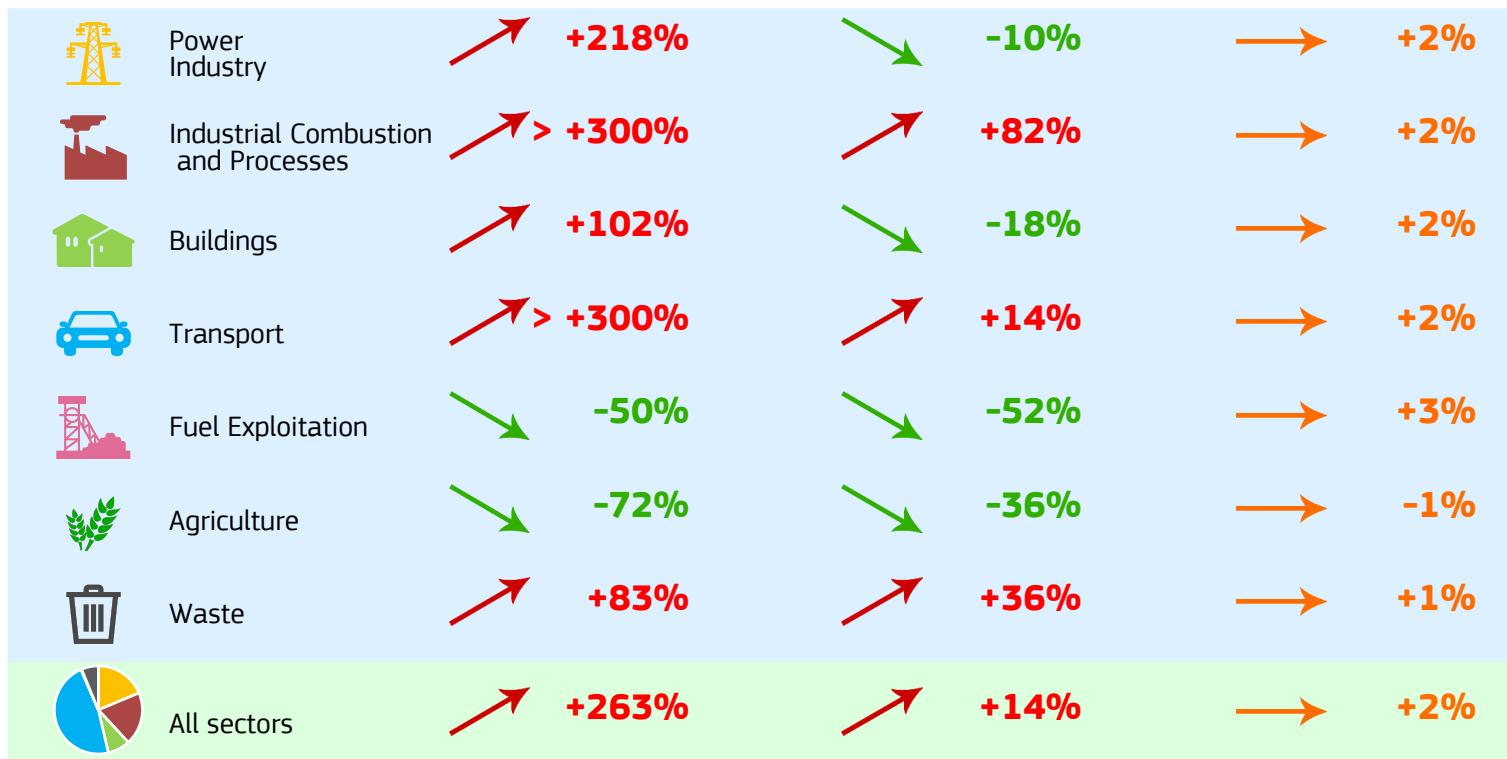


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 1.199 | 12.365 | 0.402 | 97.000k |
| 2015 | 1.078 | 11.497 | 0.444 | 93.742k |
| 2005 | 1.051 | 11.843 | 0.634 | 88.744k |
| 1990 | 0.330 | 4.678 | 0.306 | 70.624k |

2022 vs 1990

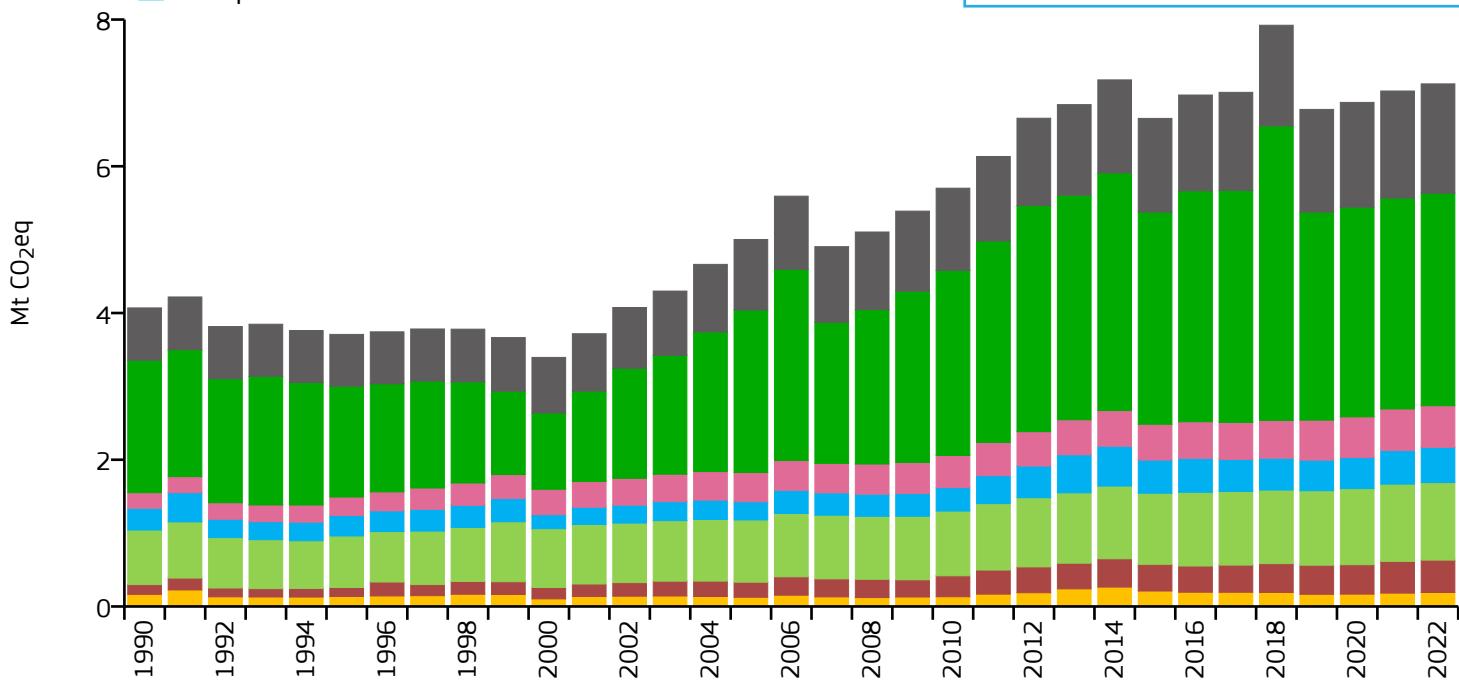
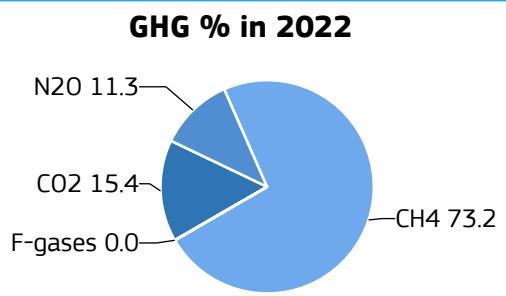
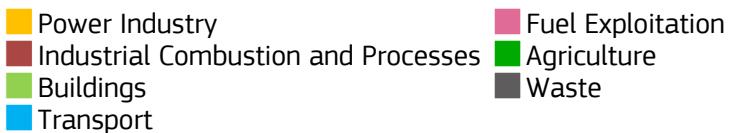
2022 vs 2005

2022 vs 2021



Sierra Leone

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 7.123 | 0.850 | 0.506 | 8.376M |
| 2015 | 6.653 | 0.919 | 0.600 | 7.237M |
| 2005 | 5.002 | 0.884 | 0.725 | 5.658M |
| 1990 | 4.069 | 0.944 | 0.656 | 4.312M |

2022 vs 1990

2022 vs 2005

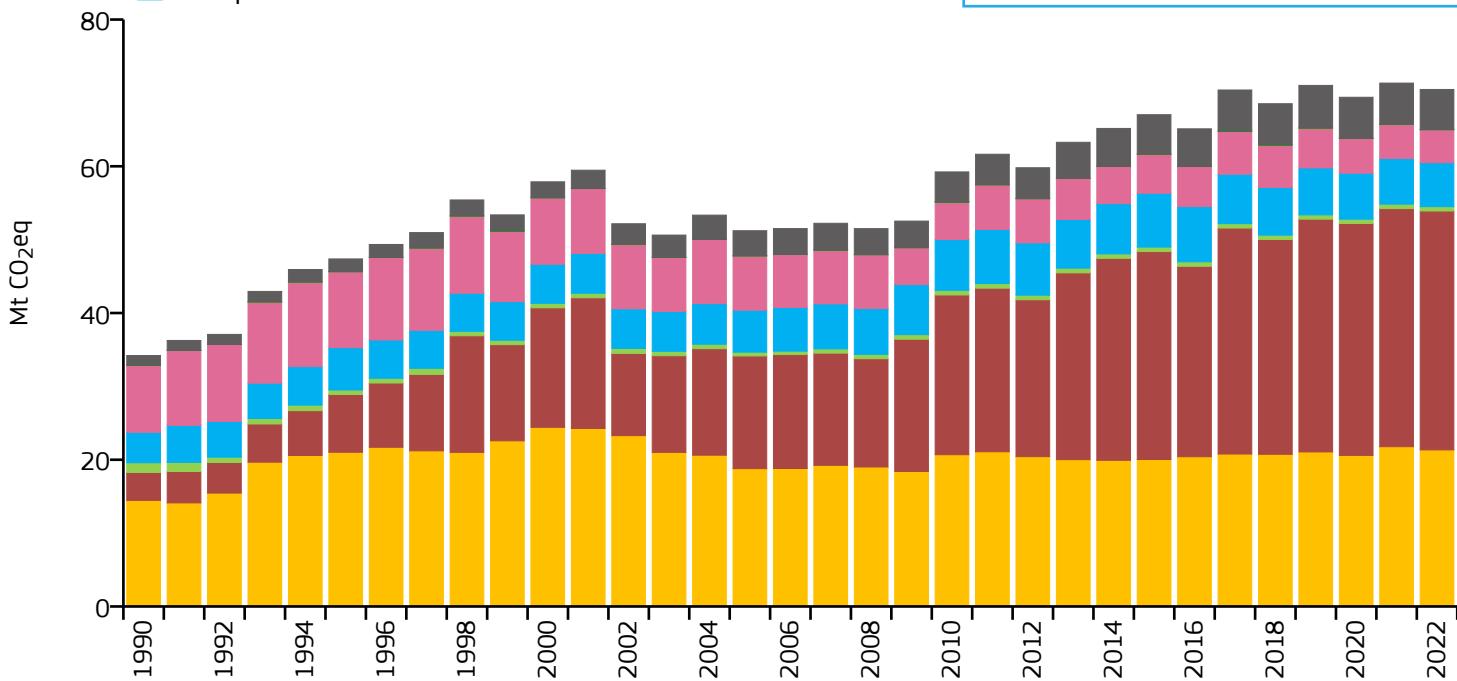
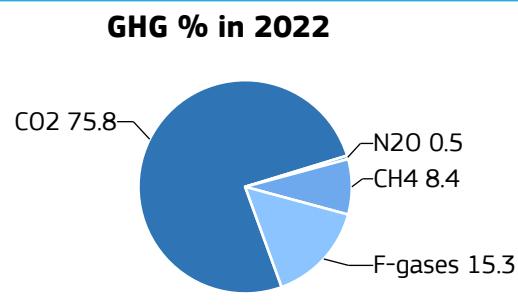
2022 vs 2021



Singapore

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 70.470 | 11.667 | 0.116 | 6.040M |
| 2015 | 67.030 | 12.110 | 0.136 | 5.535M |
| 2005 | 51.214 | 11.404 | 0.179 | 4.491M |
| 1990 | 34.203 | 11.352 | 0.301 | 3.013M |

2022 vs 1990

2022 vs 2005

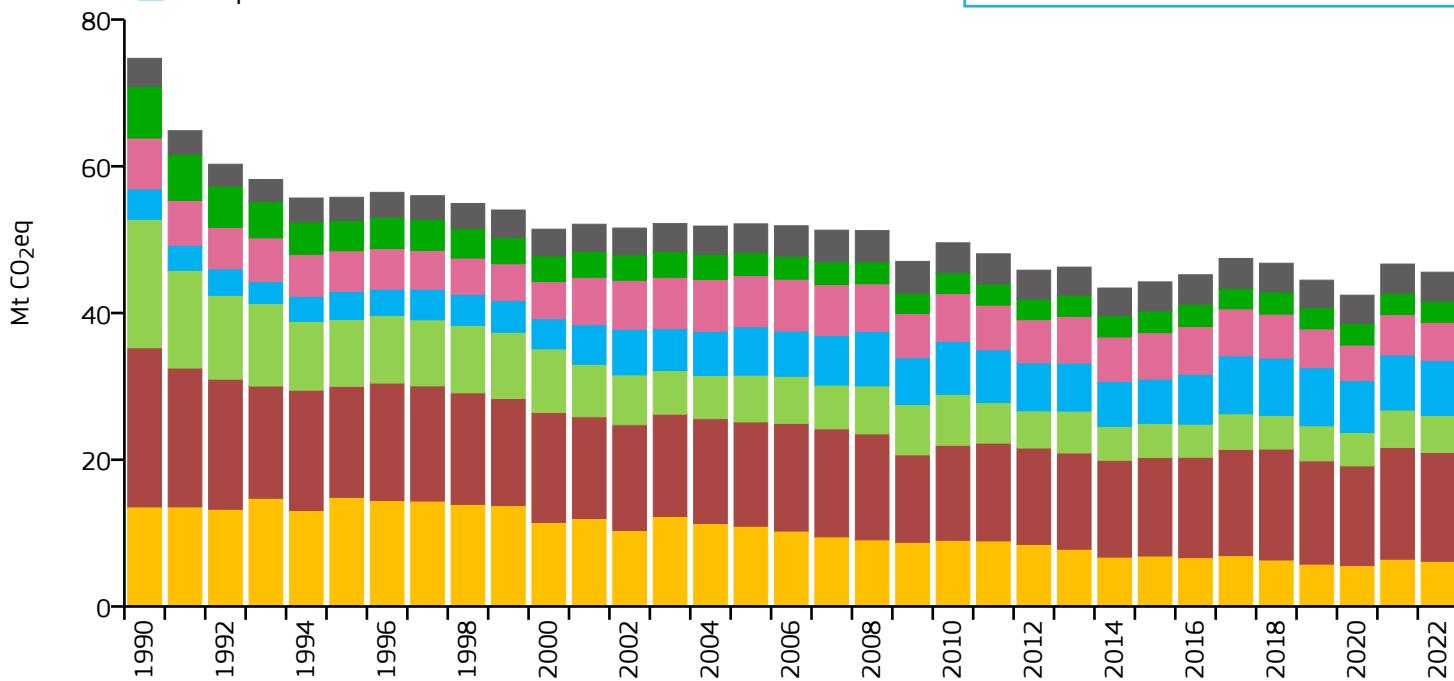
2022 vs 2021



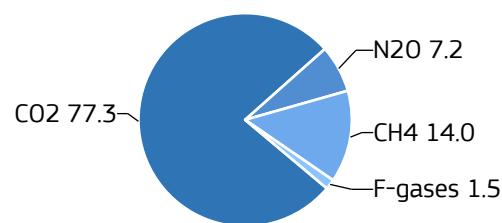
Slovakia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 45.564 | 8.360 | 0.253 | 5.450M |
| 2015 | 44.243 | 8.134 | 0.283 | 5.439M |
| 2005 | 52.152 | 9.660 | 0.483 | 5.399M |
| 1990 | 74.712 | 14.127 | 0.923 | 5.288M |

2022 vs 1990

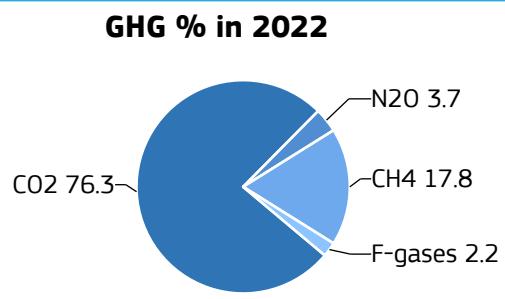
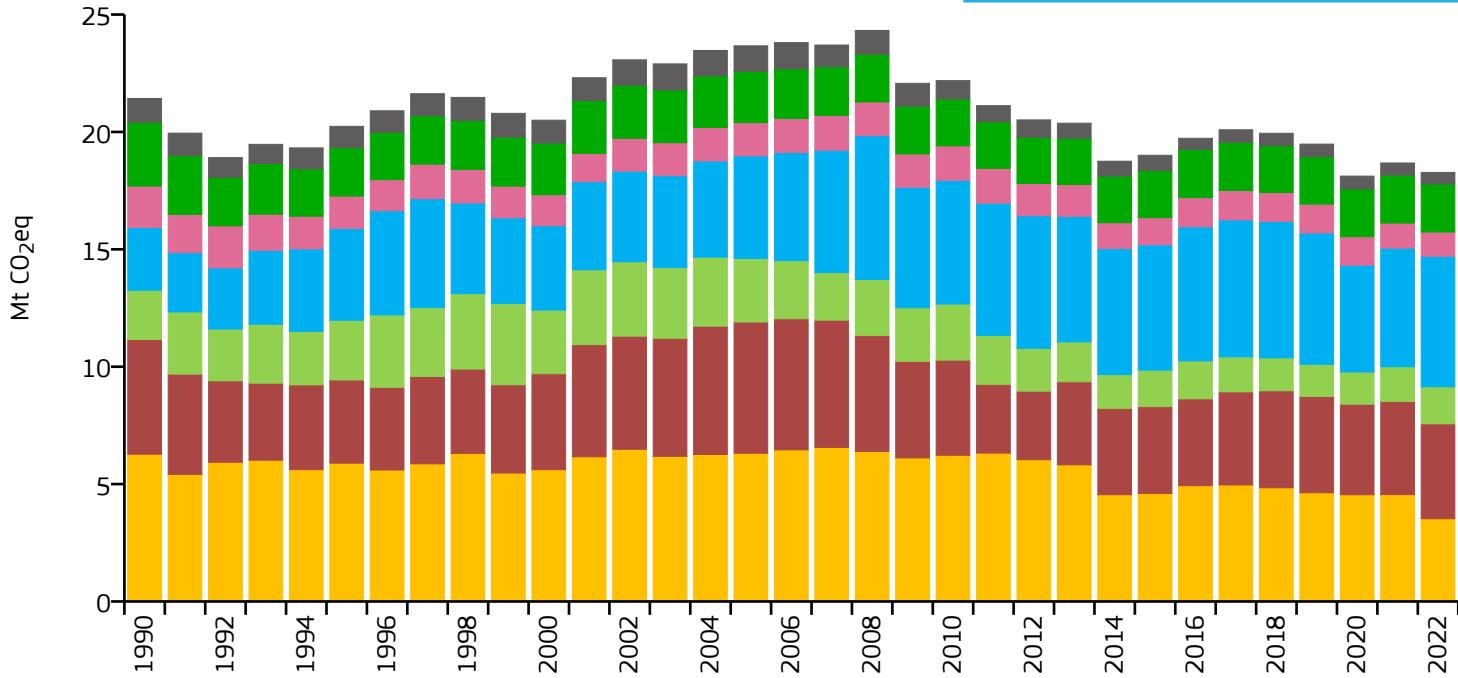
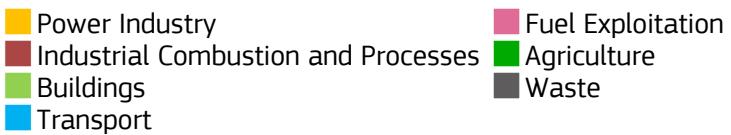
2022 vs 2005

2022 vs 2021

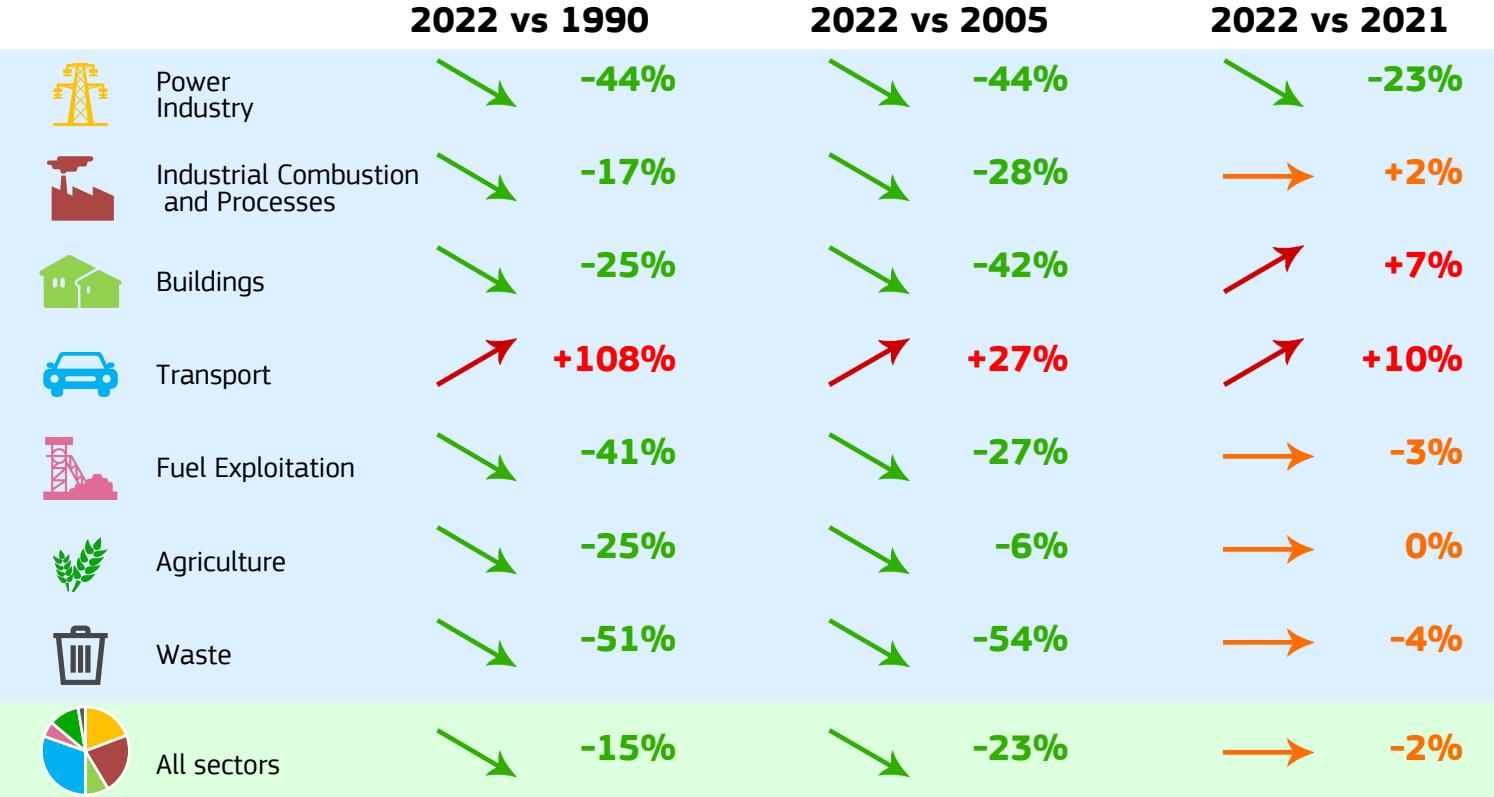


Slovenia

GHG emissions by sector



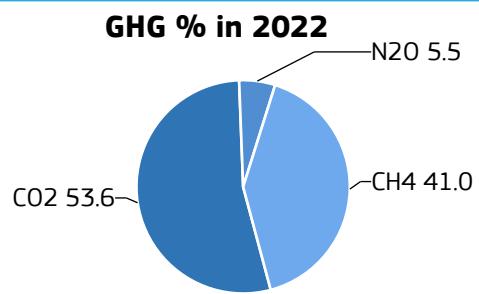
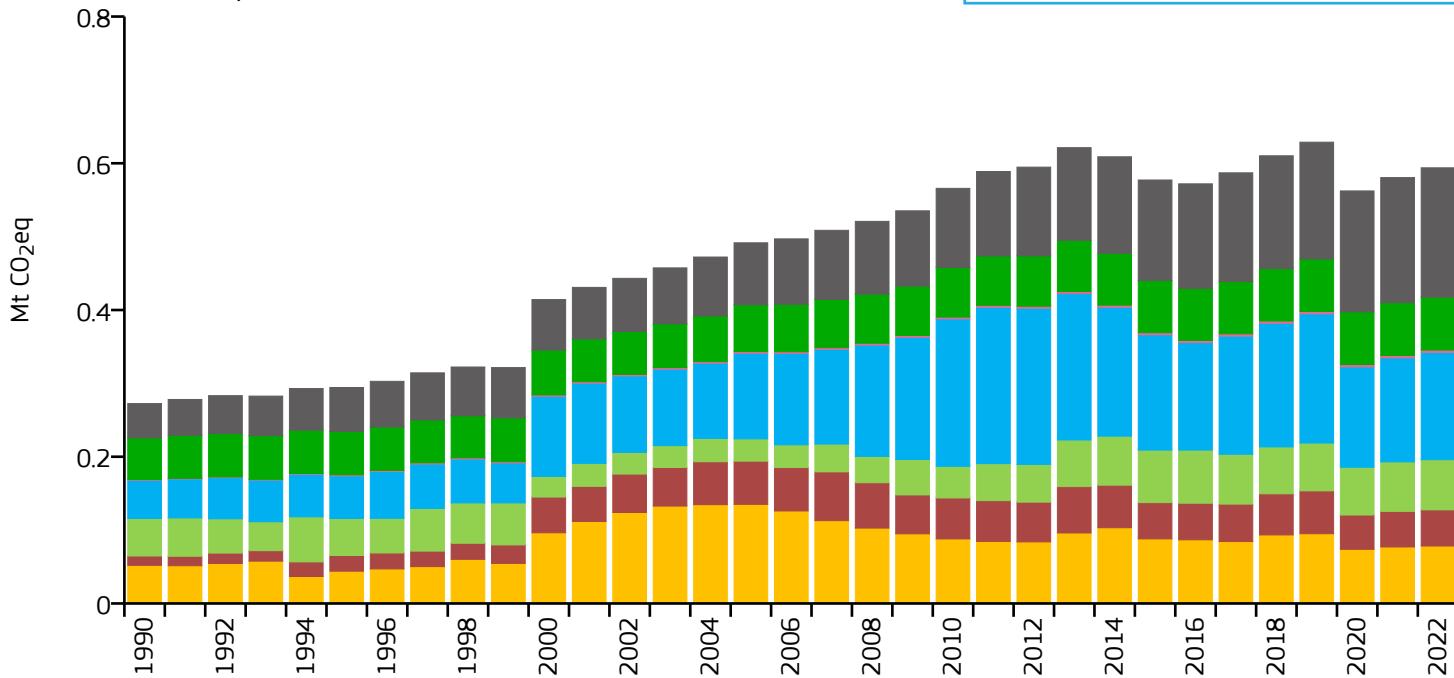
| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 18.276 | 8.782 | 0.205 | 2.081M |
| 2015 | 19.006 | 9.160 | 0.272 | 2.075M |
| 2005 | 23.668 | 11.856 | 0.380 | 1.996M |
| 1990 | 21.426 | 10.678 | 0.479 | 2.006M |



Solomon Islands

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

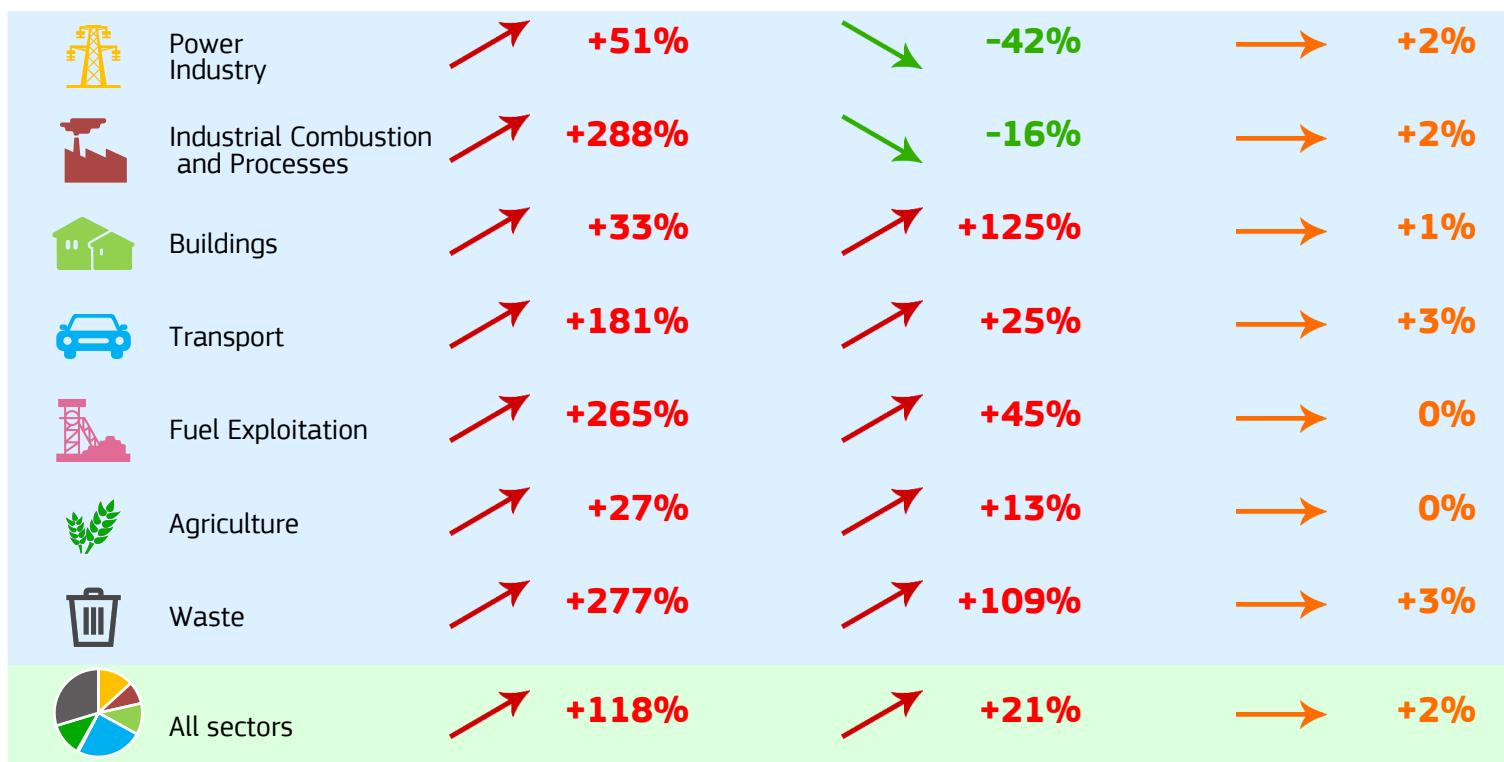


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.594 | 0.884 | 0.365 | 672.000k |
| 2015 | 0.577 | 0.983 | 0.372 | 587.482k |
| 2005 | 0.492 | 1.046 | 0.488 | 469.885k |
| 1990 | 0.272 | 0.874 | 0.383 | 311.840k |

2022 vs 1990

2022 vs 2005

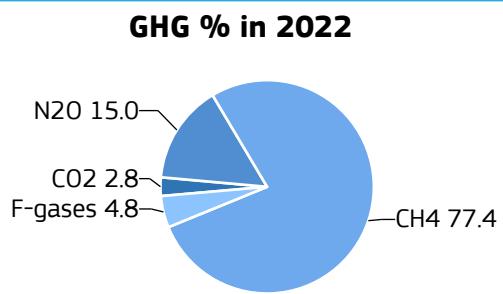
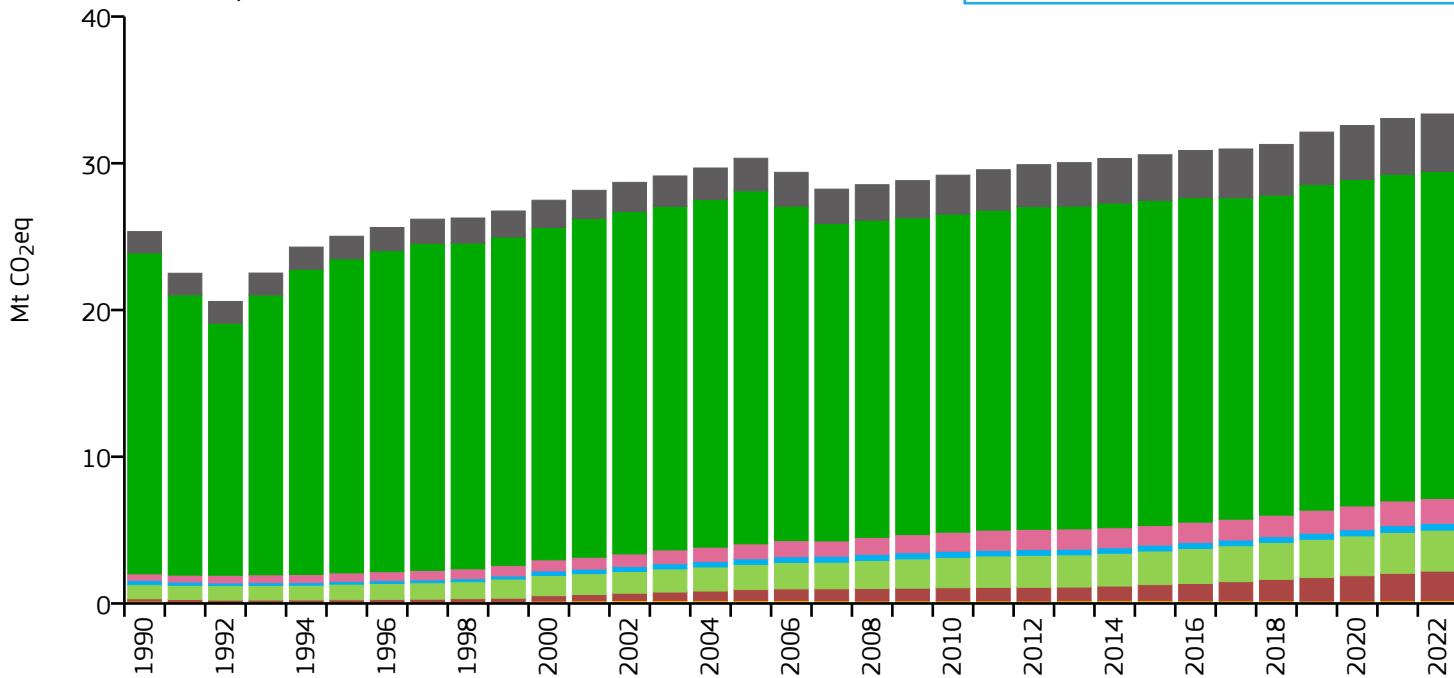
2022 vs 2021



Somalia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

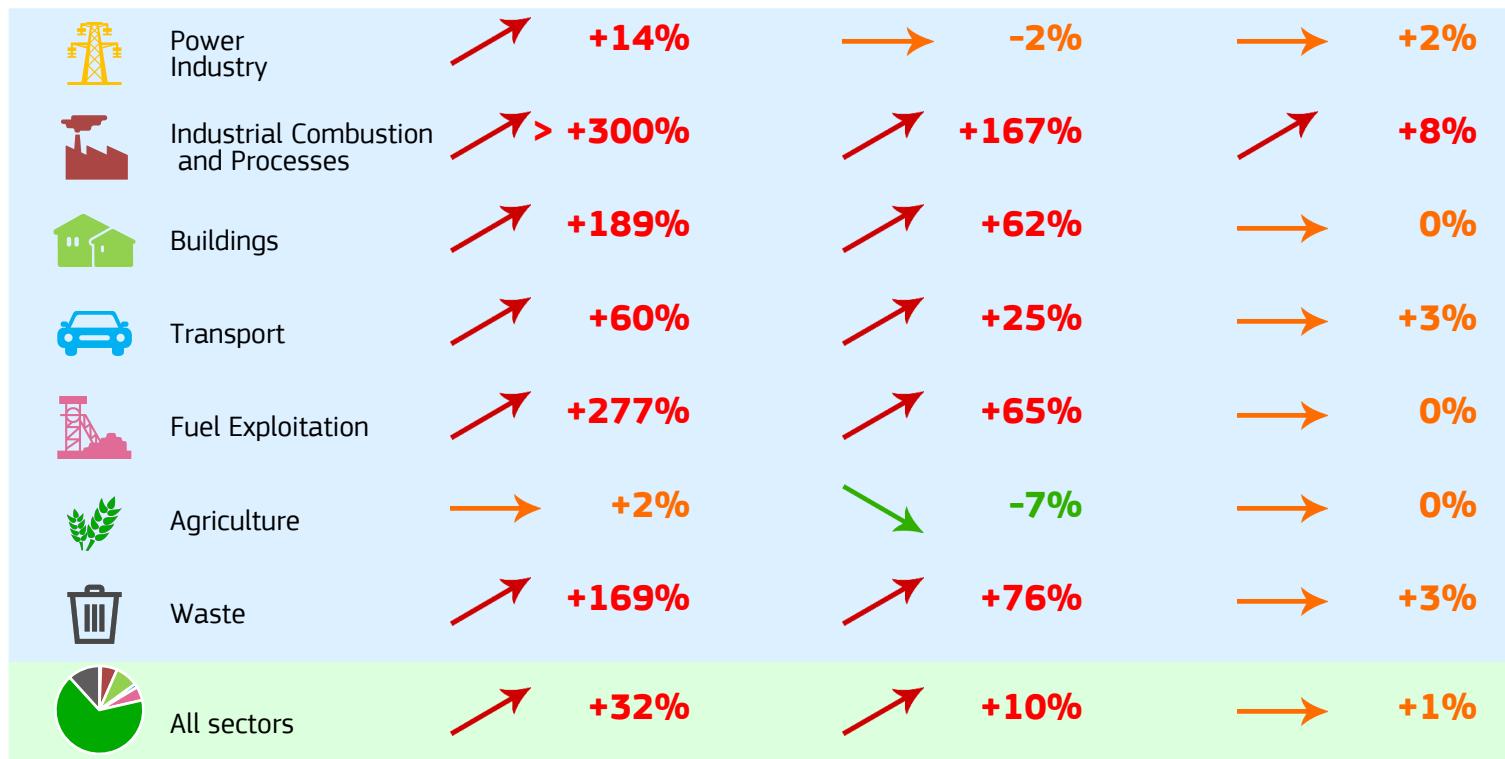


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 33.358 | 1.952 | 1.641 | 17.088M |
| 2015 | 30.580 | 2.199 | 2.158 | 13.908M |
| 2005 | 30.342 | 2.915 | 2.617 | 10.410M |
| 1990 | 25.345 | 3.426 | 1.962 | 7.397M |

2022 vs 1990

2022 vs 2005

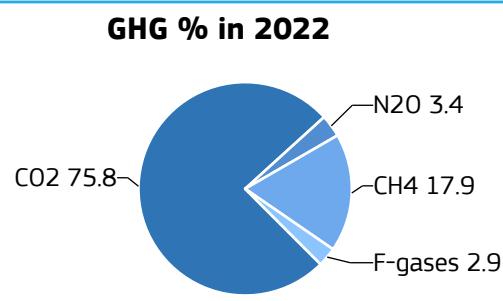
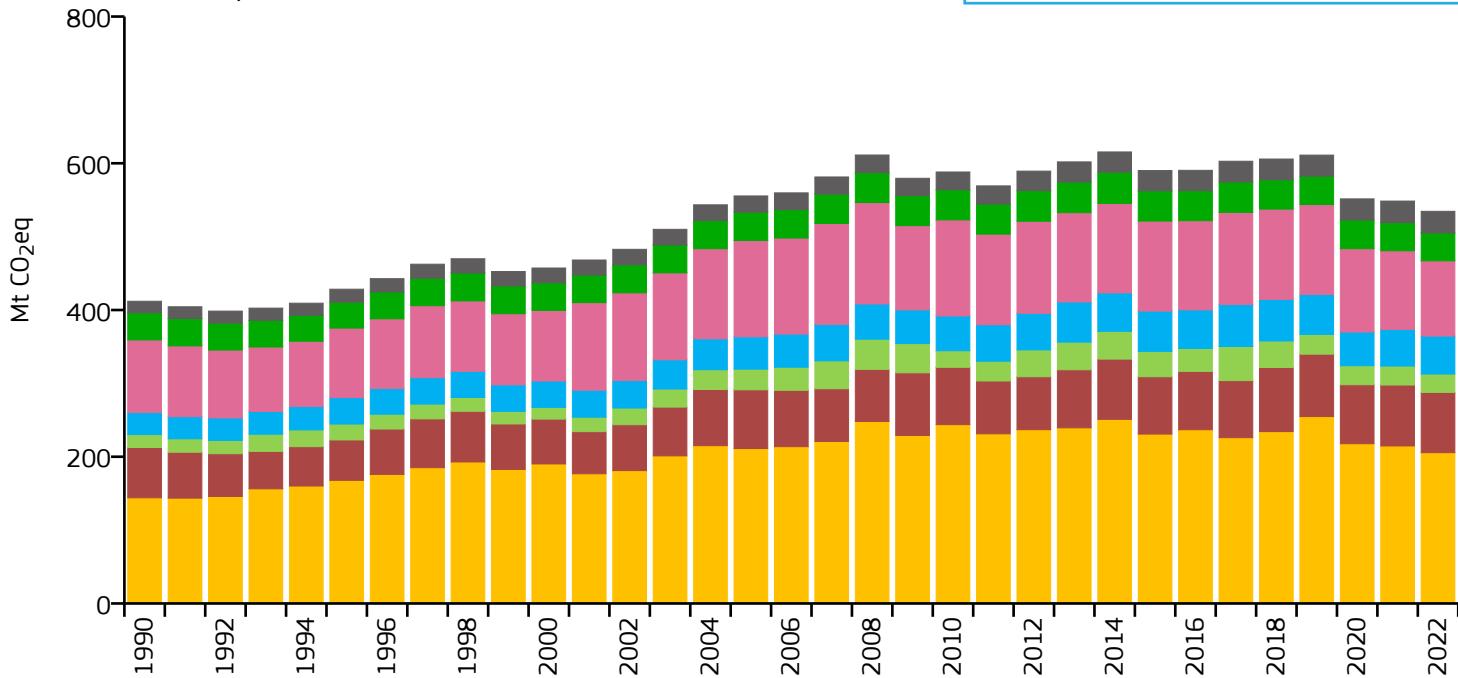
2022 vs 2021



South Africa

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 534.532 | 8.909 | 0.663 | 59.996M |
| 2015 | 590.087 | 10.672 | 0.760 | 55.291M |
| 2005 | 555.478 | 11.378 | 0.928 | 48.821M |
| 1990 | 411.938 | 10.967 | 0.994 | 37.560M |

2022 vs 1990

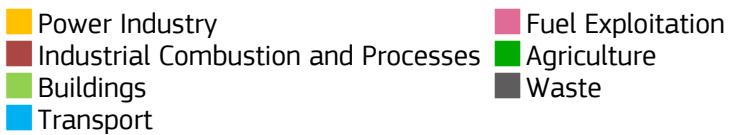
2022 vs 2005

2022 vs 2021

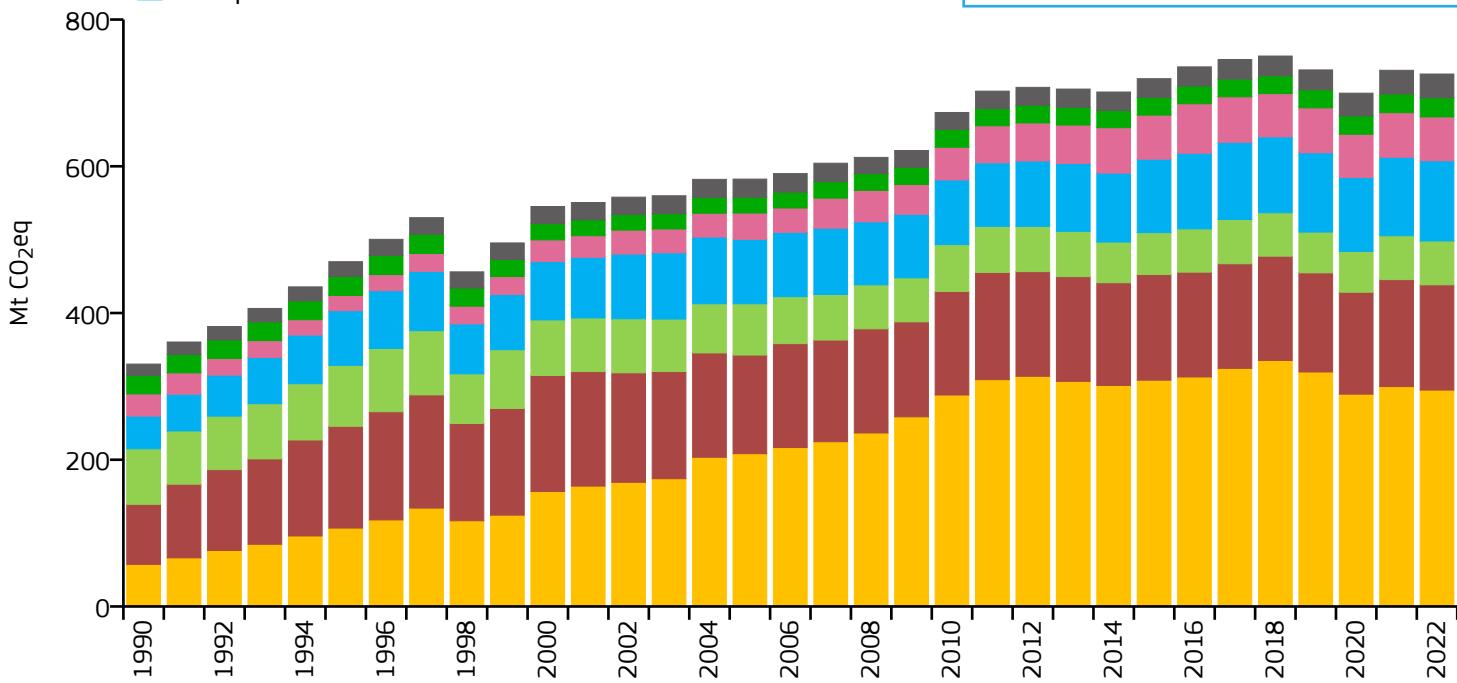
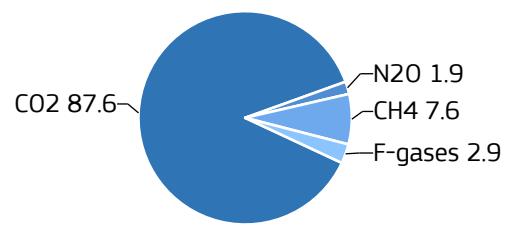


South Korea

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 725.744 | 14.006 | 0.309 | 51.817M |
| 2015 | 719.382 | 14.219 | 0.363 | 50.594M |
| 2005 | 582.520 | 11.959 | 0.422 | 48.709M |
| 1990 | 330.374 | 7.697 | 0.609 | 42.923M |

2022 vs 1990

2022 vs 2005

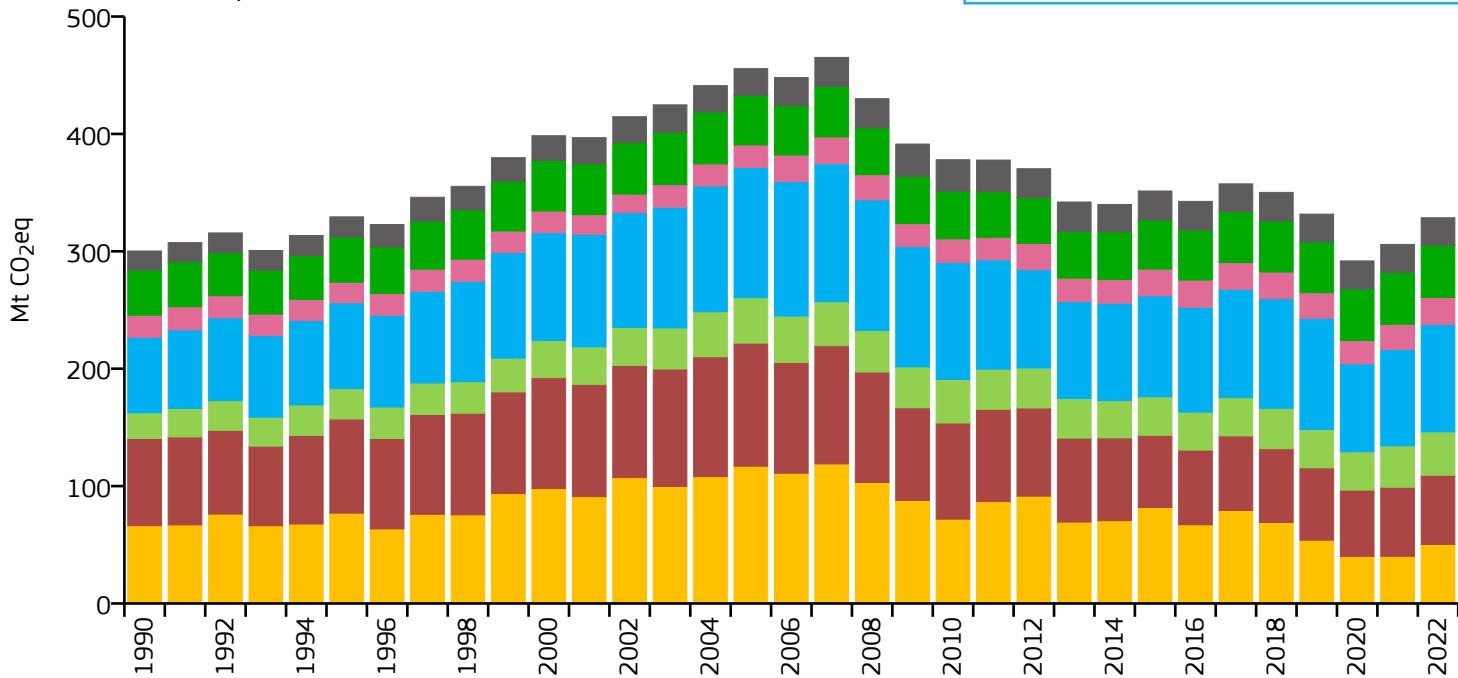
2022 vs 2021



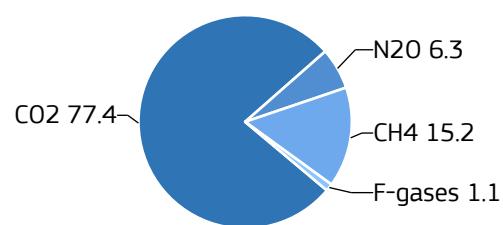
Spain and Andorra

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 328.591 | 7.078 | 0.173 | 46.424M |
| 2015 | 351.379 | 7.573 | 0.202 | 46.398M |
| 2005 | 455.616 | 10.345 | 0.275 | 44.043M |
| 1990 | 300.269 | 7.639 | 0.280 | 39.306M |

2022 vs 1990

2022 vs 2005

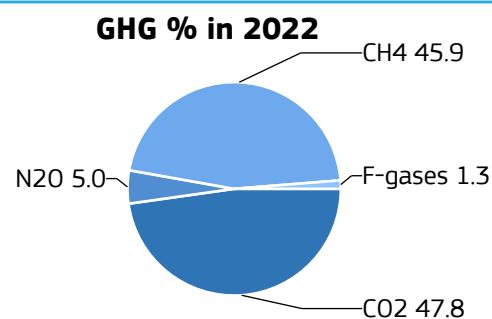
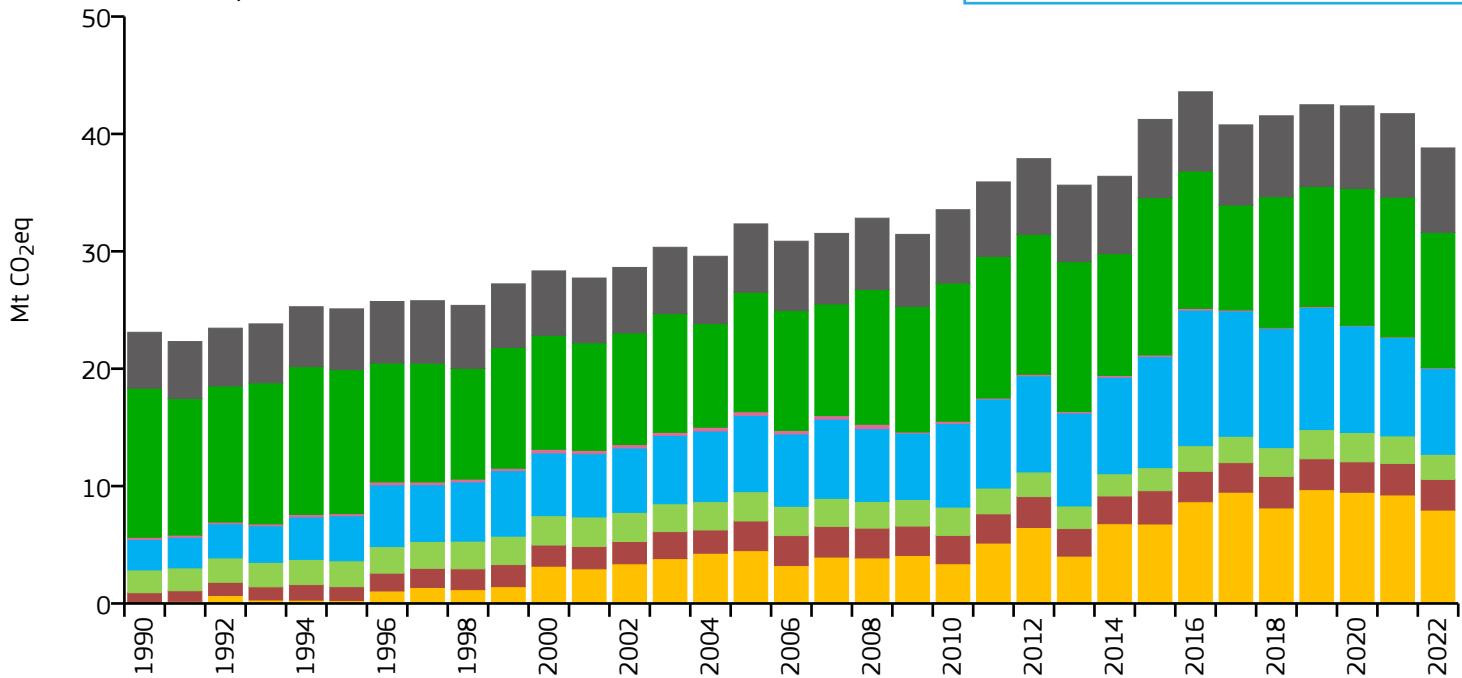
2022 vs 2021



Sri Lanka

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 38.804 | 1.830 | 0.143 | 21.204M |
| 2015 | 41.236 | 1.991 | 0.158 | 20.714M |
| 2005 | 32.334 | 1.656 | 0.230 | 19.525M |
| 1990 | 23.103 | 1.333 | 0.332 | 17.330M |

2022 vs 1990

2022 vs 2005

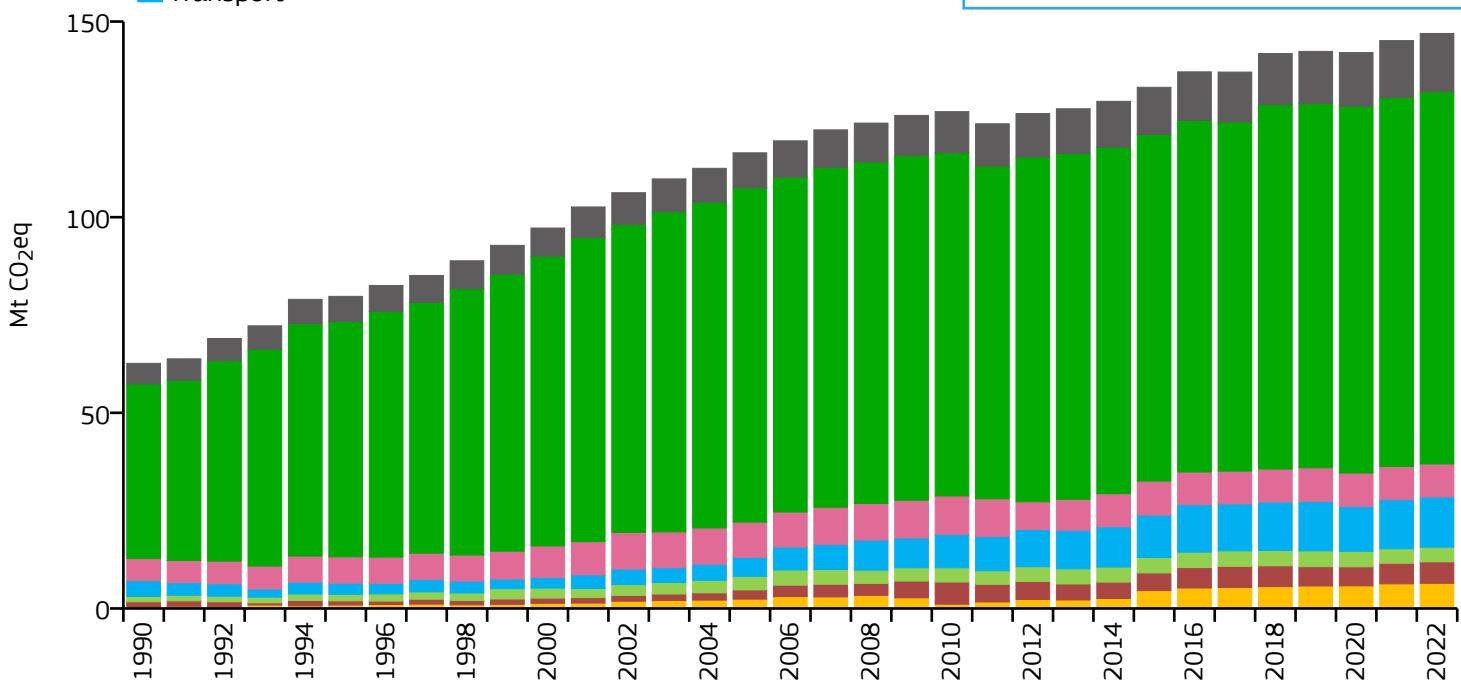
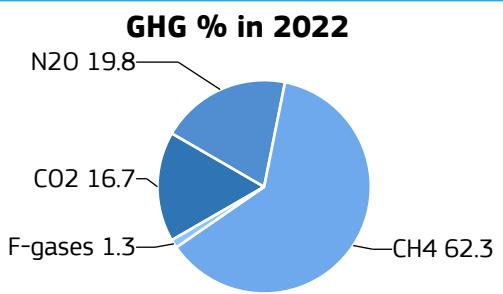
2022 vs 2021



Sudan and South Sudan

GHG emissions by sector

- | | |
|---|---|
|  |  |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 146.955 | 2.420 | 0.878 | 60.733M |
| 2015 | 133.198 | 2.673 | 0.739 | 49.838M |
| 2005 | 116.451 | 3.018 | 0.667 | 38.584M |
| 1990 | 62.645 | 2.440 | 0.879 | 25.677M |

2022 vs 1990

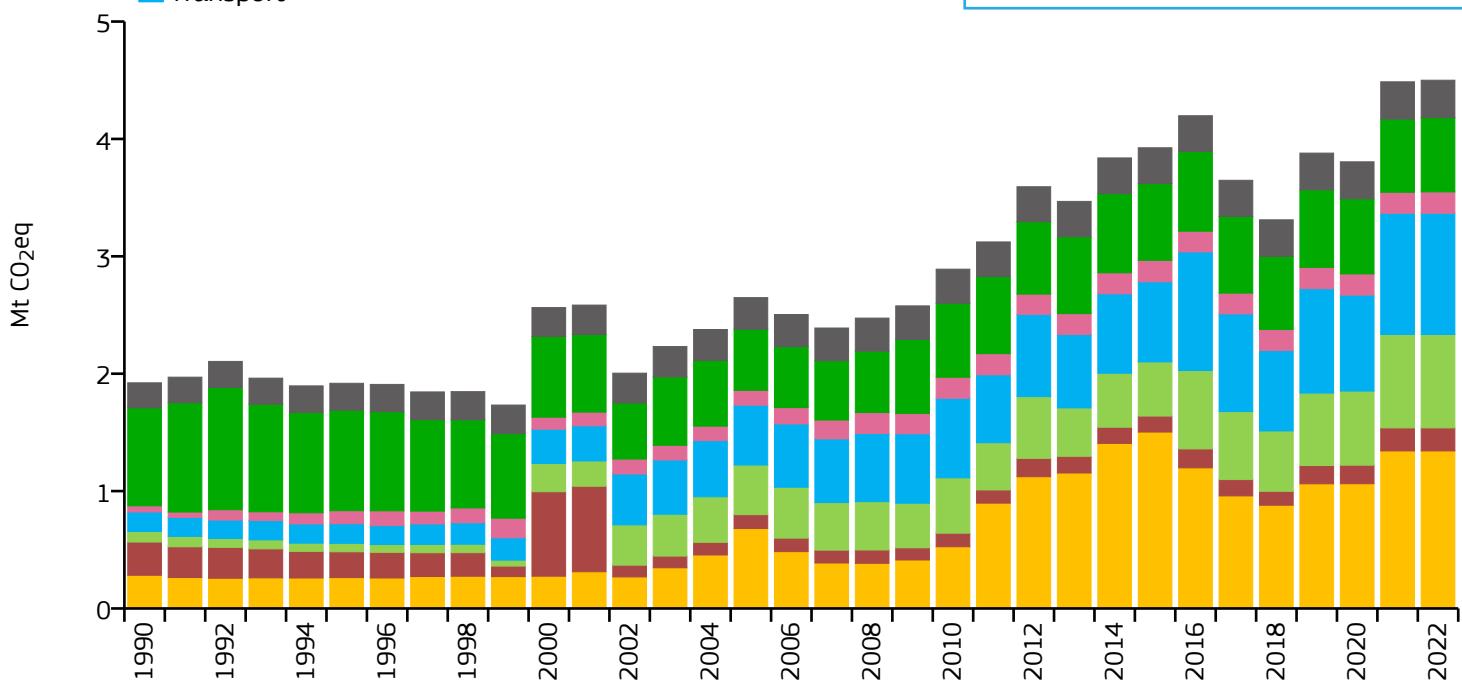
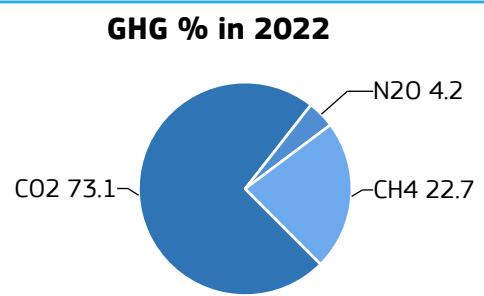
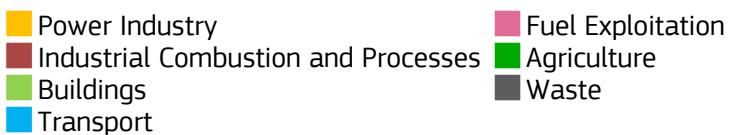
2022 vs 2005

2022 vs 2021



Suriname

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 4.500 | 7.667 | 0.488 | 587.000k |
| 2015 | 3.925 | 7.094 | 0.363 | 553.208k |
| 2005 | 2.648 | 5.307 | 0.333 | 498.946k |
| 1990 | 1.922 | 4.718 | 0.342 | 407.472k |

2022 vs 1990

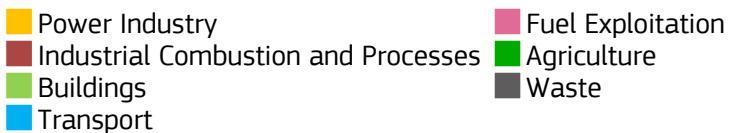
2022 vs 2005

2022 vs 2021

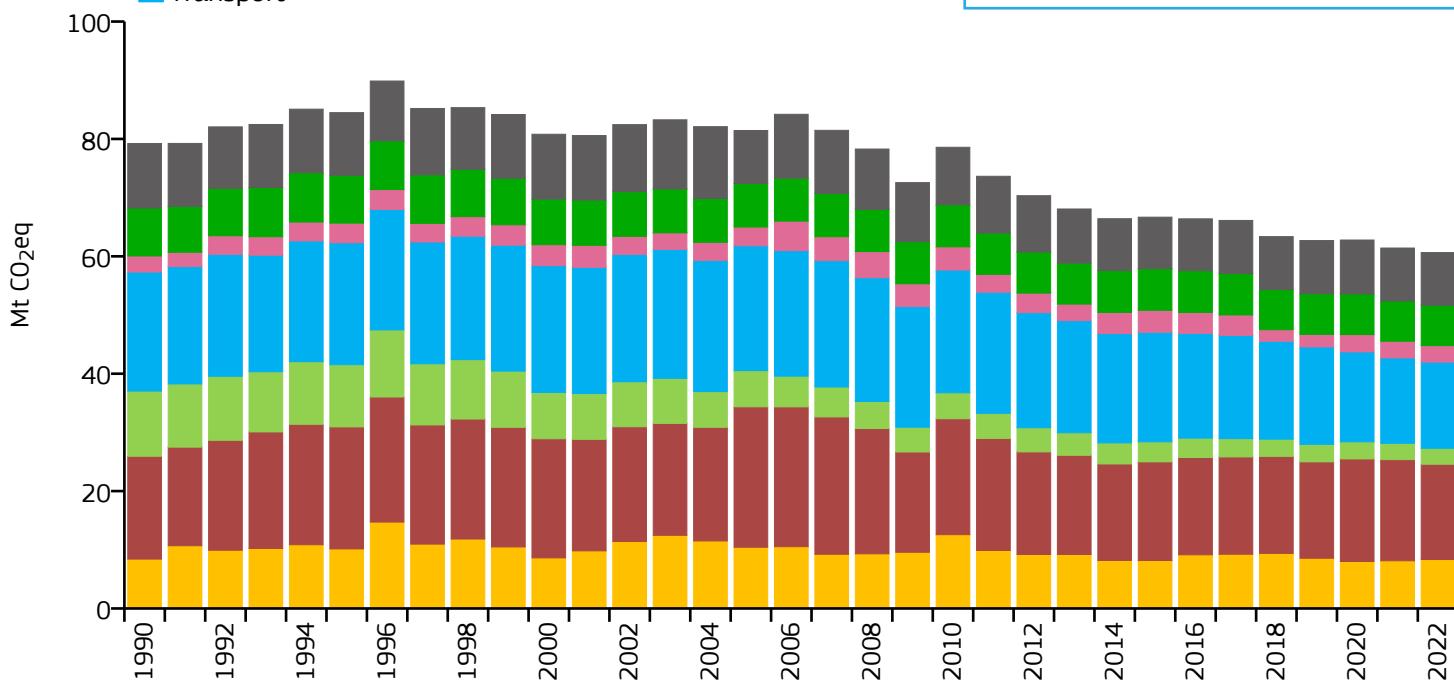
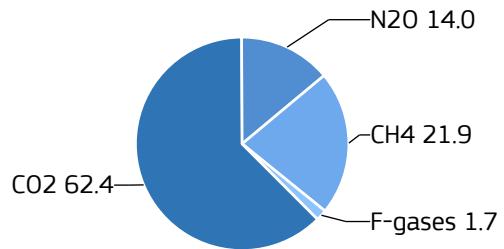


Sweden

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 60.637 | 5.914 | 0.105 | 10.253M |
| 2015 | 66.670 | 6.828 | 0.134 | 9.764M |
| 2005 | 81.440 | 9.010 | 0.198 | 9.039M |
| 1990 | 79.215 | 9.246 | 0.271 | 8.567M |

2022 vs 1990

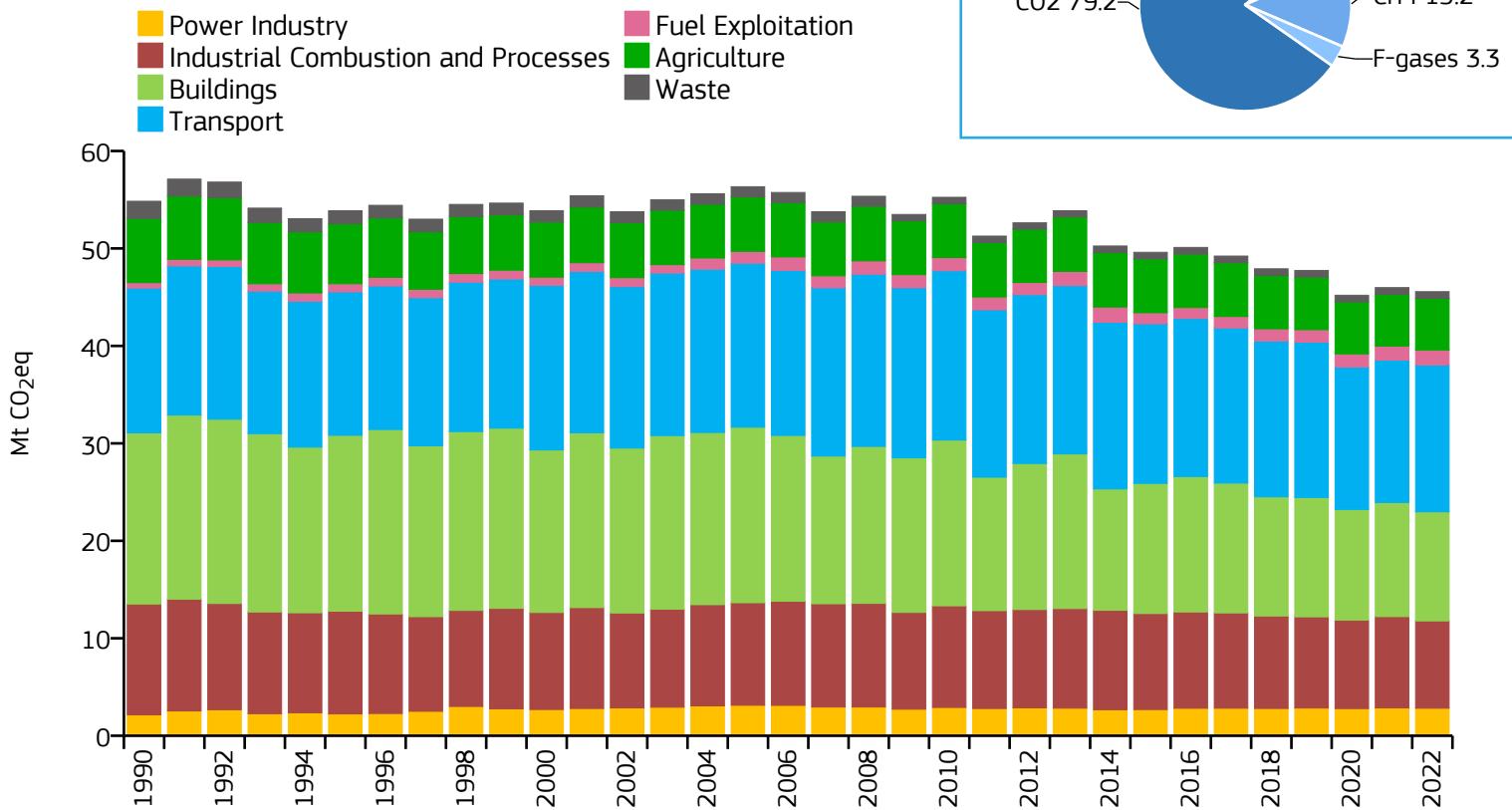
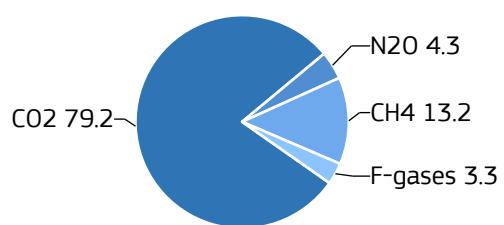
2022 vs 2005

2022 vs 2021



Switzerland and Liechtenstein

GHG emissions by sector

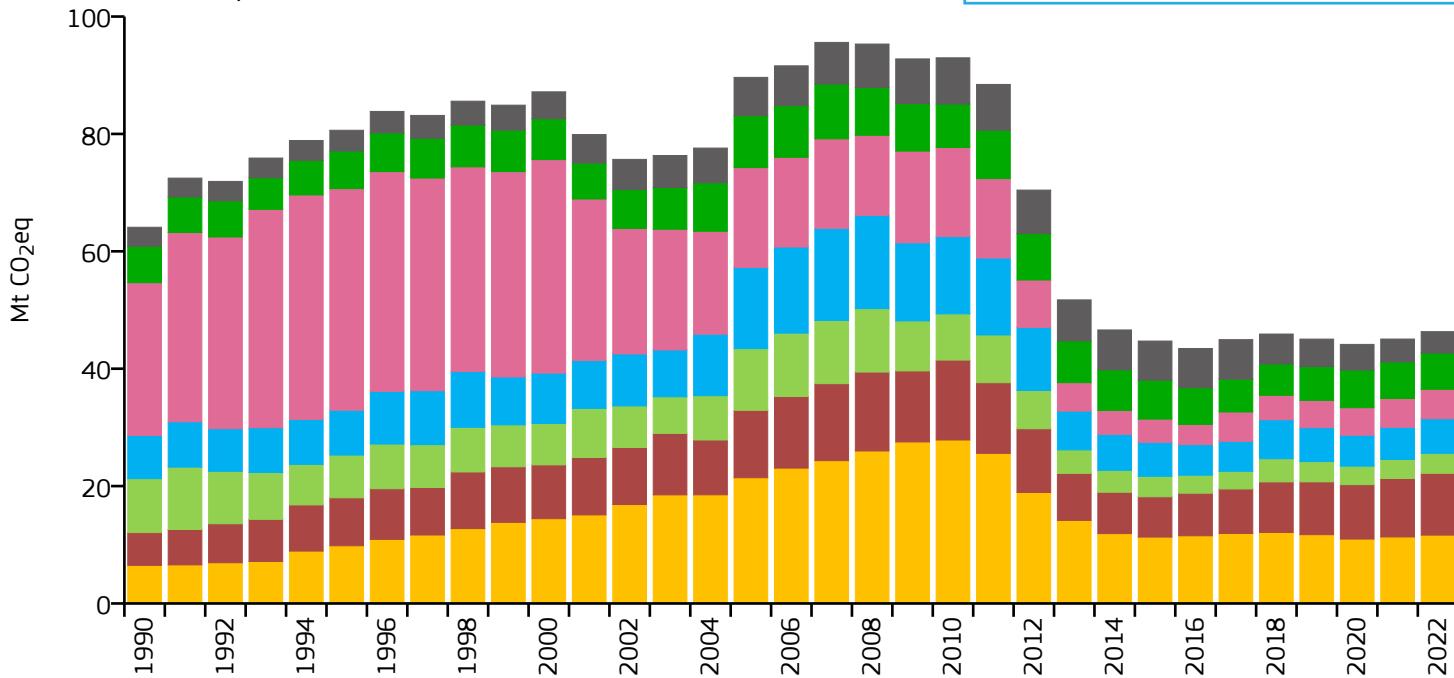
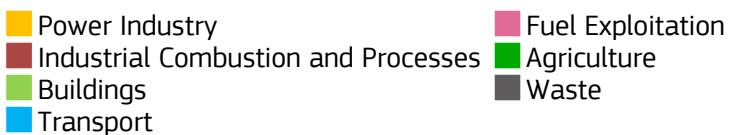

GHG % in 2022


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 45.564 | 5.184 | 0.073 | 8.789M |
| 2015 | 49.604 | 5.962 | 0.089 | 8.320M |
| 2005 | 56.335 | 7.602 | 0.124 | 7.410M |
| 1990 | 54.843 | 8.216 | 0.145 | 6.675M |

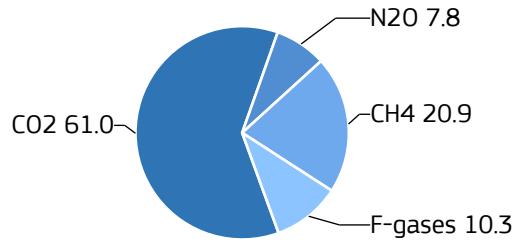
2022 vs 1990
2022 vs 2005
2022 vs 2021


Syria

GHG emissions by sector



GHG % in 2022

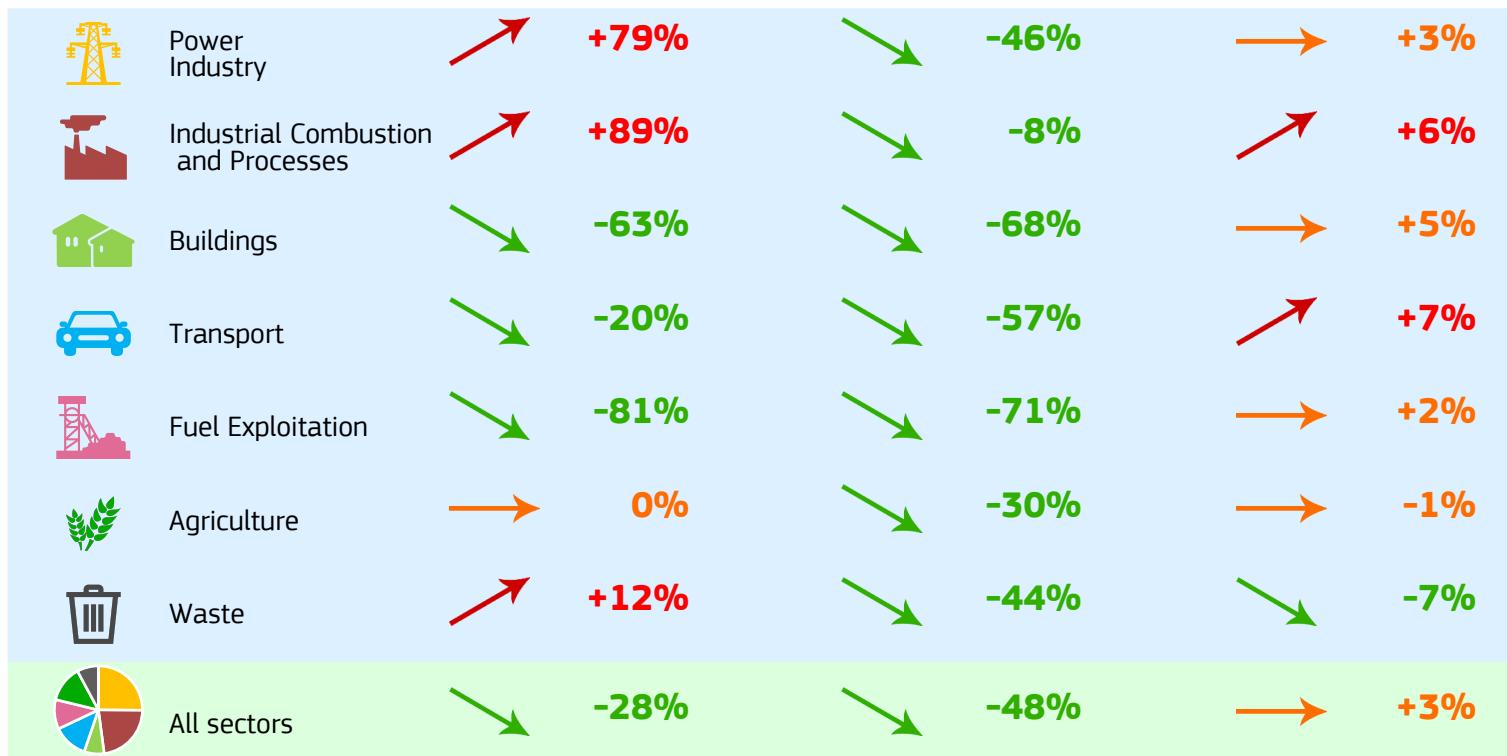


| Year | GHG emissions Mt CO2eq/yr | GHG emissions per capita t CO2eq/cap/yr | GHG emissions per unit of GDP PPP t CO2eq/kUSD/yr | Population |
|------|------------------------------|--|--|------------|
| 2022 | 46.312 | 2.263 | 1.997 | 20.467M |
| 2015 | 44.709 | 2.386 | 1.629 | 18.735M |
| 2005 | 89.637 | 4.900 | 2.668 | 18.295M |
| 1990 | 64.098 | 5.150 | 3.719 | 12.446M |

2022 vs 1990

2022 vs 2005

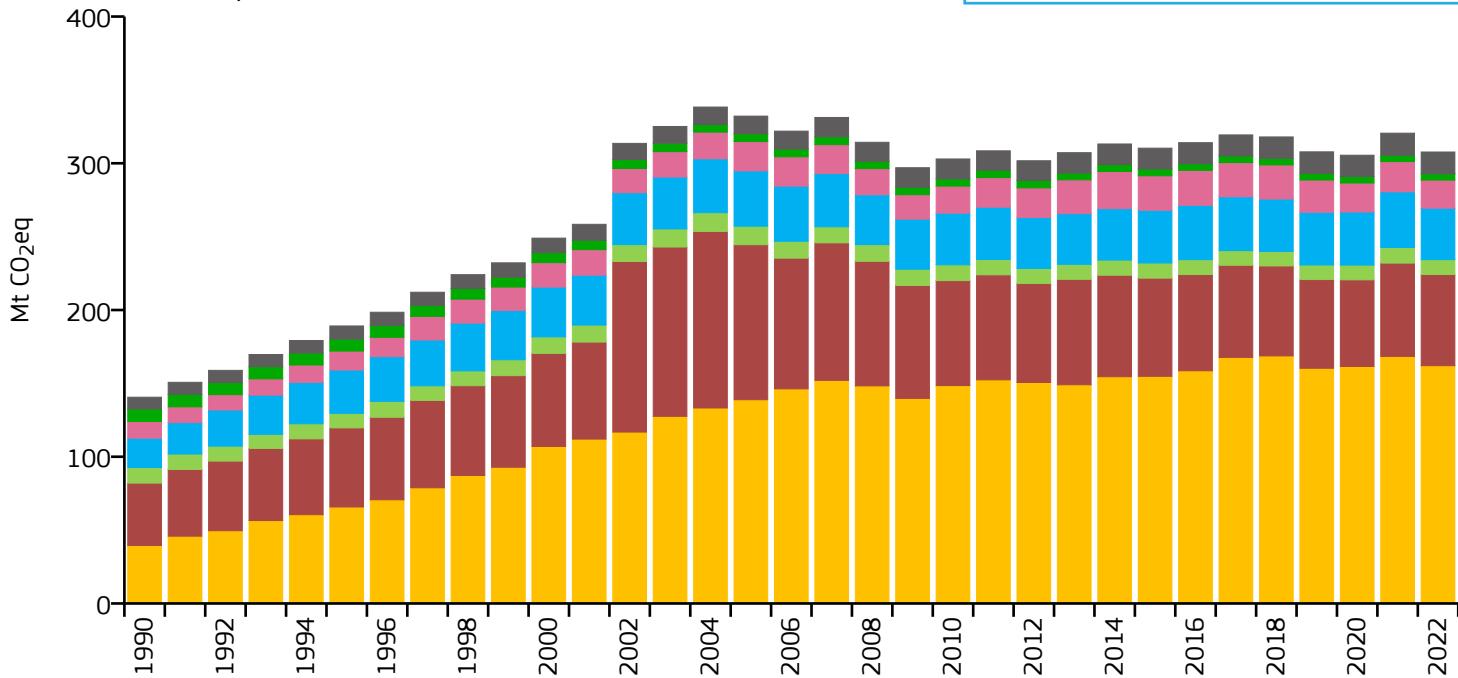
2022 vs 2021



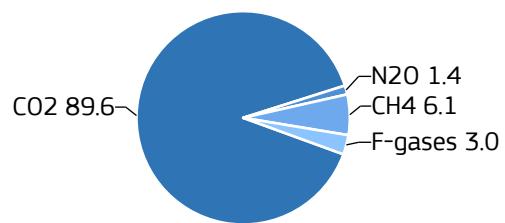
Taiwan

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 307.682 | 12.861 | 0.191 | 23.923M |
| 2015 | 310.304 | 13.212 | 0.282 | 23.486M |
| 2005 | 332.140 | 14.695 | 0.507 | 22.603M |
| 1990 | 140.576 | 6.921 | 0.689 | 20.312M |

2022 vs 1990

2022 vs 2005

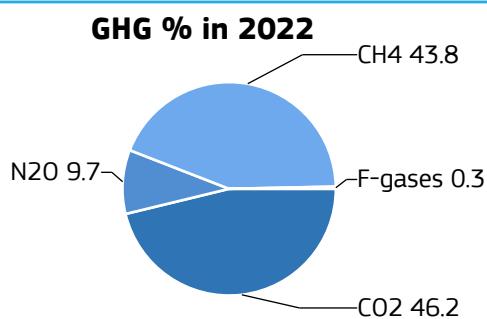
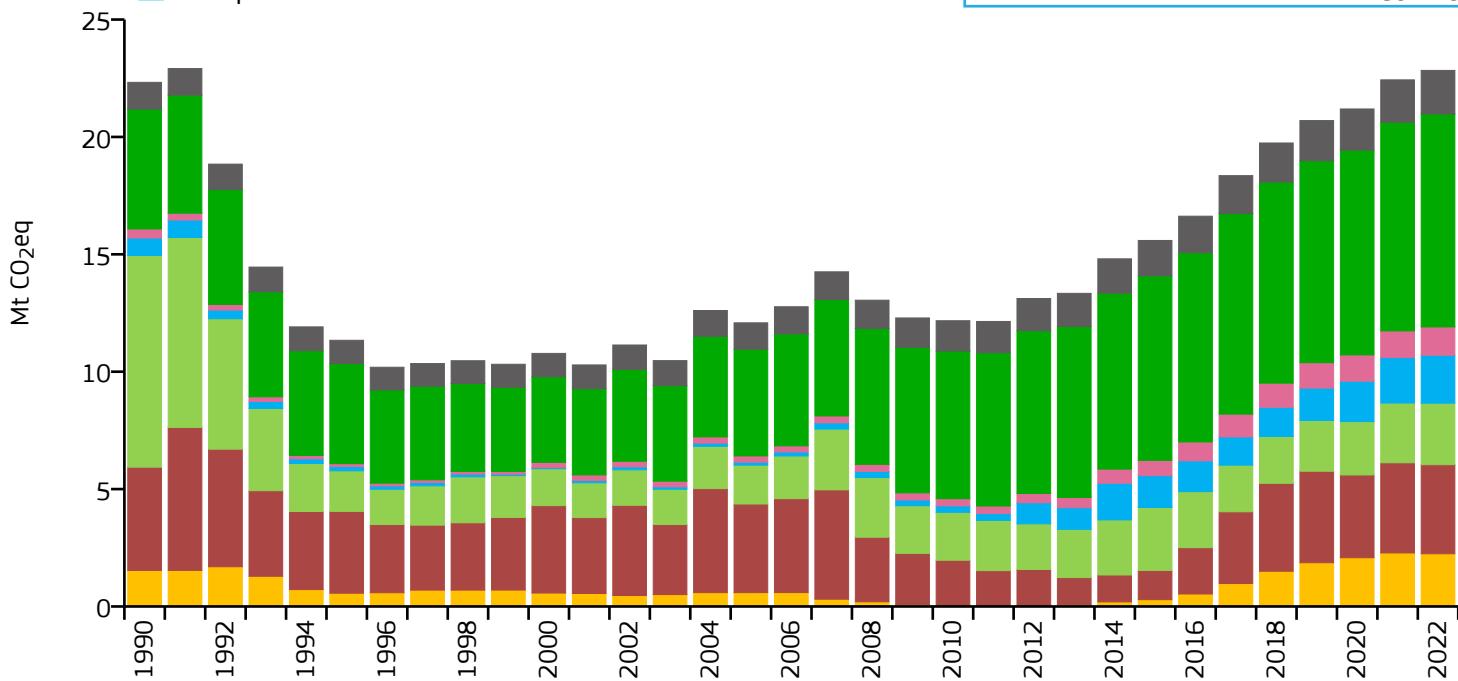
2022 vs 2021



Tajikistan

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 22.834 | 2.321 | 0.555 | 9.836M |
| 2015 | 15.590 | 1.824 | 0.618 | 8.549M |
| 2005 | 12.081 | 1.763 | 0.925 | 6.854M |
| 1990 | 22.325 | 4.225 | 1.033 | 5.284M |

2022 vs 1990

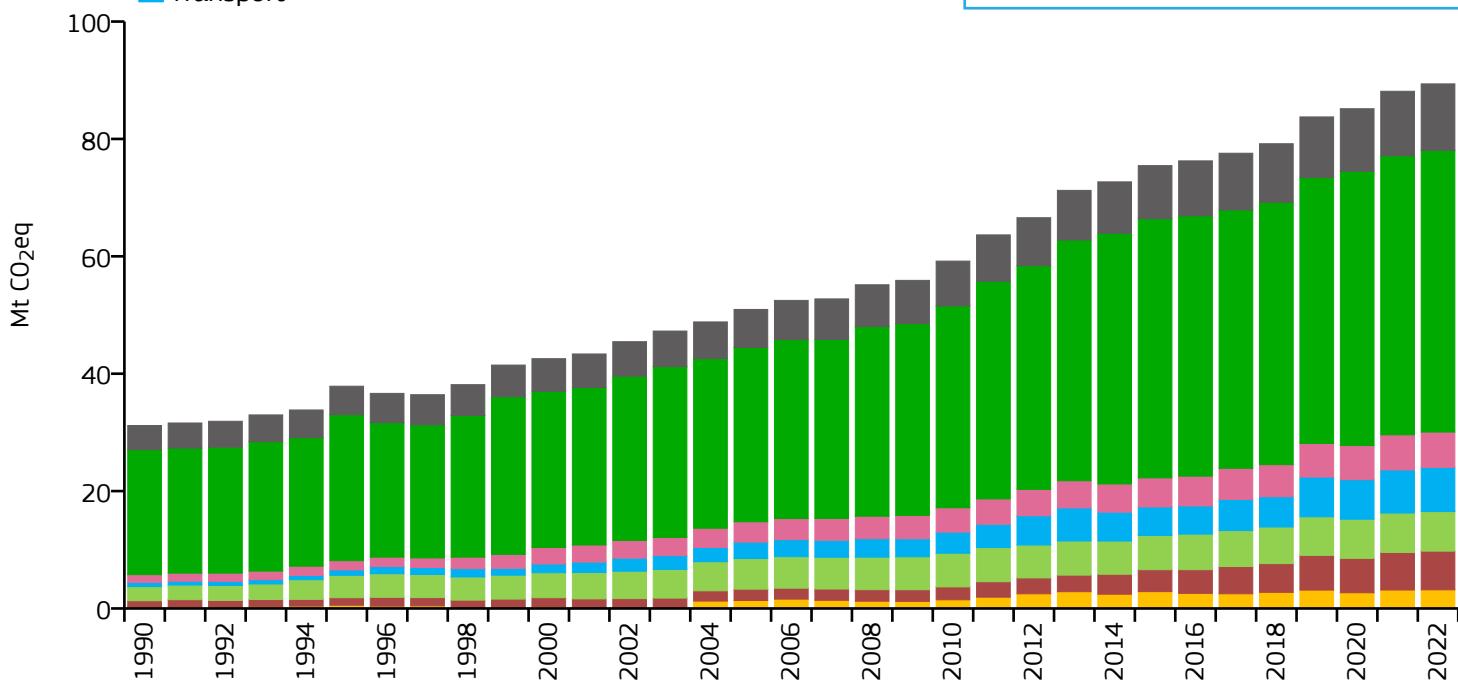
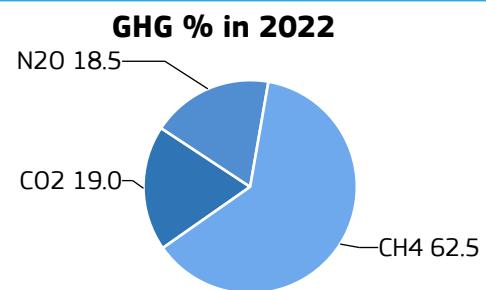
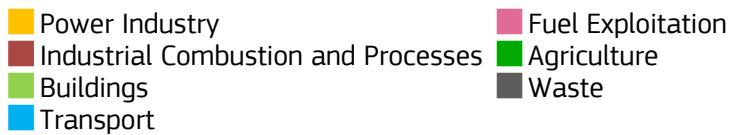
2022 vs 2005

2022 vs 2021



Tanzania

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 89.378 | 1.342 | 0.537 | 66.612M |
| 2015 | 75.452 | 1.400 | 0.642 | 53.880M |
| 2005 | 50.949 | 1.293 | 0.794 | 39.410M |
| 1990 | 31.170 | 1.224 | 0.914 | 25.460M |

2022 vs 1990

2022 vs 2005

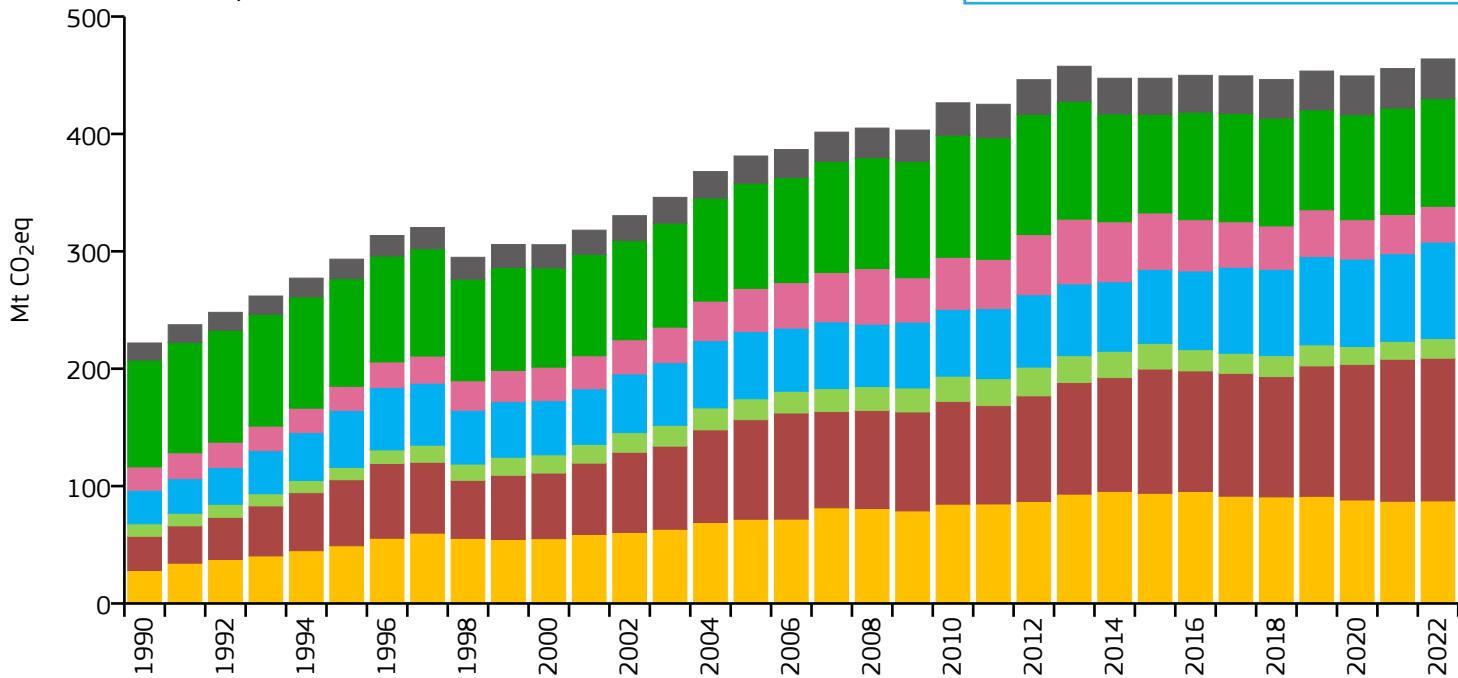
2022 vs 2021



Thailand

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste

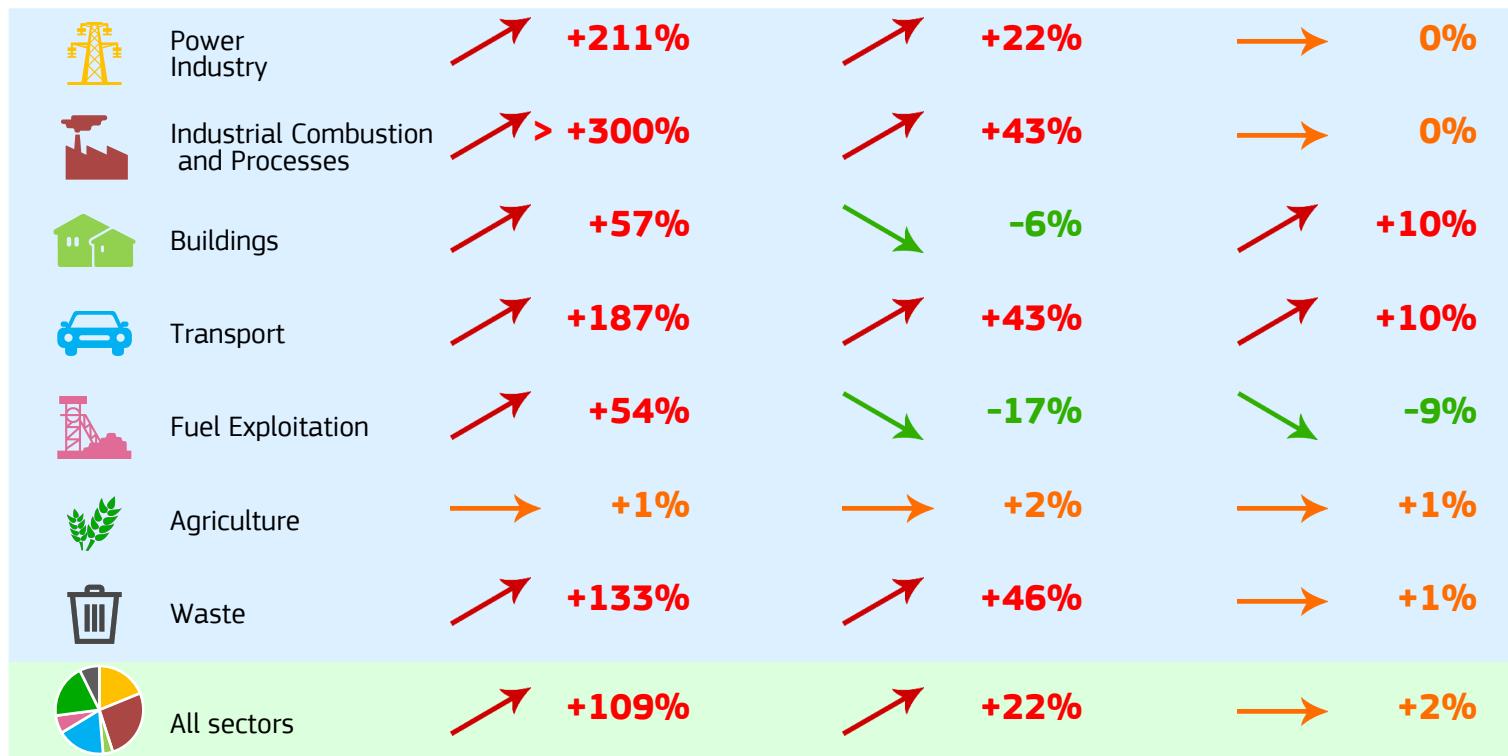


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 463.875 | 6.668 | 0.370 | 69.567M |
| 2015 | 447.446 | 6.517 | 0.400 | 68.658M |
| 2005 | 381.183 | 5.826 | 0.474 | 65.425M |
| 1990 | 221.898 | 3.922 | 0.552 | 56.583M |

2022 vs 1990

2022 vs 2005

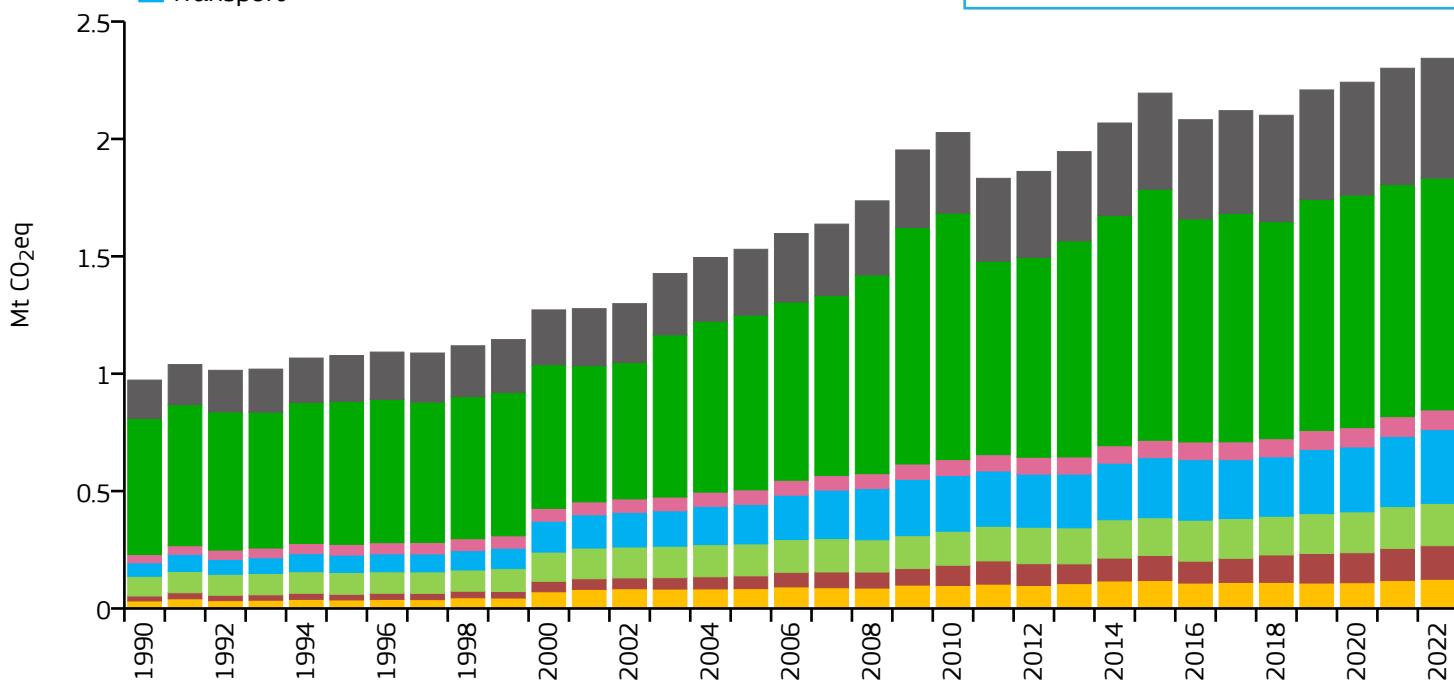
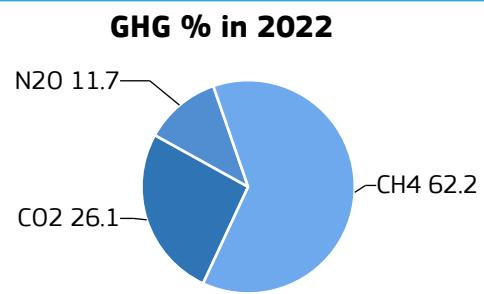
2022 vs 2021



The Gambia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 2.343 | 0.966 | 0.407 | 2.427M |
| 2015 | 2.195 | 1.110 | 0.511 | 1.978M |
| 2005 | 1.530 | 1.059 | 0.447 | 1.444M |
| 1990 | 0.973 | 1.061 | 0.449 | 916.808k |

2022 vs 1990

2022 vs 2005

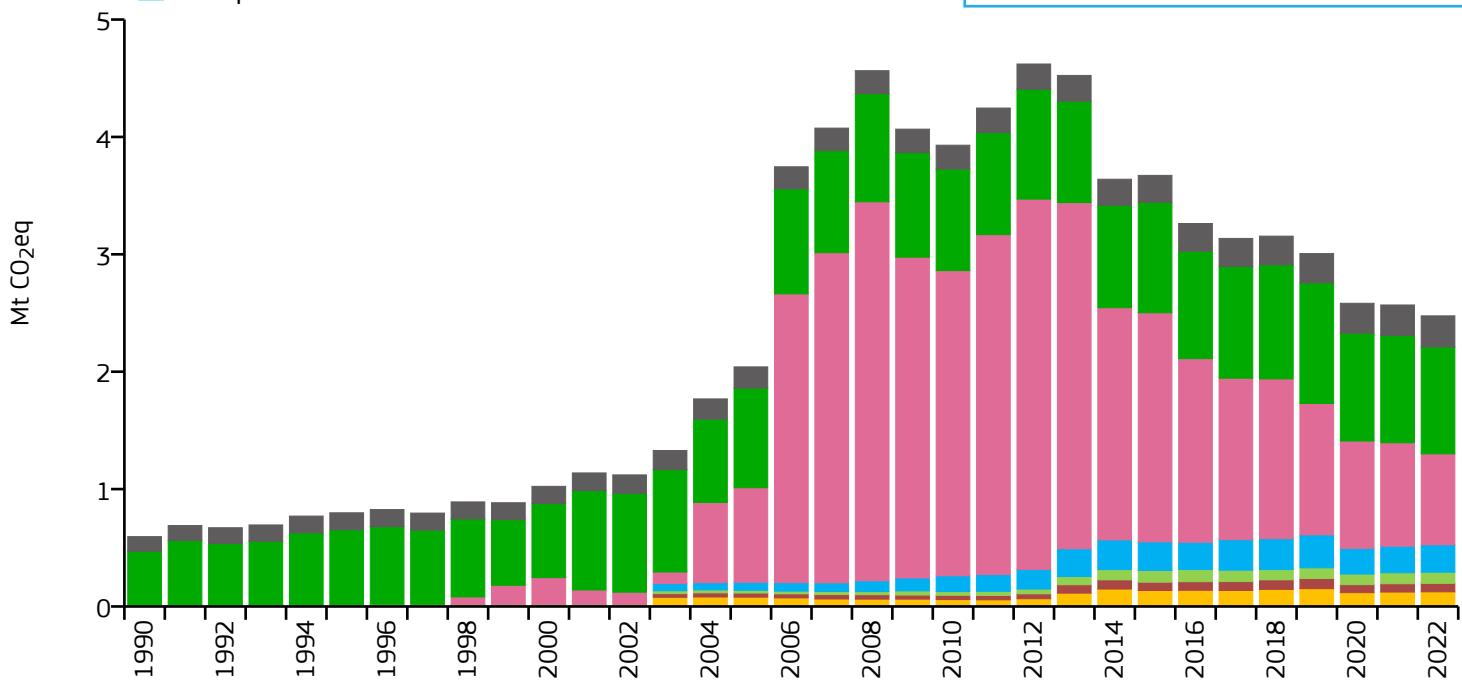
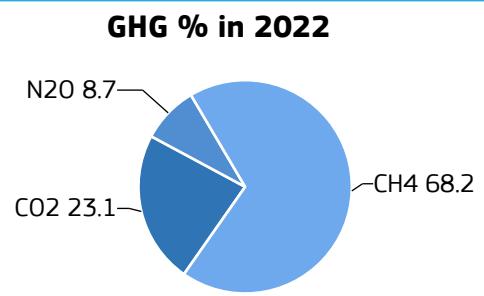
2022 vs 2021



Timor-Leste

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 2.476 | 1.718 | 0.451 | 1.441M |
| 2015 | 3.672 | 2.959 | 0.943 | 1.241M |
| 2005 | 2.041 | 1.988 | 0.914 | 1.026M |
| 1990 | 0.595 | 0.791 | 0.389 | 751.933k |

2022 vs 1990

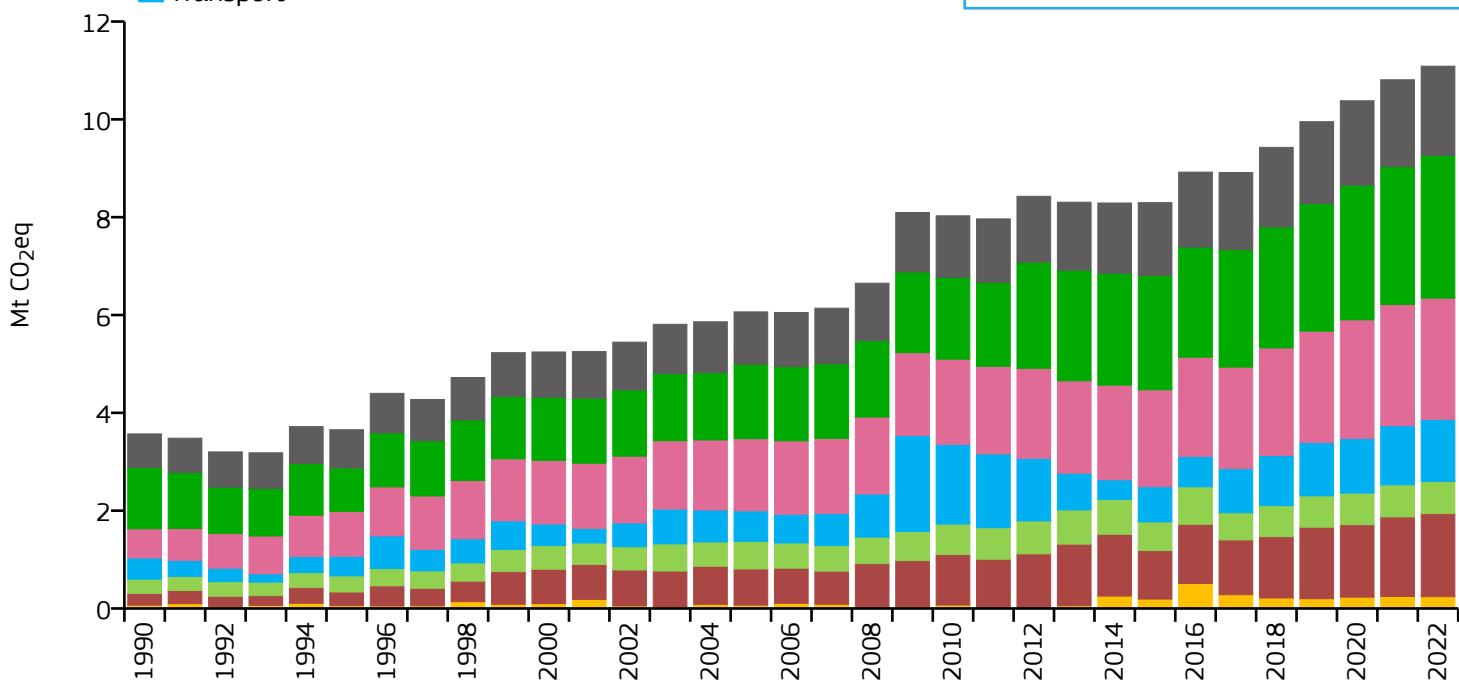
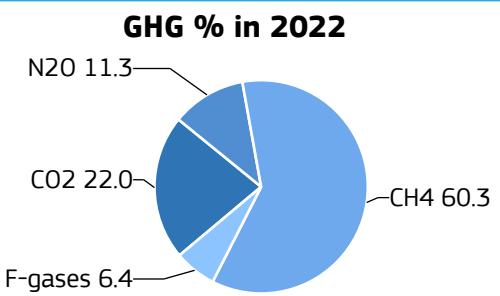
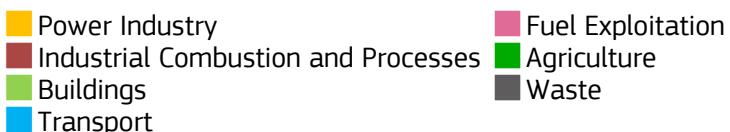
2022 vs 2005

2022 vs 2021



Togo

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 11.088 | 1.262 | 0.567 | 8.787M |
| 2015 | 8.298 | 1.119 | 0.590 | 7.417M |
| 2005 | 6.064 | 1.067 | 0.687 | 5.683M |
| 1990 | 3.569 | 0.942 | 0.529 | 3.787M |

2022 vs 1990

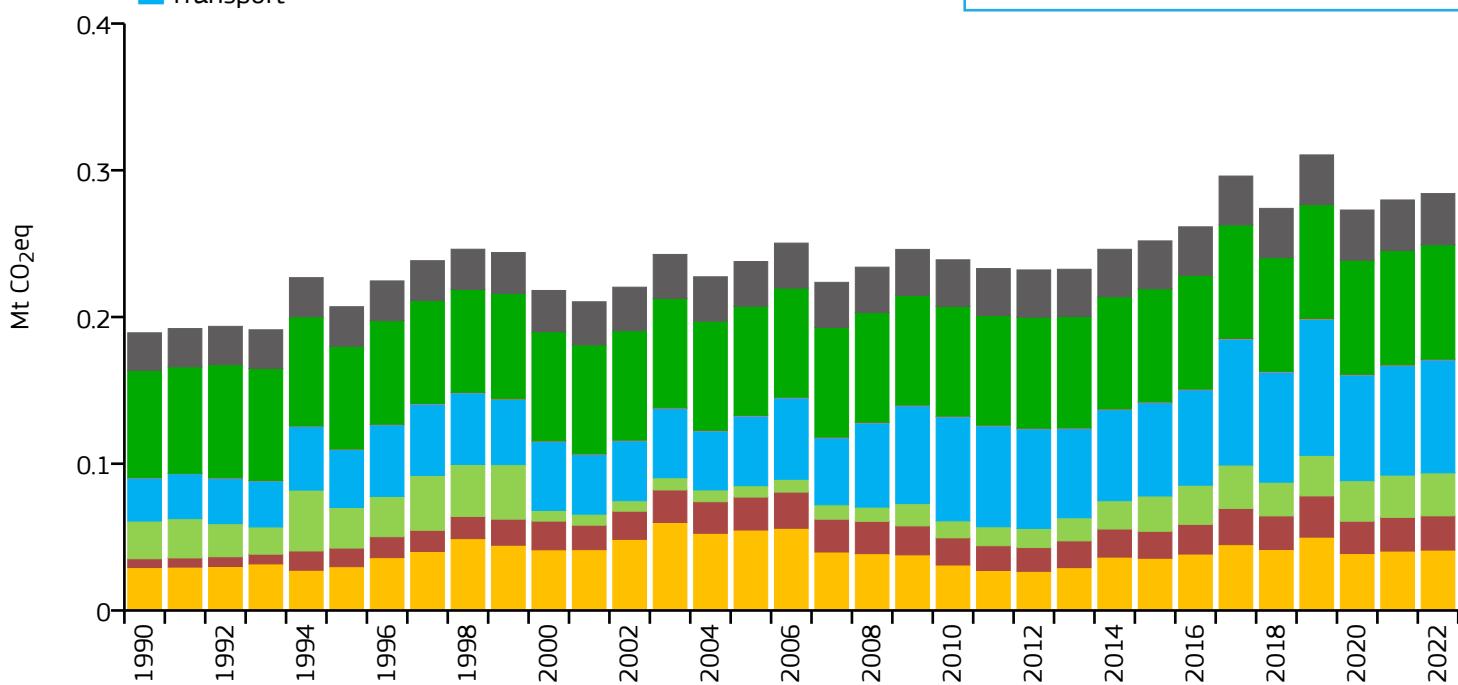
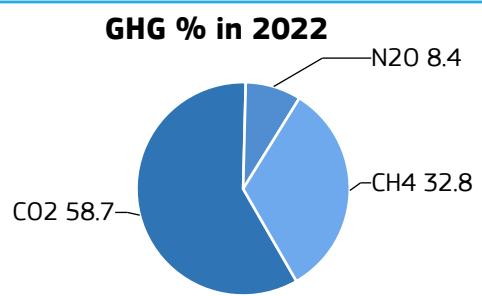
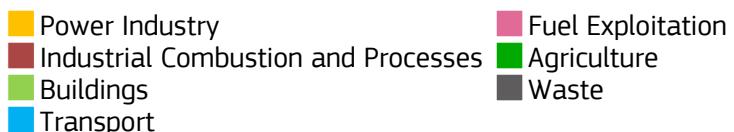
2022 vs 2005

2022 vs 2021



Tonga

GHG emissions by sector

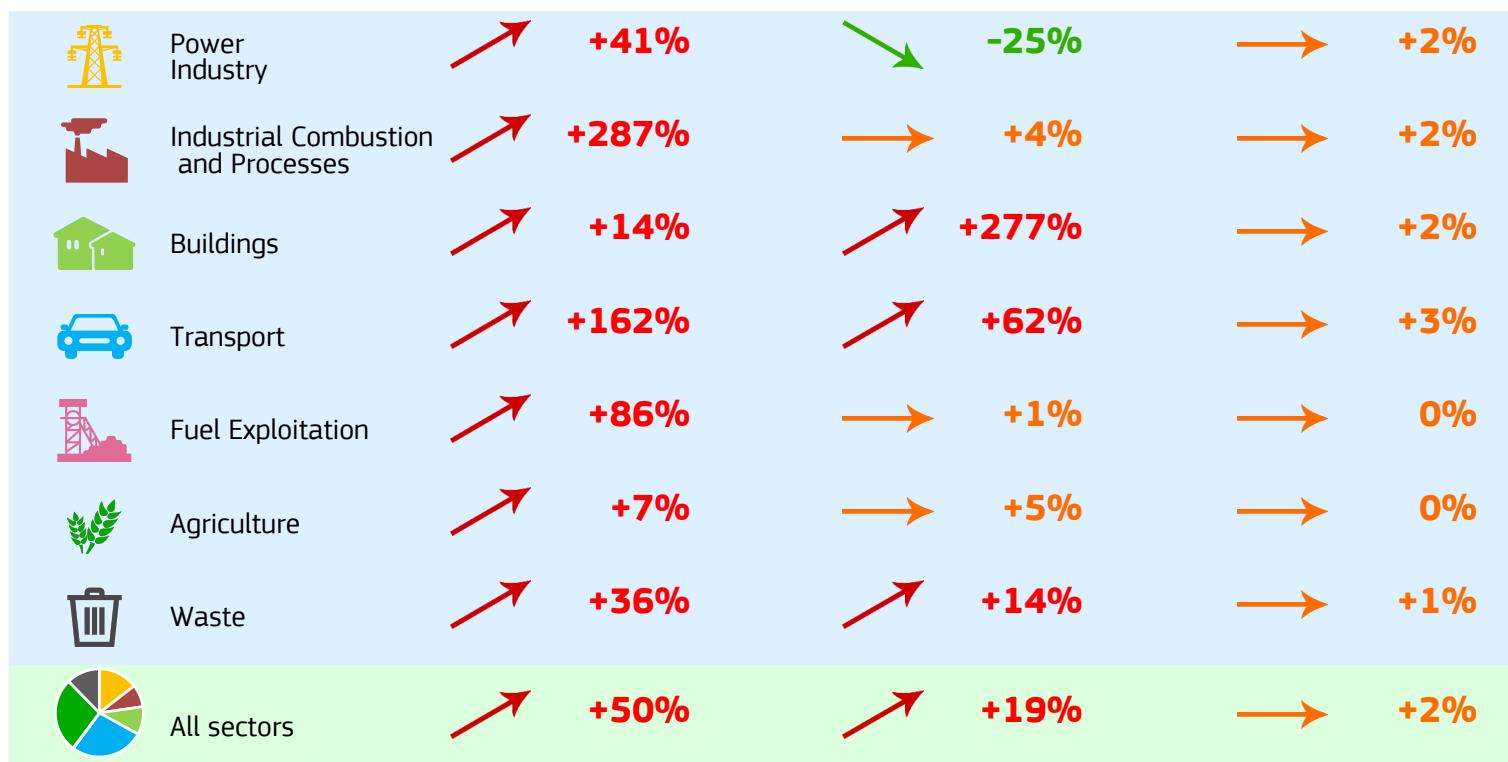


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.284 | 2.514 | 0.448 | 113.000k |
| 2015 | 0.252 | 2.368 | 0.420 | 106.364k |
| 2005 | 0.238 | 2.354 | 0.444 | 101.041k |
| 1990 | 0.189 | 1.989 | 0.529 | 95.153k |

2022 vs 1990

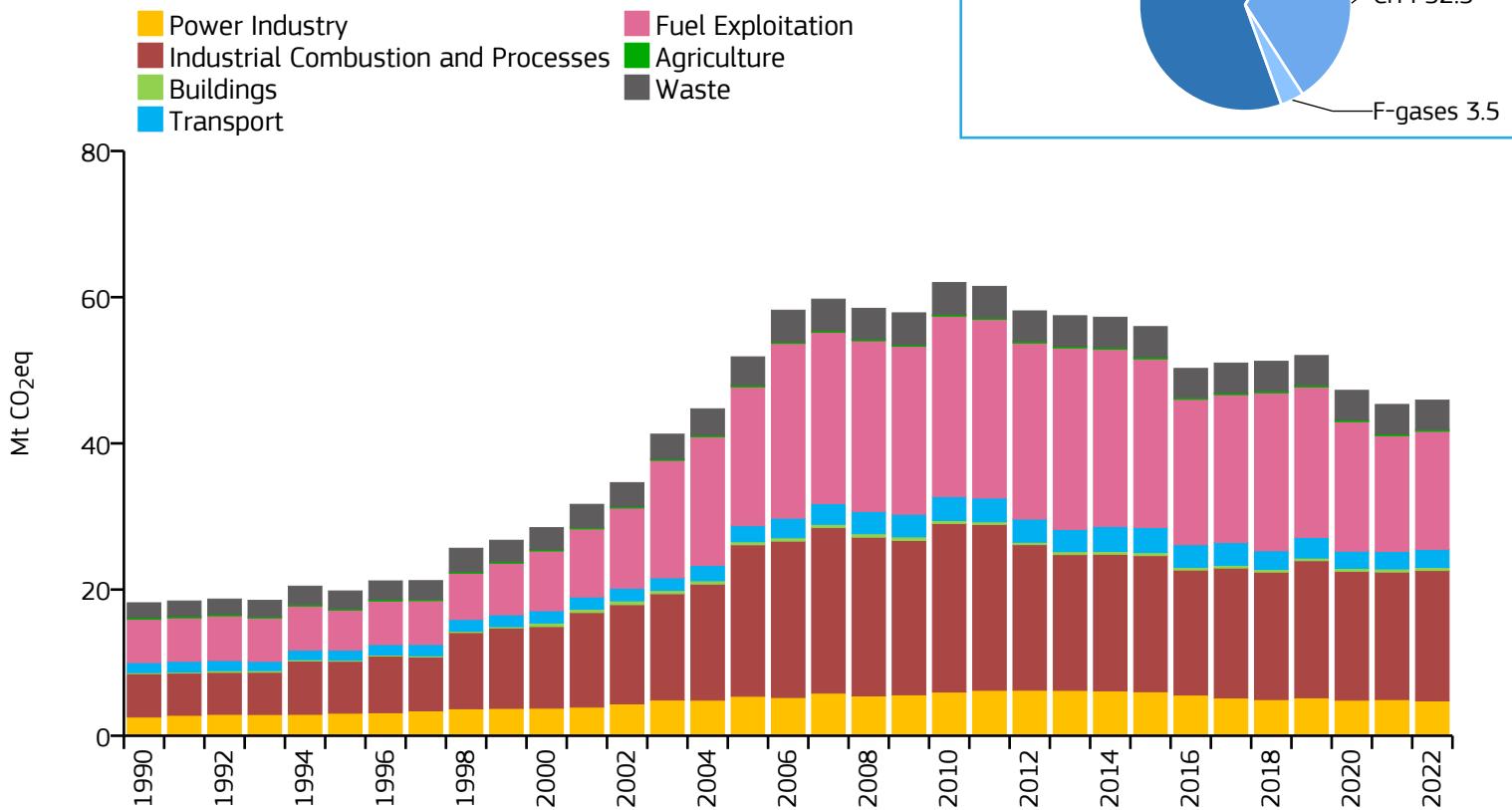
2022 vs 2005

2022 vs 2021



Trinidad and Tobago

GHG emissions by sector

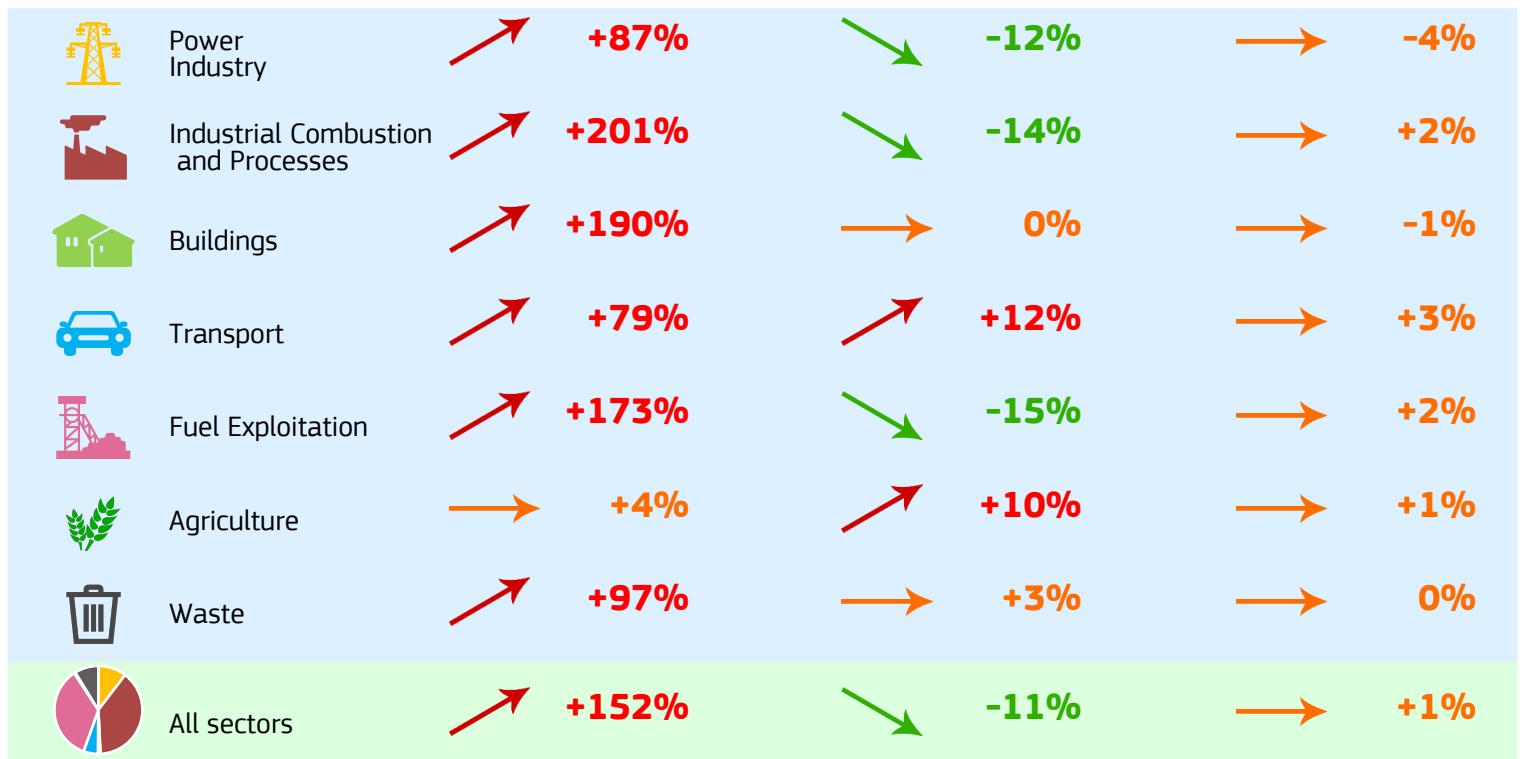


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 45.911 | 33.269 | 1.275 | 1.380M |
| 2015 | 55.974 | 41.155 | 1.283 | 1.360M |
| 2005 | 51.840 | 39.972 | 1.629 | 1.297M |
| 1990 | 18.194 | 14.890 | 1.471 | 1.222M |

2022 vs 1990

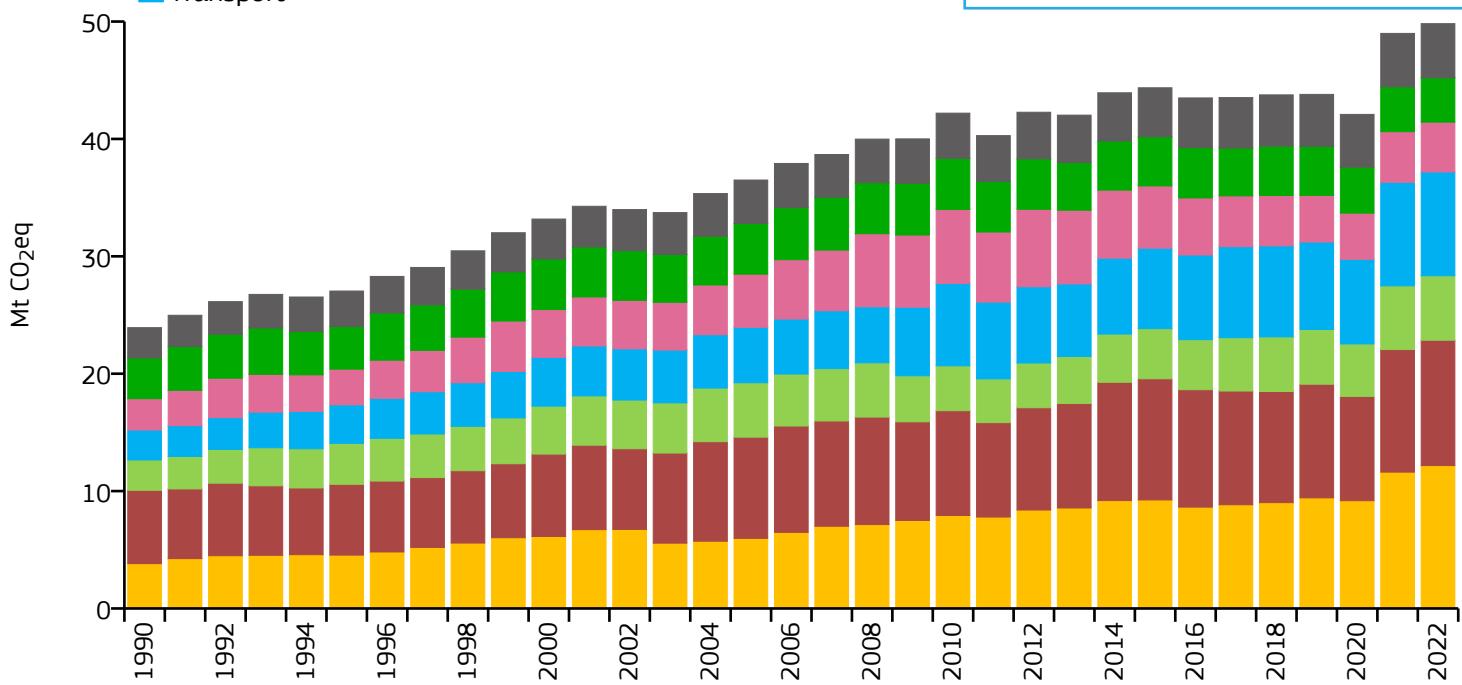
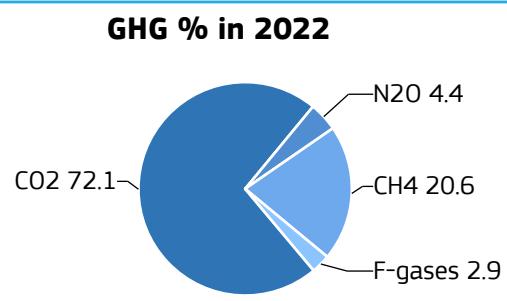
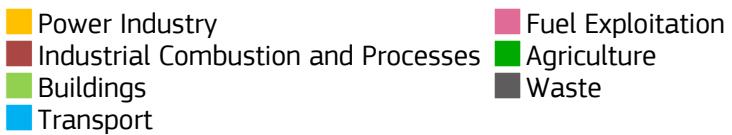
2022 vs 2005

2022 vs 2021



Tunisia

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 49.820 | 4.108 | 0.381 | 12.129M |
| 2015 | 44.357 | 3.935 | 0.357 | 11.274M |
| 2005 | 36.499 | 3.613 | 0.397 | 10.102M |
| 1990 | 23.923 | 2.906 | 0.501 | 8.233M |

2022 vs 1990

2022 vs 2005

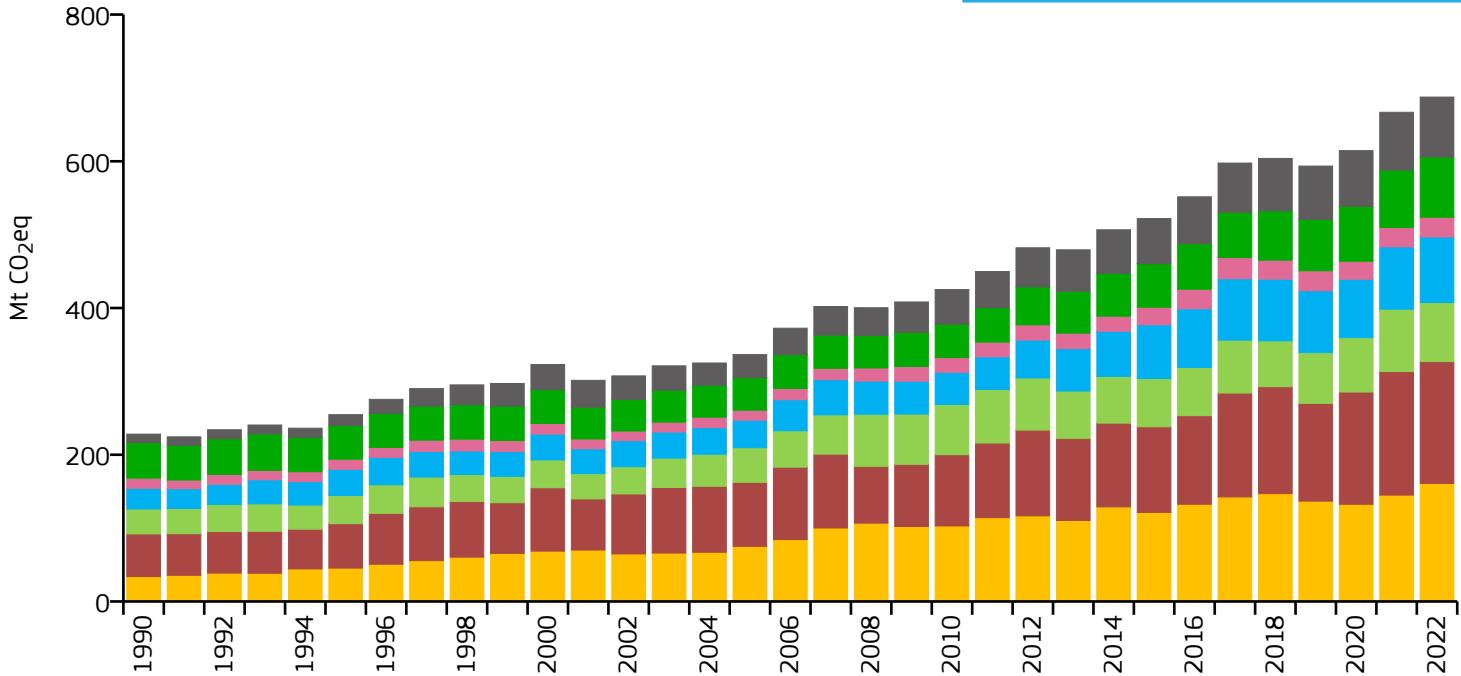
2022 vs 2021



Türkiye

GHG emissions by sector

- | | |
|---|---|
|  Power Industry  Industrial Combustion and Processes  Buildings  Transport |  Fuel Exploitation  Agriculture  Waste |
|---|---|



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 687.526 | 8.087 | 0.244 | 85.019M |
| 2015 | 521.915 | 6.668 | 0.256 | 78.272M |
| 2005 | 336.515 | 4.956 | 0.272 | 67.903M |
| 1990 | 228.086 | 4.230 | 0.335 | 53.922M |

2022 vs 1990

2022 vs 2005

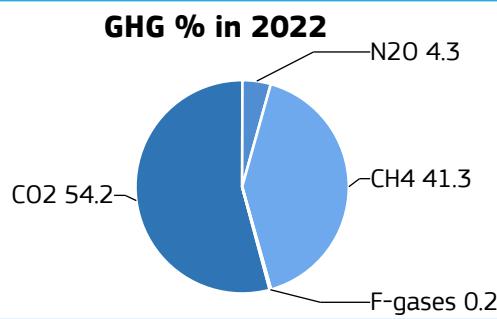
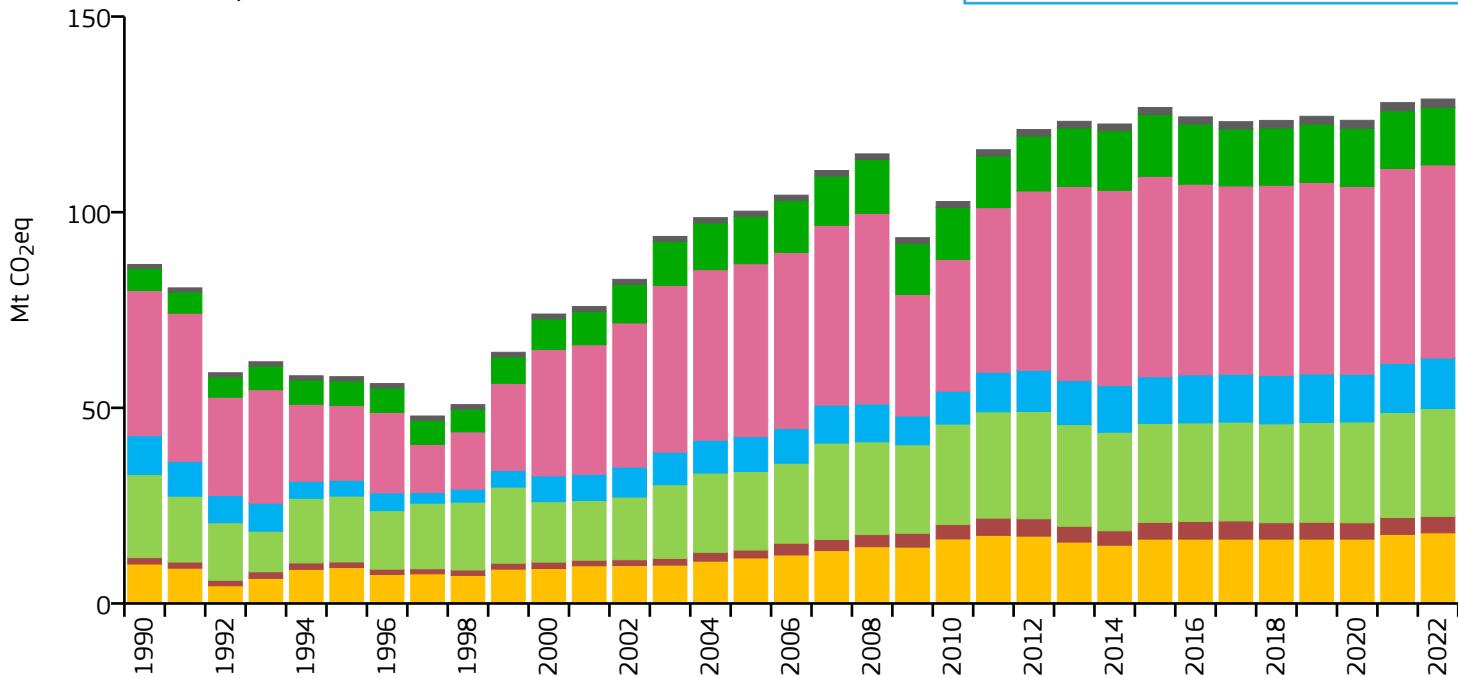
2022 vs 2021



Turkmenistan

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 128.919 | 20.797 | 1.280 | 6.199M |
| 2015 | 126.752 | 22.776 | 1.753 | 5.565M |
| 2005 | 100.266 | 21.088 | 3.746 | 4.755M |
| 1990 | 86.641 | 23.518 | 3.263 | 3.684M |

2022 vs 1990

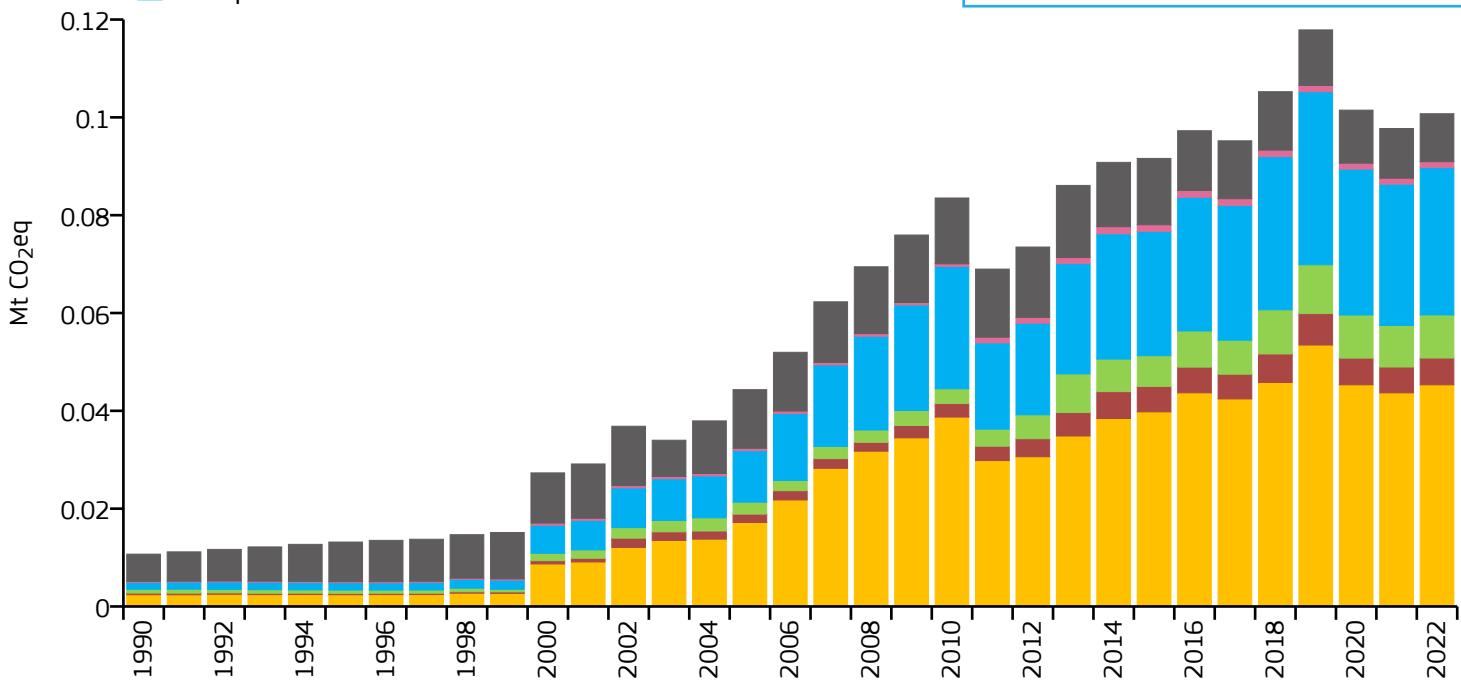
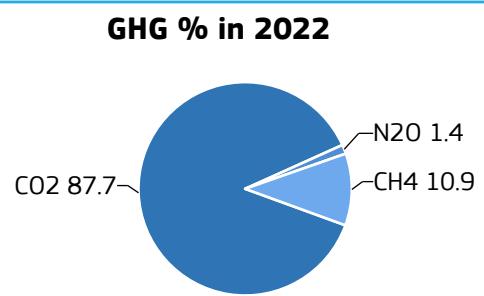
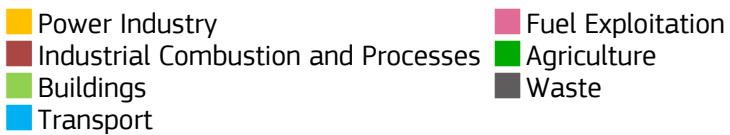
2022 vs 2005

2022 vs 2021



Turks and Caicos Islands

GHG emissions by sector

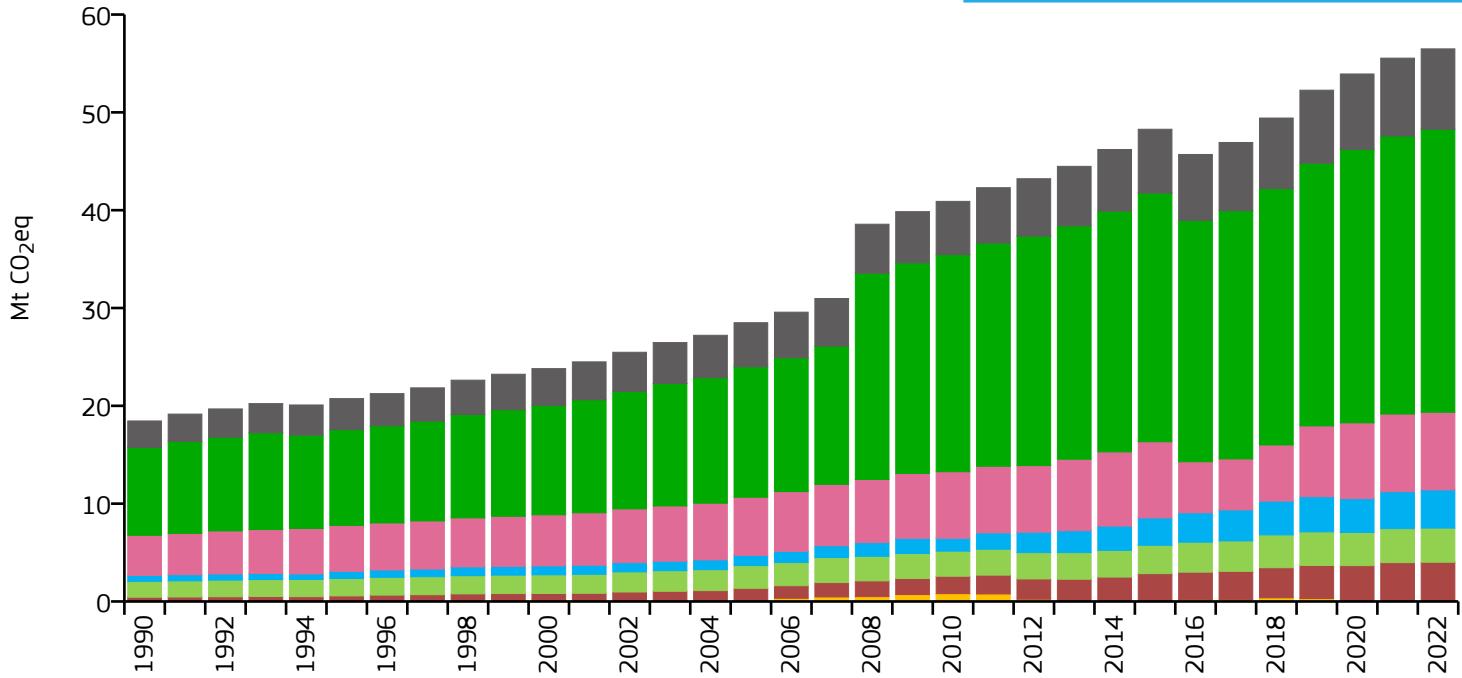
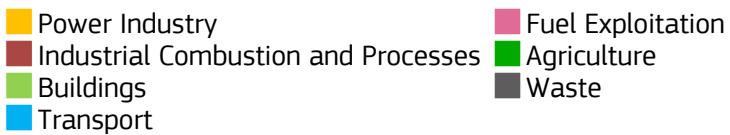


| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.101 | 2.651 | 0.114 | 38.000k |
| 2015 | 0.092 | 2.668 | 0.095 | 34.339k |
| 2005 | 0.044 | 1.676 | 0.065 | 26.448k |
| 1990 | 0.011 | 0.926 | 0.058 | 11.552k |

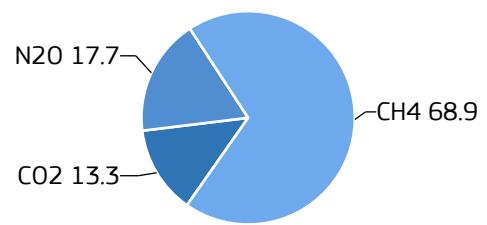
2022 vs 1990**2022 vs 2005****2022 vs 2021**

Uganda

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 56.490 | 1.124 | 0.524 | 50.243M |
| 2015 | 48.274 | 1.202 | 0.611 | 40.145M |
| 2005 | 28.496 | 0.998 | 0.691 | 28.544M |
| 1990 | 18.452 | 1.058 | 1.164 | 17.439M |

2022 vs 1990

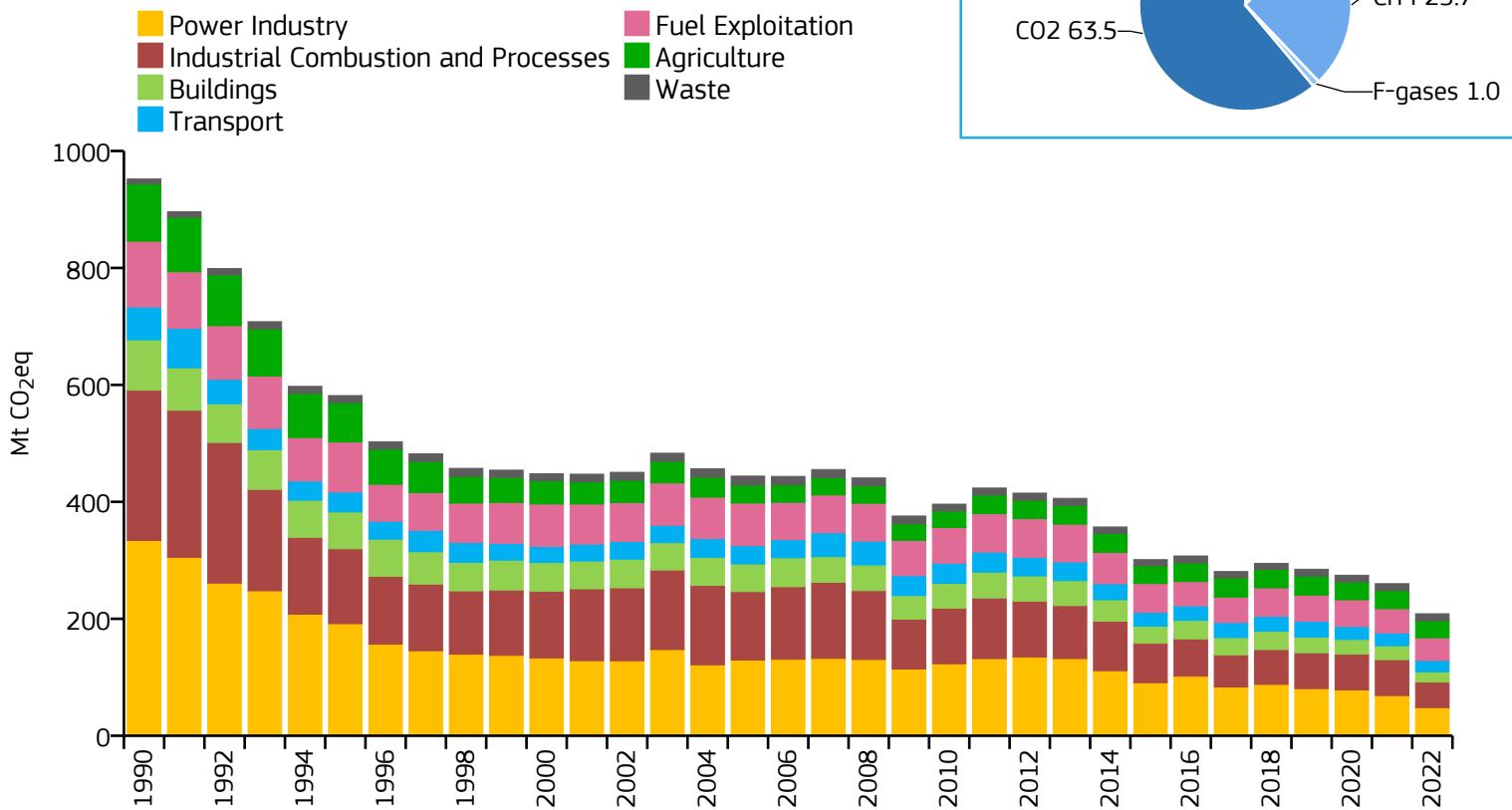
2022 vs 2005

2022 vs 2021



Ukraine

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 208.607 | 4.836 | 0.549 | 43.140M |
| 2015 | 301.123 | 6.743 | 0.627 | 44.658M |
| 2005 | 444.001 | 9.469 | 0.833 | 46.892M |
| 1990 | 952.140 | 18.501 | 1.117 | 51.464M |

2022 vs 1990

2022 vs 2005

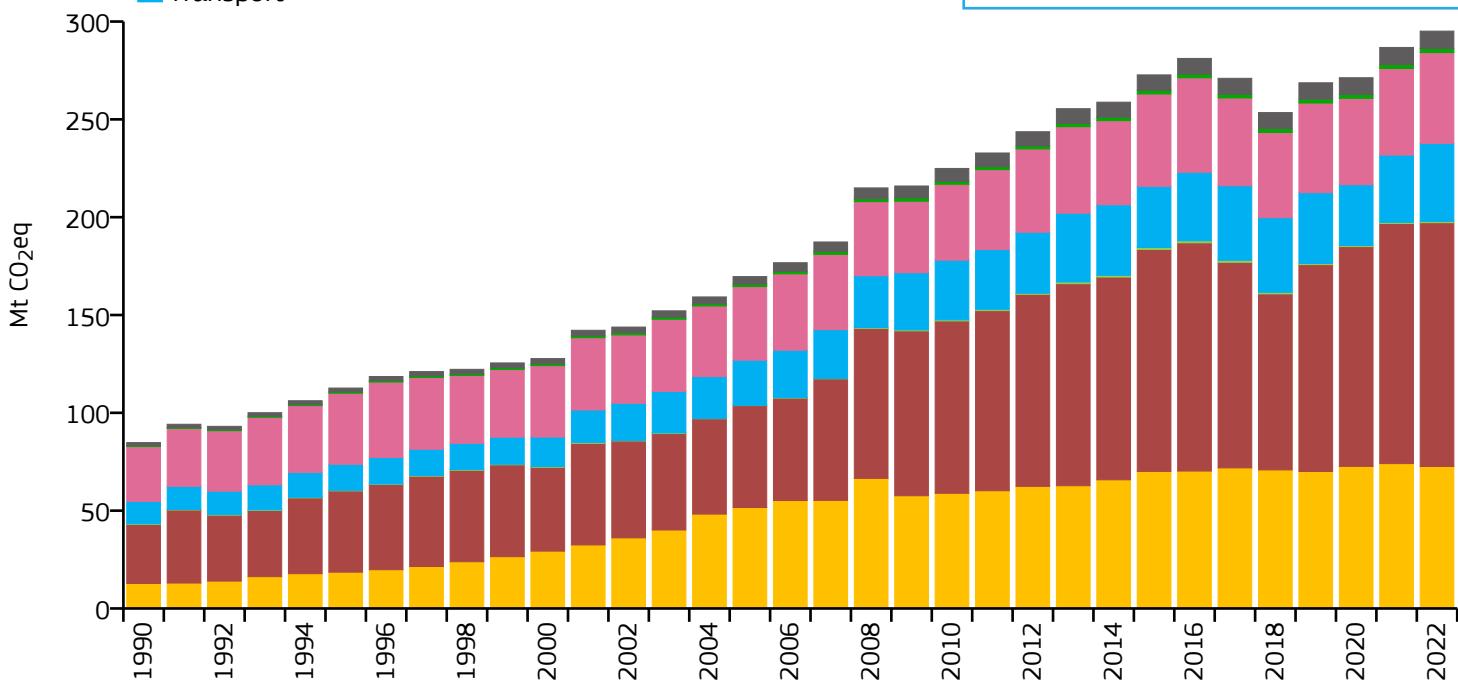
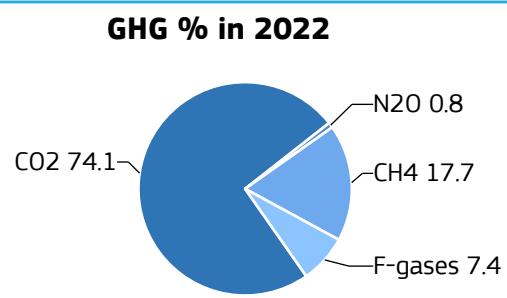
2022 vs 2021



United Arab Emirates

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 295.110 | 29.332 | 0.421 | 10.061M |
| 2015 | 272.732 | 29.793 | 0.449 | 9.154M |
| 2005 | 169.629 | 37.040 | 0.412 | 4.580M |
| 1990 | 84.787 | 45.580 | 0.421 | 1.860M |

2022 vs 1990

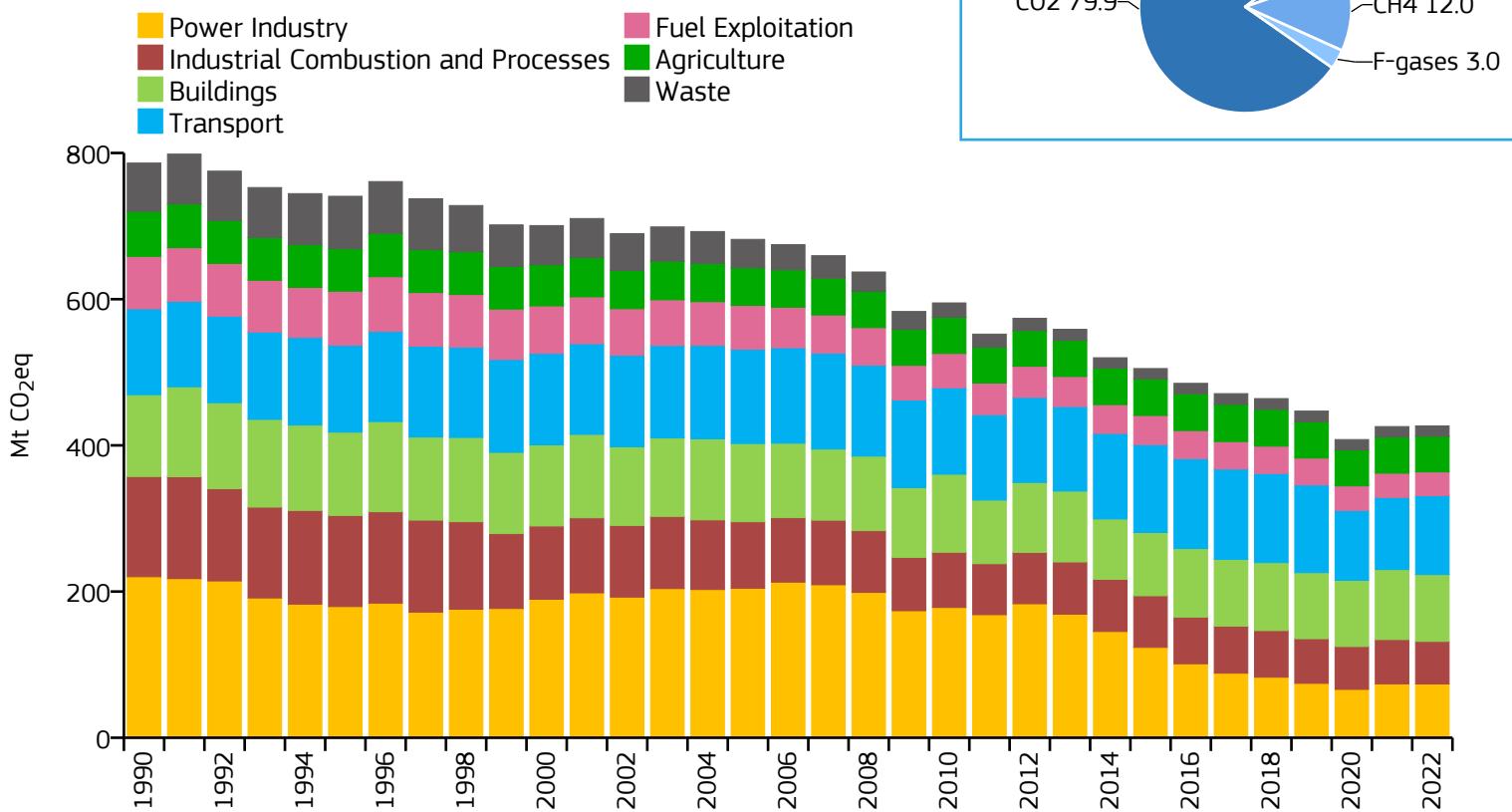
2022 vs 2005

2022 vs 2021



United Kingdom

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 426.562 | 6.268 | 0.136 | 68.057M |
| 2015 | 505.060 | 7.723 | 0.174 | 65.397M |
| 2005 | 681.823 | 11.310 | 0.264 | 60.287M |
| 1990 | 786.212 | 13.749 | 0.439 | 57.183M |

2022 vs 1990

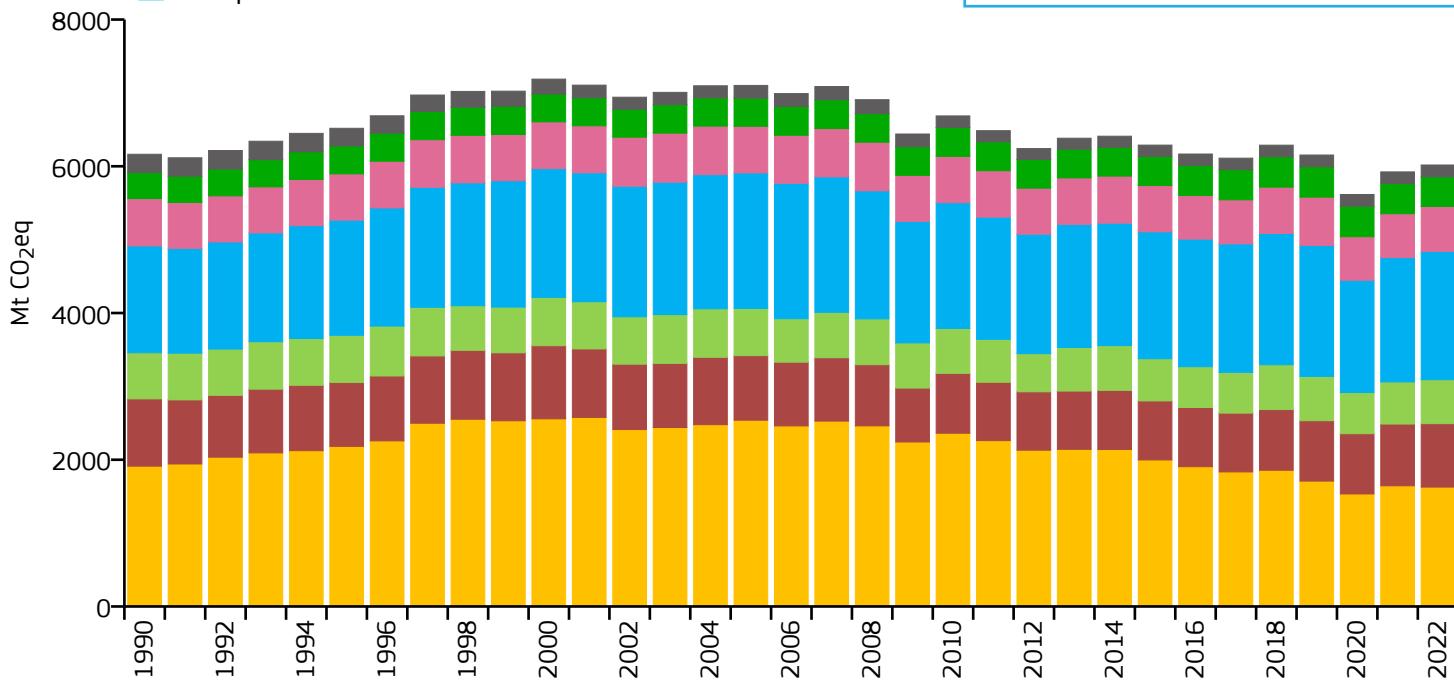
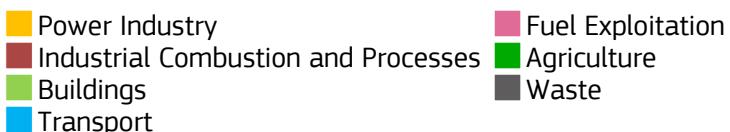
2022 vs 2005

2022 vs 2021

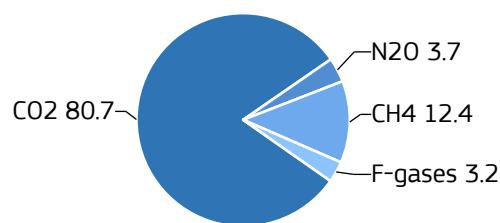


United States

GHG emissions by sector



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 6017.443 | 17.901 | 0.279 | 336.150M |
| 2015 | 6288.541 | 19.656 | 0.336 | 319.929M |
| 2005 | 7101.881 | 24.064 | 0.442 | 295.130M |
| 1990 | 6163.742 | 24.408 | 0.610 | 252.530M |

2022 vs 1990

2022 vs 2005

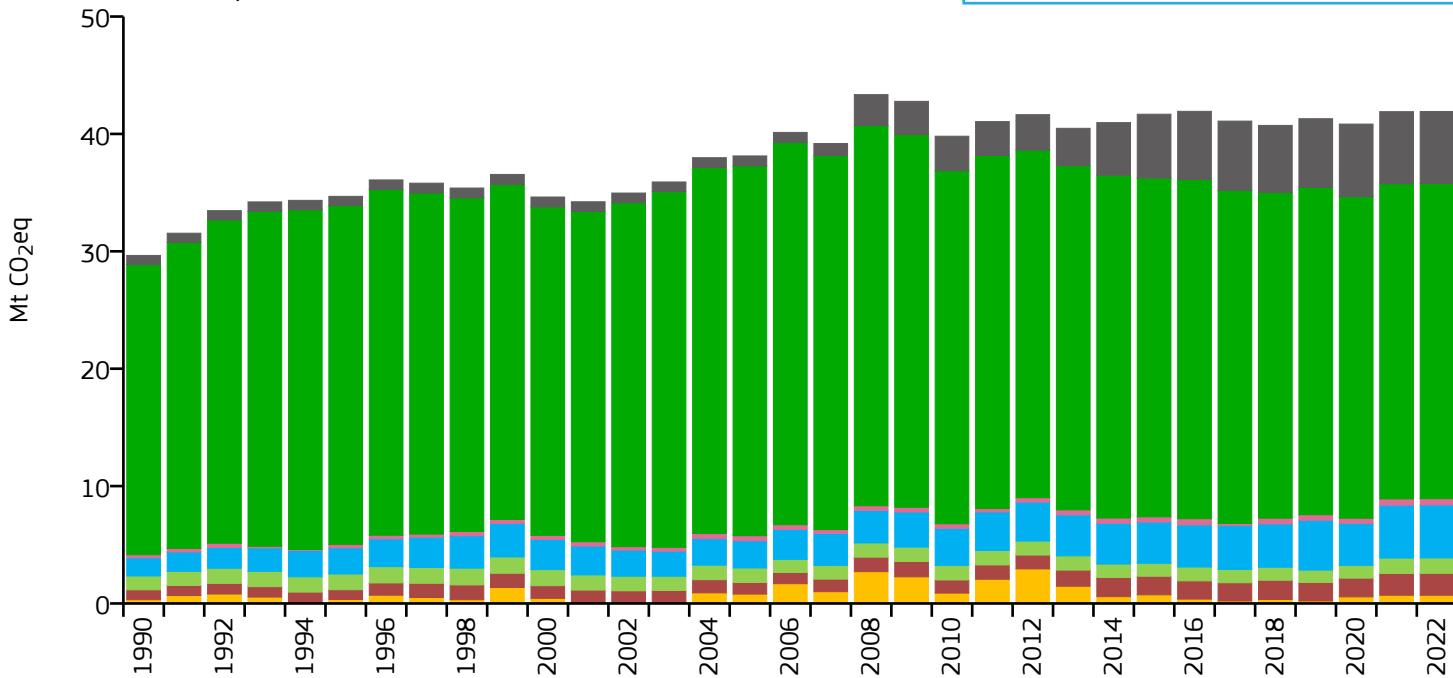
2022 vs 2021



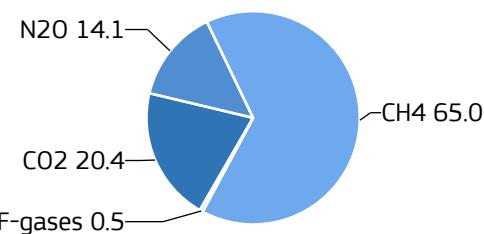
Uruguay

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 41.908 | 11.912 | 0.501 | 3.518M |
| 2015 | 41.680 | 12.146 | 0.539 | 3.432M |
| 2005 | 38.125 | 11.464 | 0.777 | 3.326M |
| 1990 | 29.649 | 9.533 | 0.856 | 3.110M |

2022 vs 1990

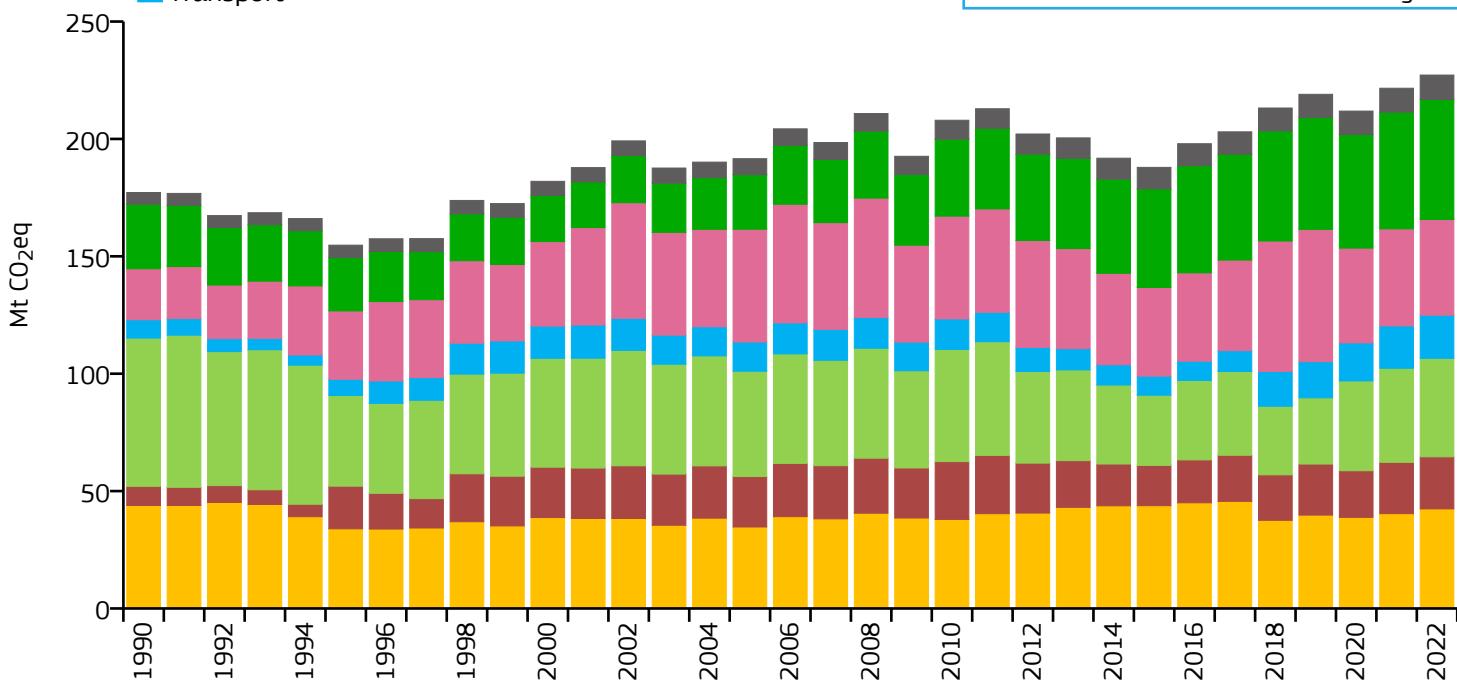
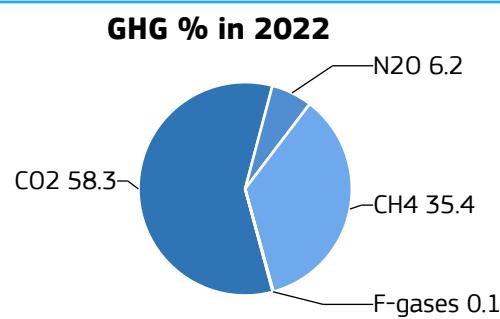
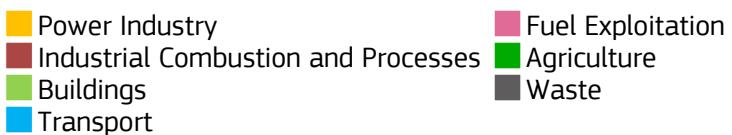
2022 vs 2005

2022 vs 2021



Uzbekistan

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 227.207 | 6.673 | 0.789 | 34.047M |
| 2015 | 187.886 | 6.066 | 0.938 | 30.976M |
| 2005 | 191.579 | 7.226 | 2.019 | 26.512M |
| 1990 | 177.173 | 8.658 | 2.374 | 20.462M |

2022 vs 1990

2022 vs 2005

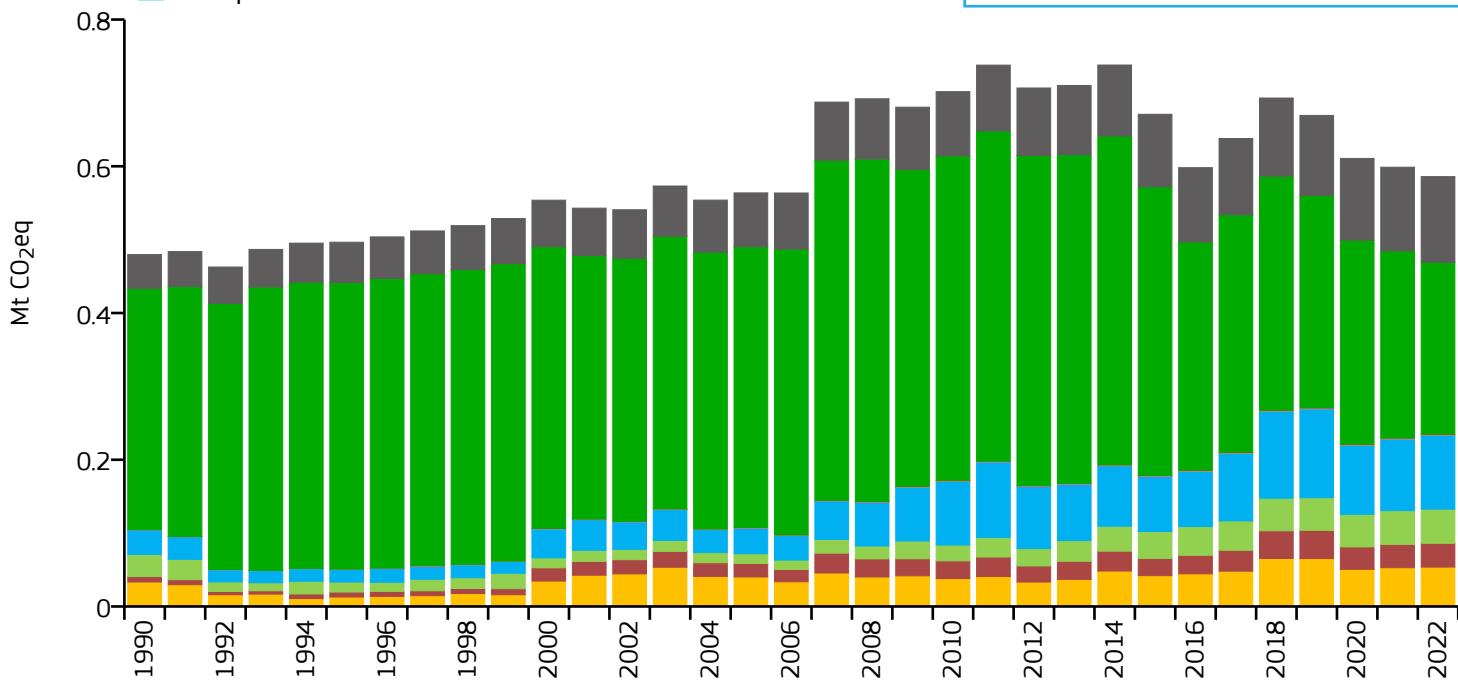
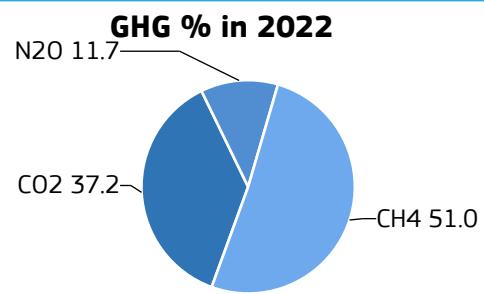
2022 vs 2021



Vanuatu

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.586 | 1.915 | 0.644 | 306.000k |
| 2015 | 0.671 | 2.535 | 0.849 | 264.603k |
| 2005 | 0.564 | 2.692 | 0.950 | 209.370k |
| 1990 | 0.480 | 3.271 | 1.146 | 146.634k |

2022 vs 1990

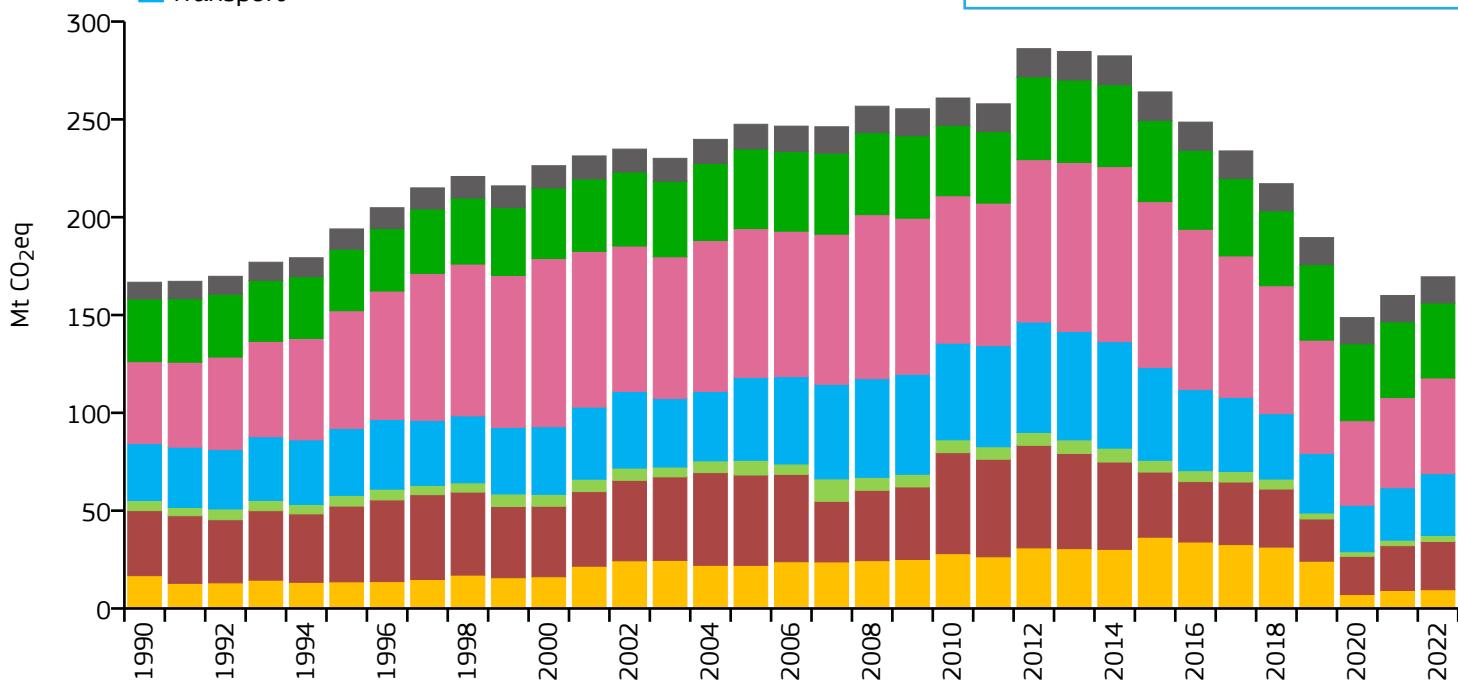
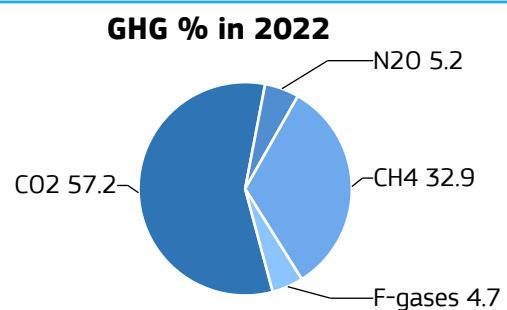
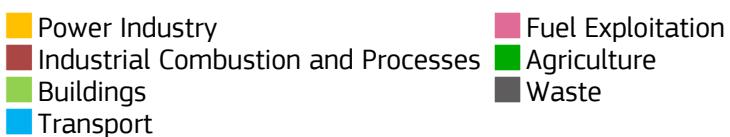
2022 vs 2005

2022 vs 2021



Venezuela

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 169.517 | 4.995 | 1.024 | 33.938M |
| 2015 | 264.025 | 8.475 | 0.492 | 31.155M |
| 2005 | 247.491 | 9.240 | 0.556 | 26.784M |
| 1990 | 166.755 | 8.396 | 0.523 | 19.862M |

2022 vs 1990

2022 vs 2005

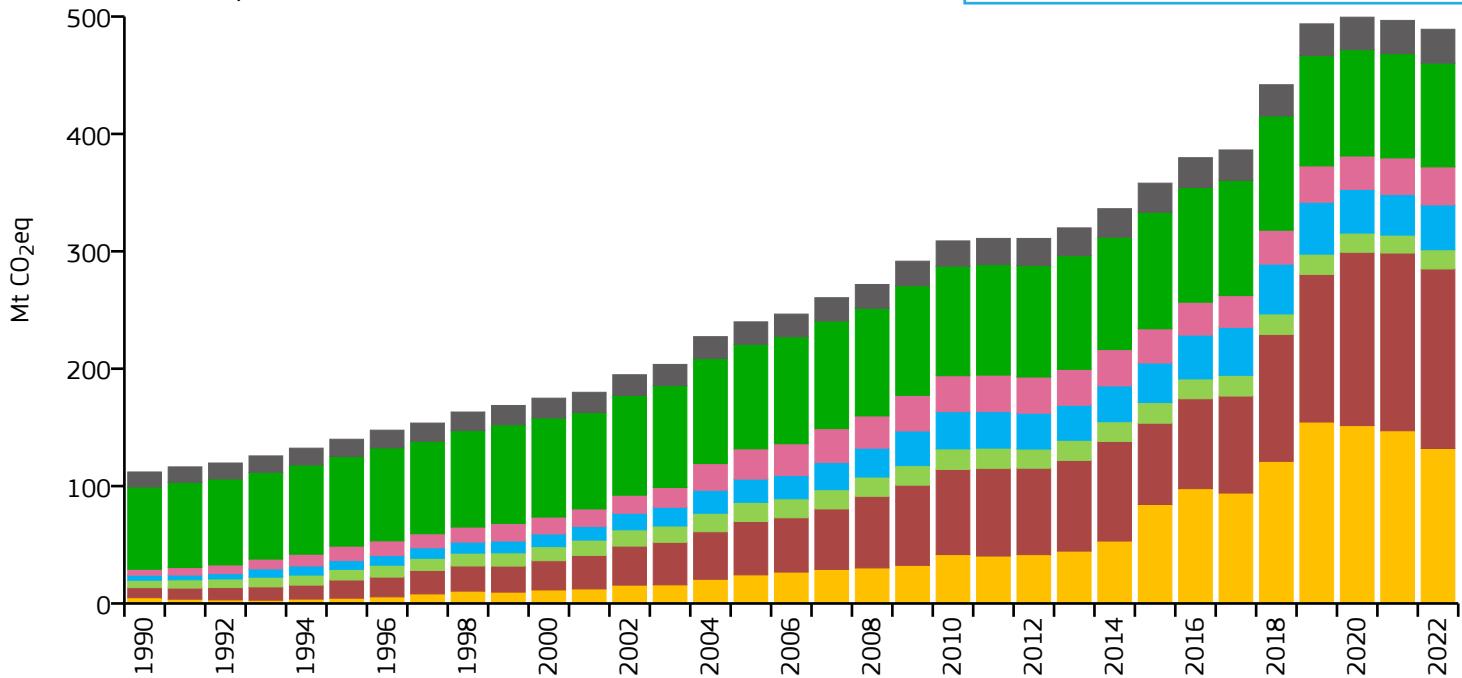
2022 vs 2021



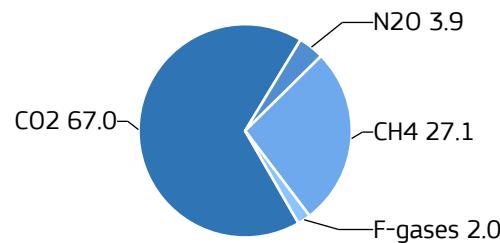
Vietnam

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



GHG % in 2022



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 489.159 | 4.882 | 0.437 | 100.195M |
| 2015 | 358.062 | 3.827 | 0.480 | 93.572M |
| 2005 | 239.900 | 2.845 | 0.589 | 84.309M |
| 1990 | 112.021 | 1.642 | 0.797 | 68.210M |

2022 vs 1990

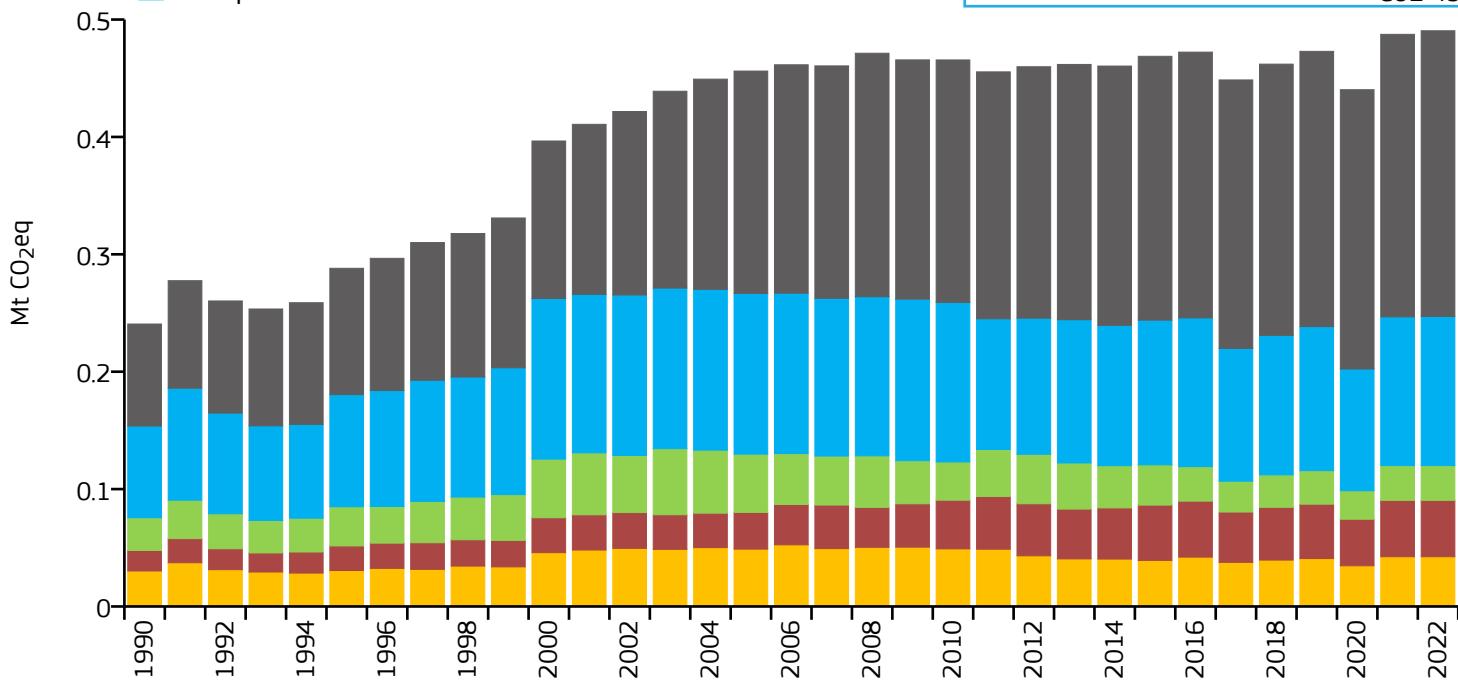
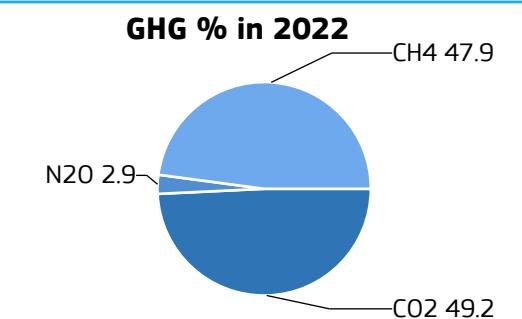
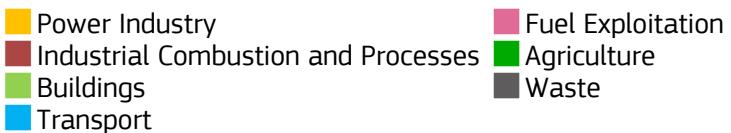
2022 vs 2005

2022 vs 2021



Western Sahara

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 0.490 | 0.783 | n/a | 626.000k |
| 2015 | 0.469 | 0.891 | n/a | 526.216k |
| 2005 | 0.456 | 1.043 | n/a | 437.515k |
| 1990 | 0.241 | 1.108 | n/a | 217.258k |

2022 vs 1990

2022 vs 2005

2022 vs 2021

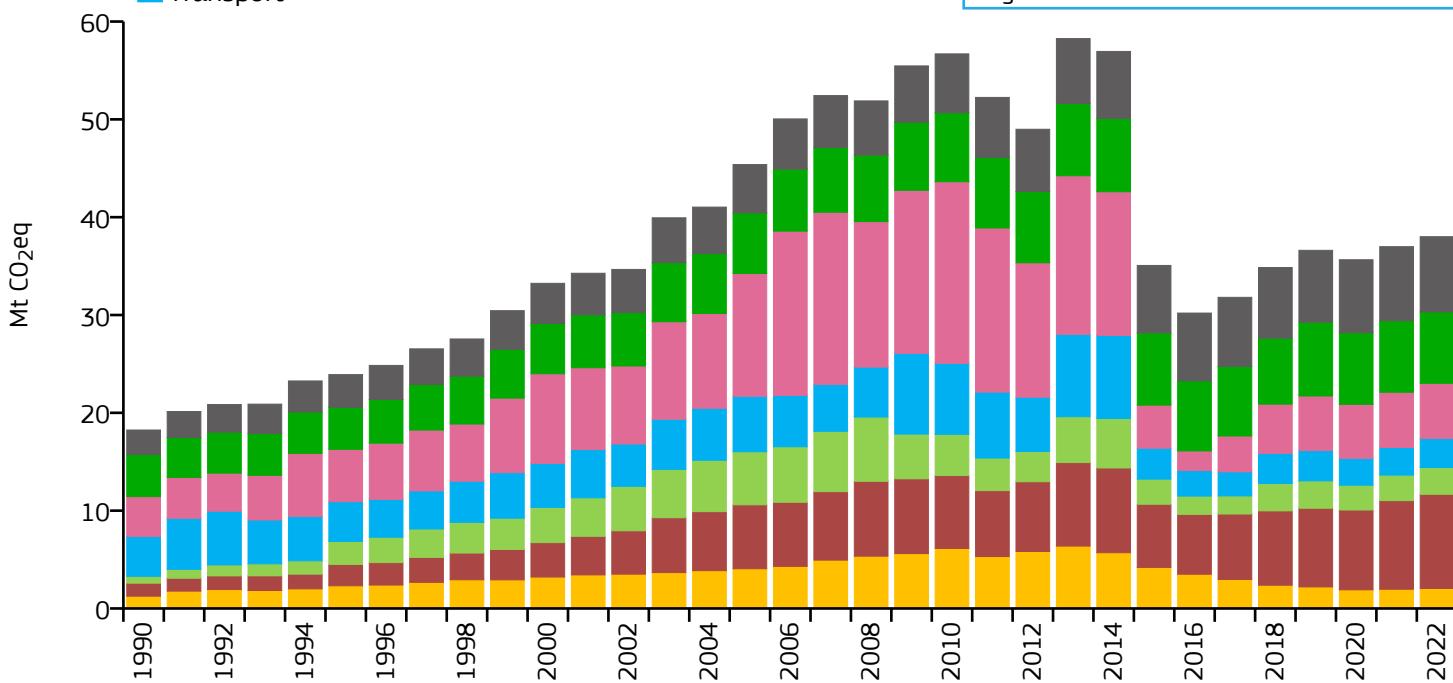
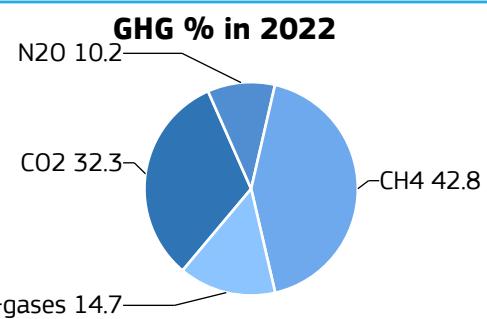


Yemen

GHG emissions by sector

Power Industry
Industrial Combustion and Processes
Buildings
Transport

Fuel Exploitation
Agriculture
Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 38.006 | 1.204 | 0.315 | 31.576M |
| 2015 | 35.067 | 1.303 | 0.319 | 26.916M |
| 2005 | 45.379 | 2.205 | 0.497 | 20.583M |
| 1990 | 18.242 | 1.513 | 0.426 | 12.057M |

2022 vs 1990

2022 vs 2005

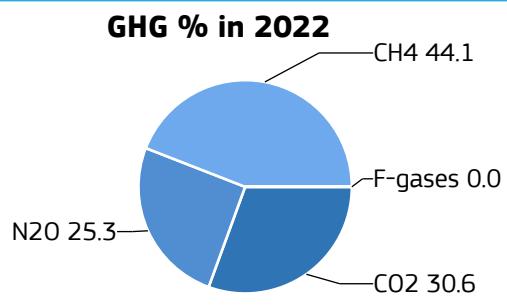
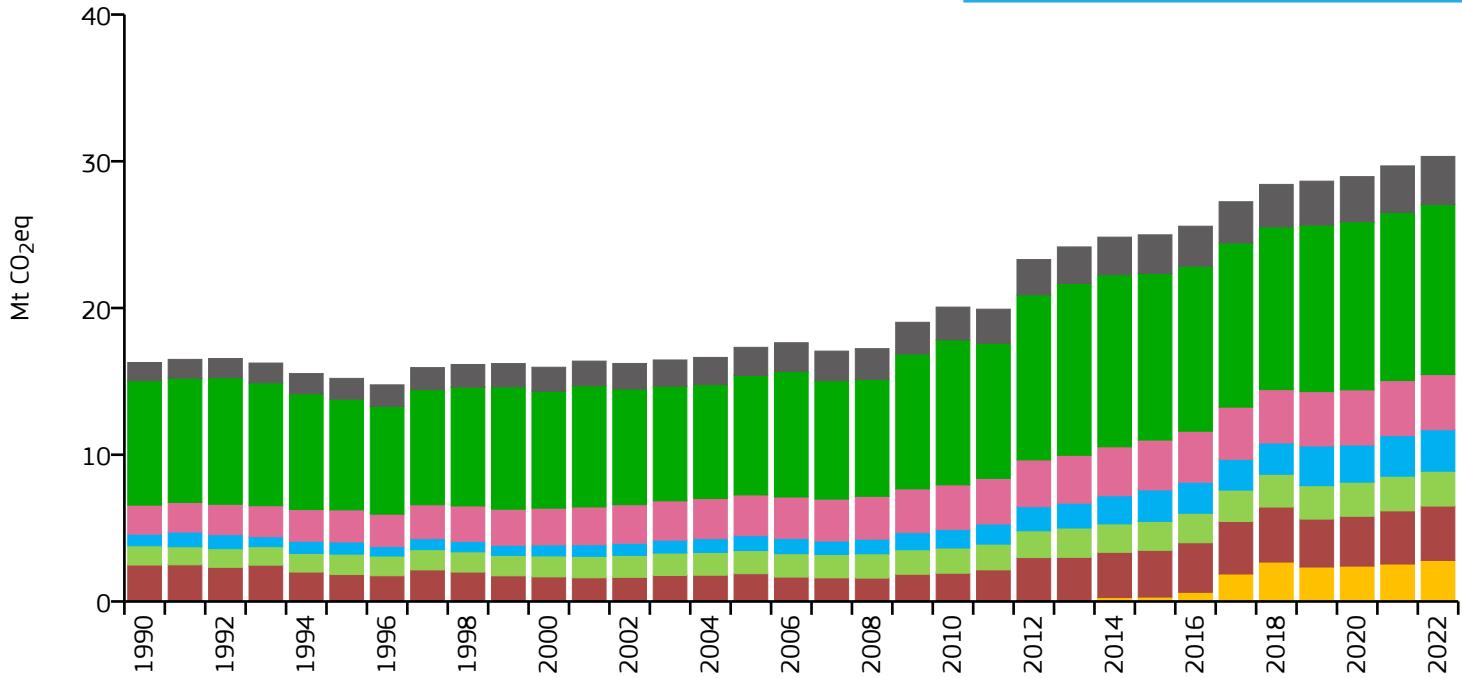
2022 vs 2021



Zambia

GHG emissions by sector

- Power Industry
- Industrial Combustion and Processes
- Buildings
- Transport
- Fuel Exploitation
- Agriculture
- Waste



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 30.331 | 1.532 | 0.459 | 19.803M |
| 2015 | 24.987 | 1.552 | 0.457 | 16.100M |
| 2005 | 17.321 | 1.437 | 0.618 | 12.053M |
| 1990 | 16.287 | 2.029 | 0.925 | 8.027M |

2022 vs 1990

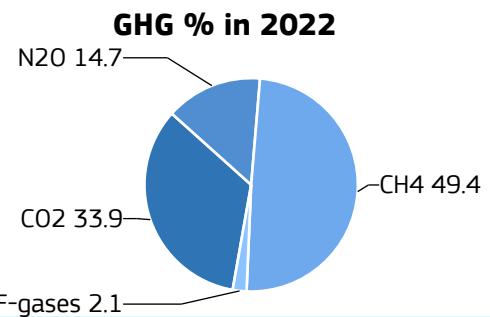
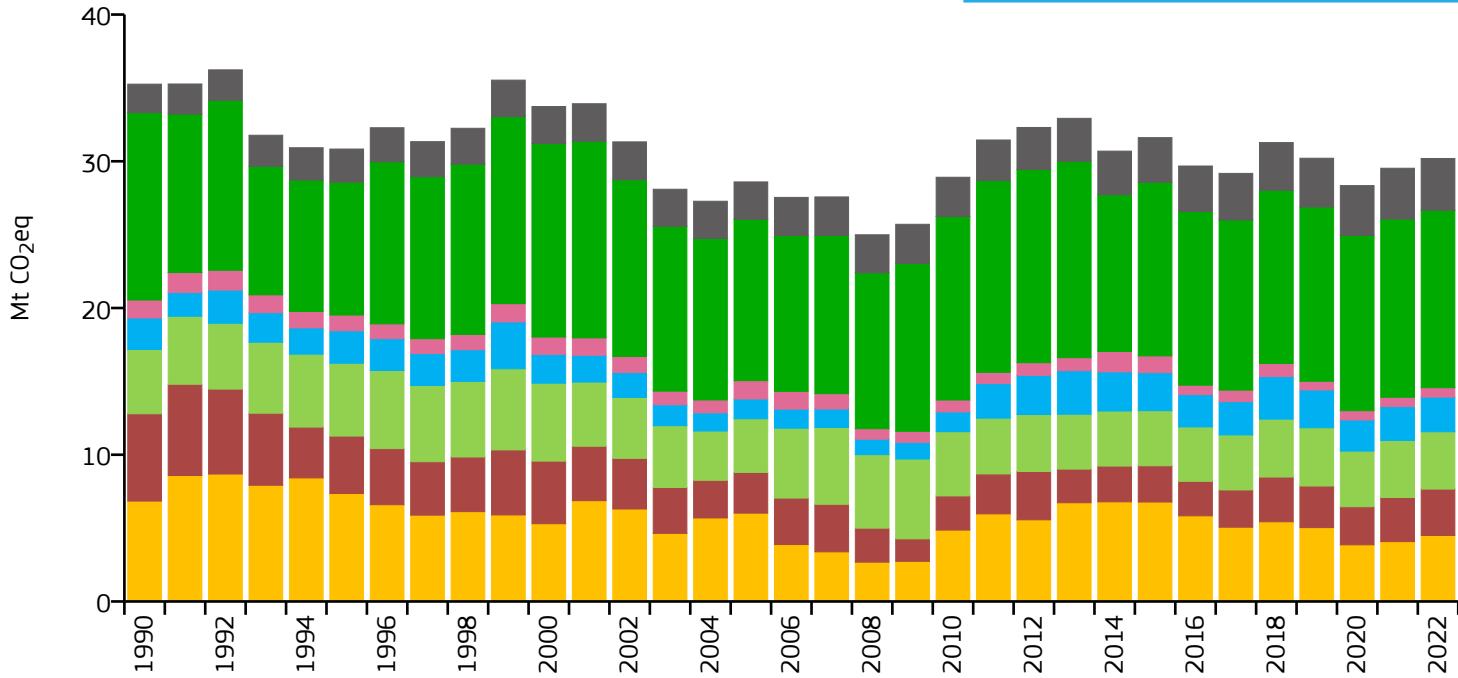
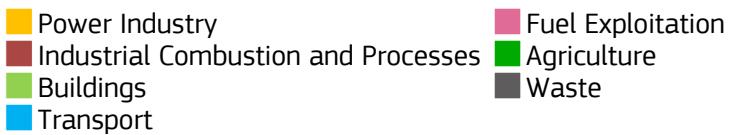
2022 vs 2005

2022 vs 2021



Zimbabwe

GHG emissions by sector



| Year | GHG emissions Mt CO ₂ eq/yr | GHG emissions per capita t CO ₂ eq/cap/yr | GHG emissions per unit of GDP PPP t CO ₂ eq/kUSD/yr | Population |
|------|---|---|---|------------|
| 2022 | 30.190 | 1.637 | 0.863 | 18.438M |
| 2015 | 31.610 | 2.004 | 0.965 | 15.777M |
| 2005 | 28.593 | 2.210 | 1.289 | 12.940M |
| 1990 | 35.256 | 3.462 | 1.289 | 10.183M |

2022 vs 1990

2022 vs 2005

2022 vs 2021



Annex 7. GHG emissions and removals from LULUCF sector by macro-regions

The following ten macro-regions⁴⁶ are presented:

Africa, Asia-Pacific Developed, Eastern Asia, Eurasia, Europe, Latin America and Caribbean, Middle East, North America, South-East Asia and developing Pacific, Southern Asia.

The following LULUCF sectors are included:

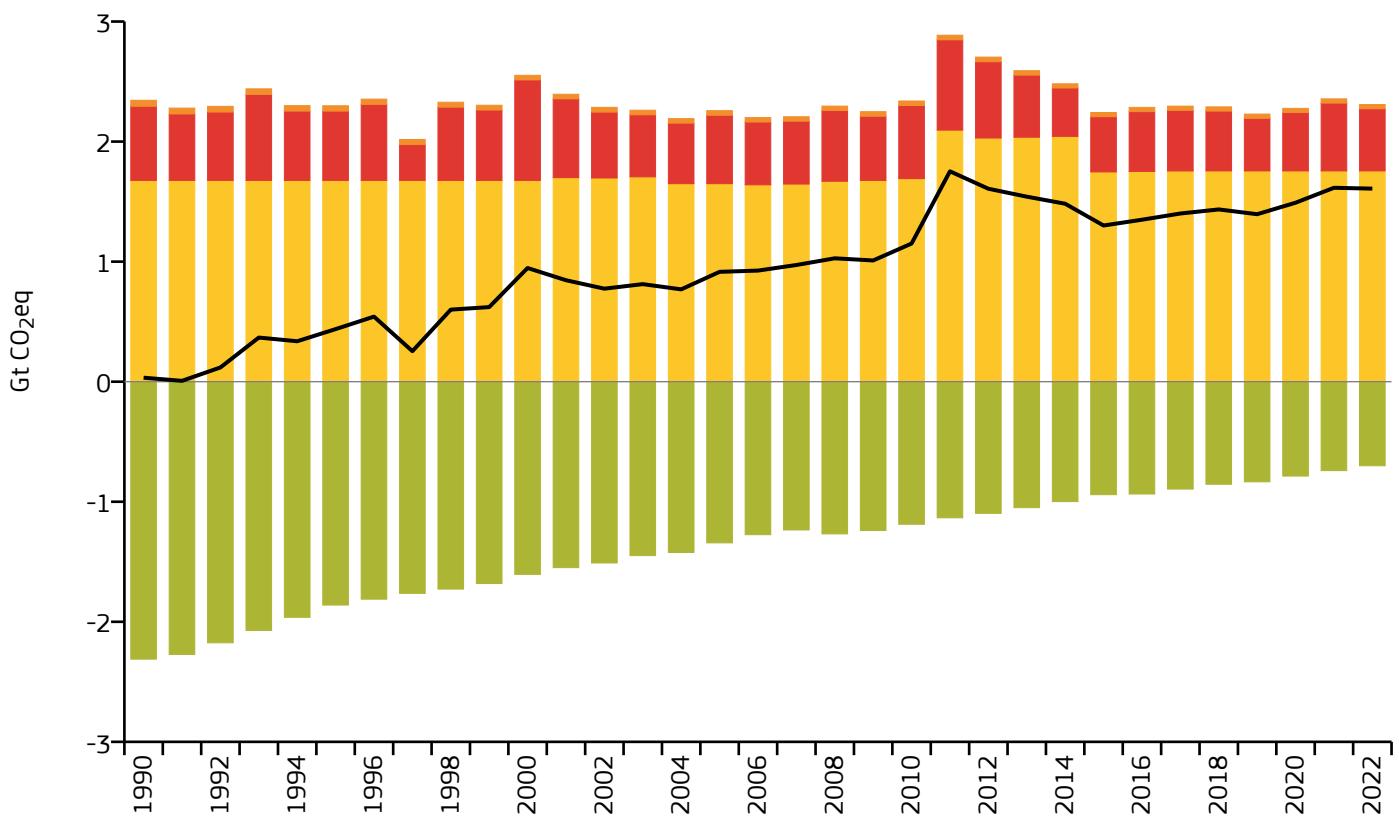
Forest Land, Deforestation, Organic Soil, Other and Fires.

⁽⁴⁶⁾ Macro regions classification follows the definition used in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR6).

Africa

GHG emissions and removals from LULUCF sector

Forest Land Deforestation Fires Organic Soil Other Net

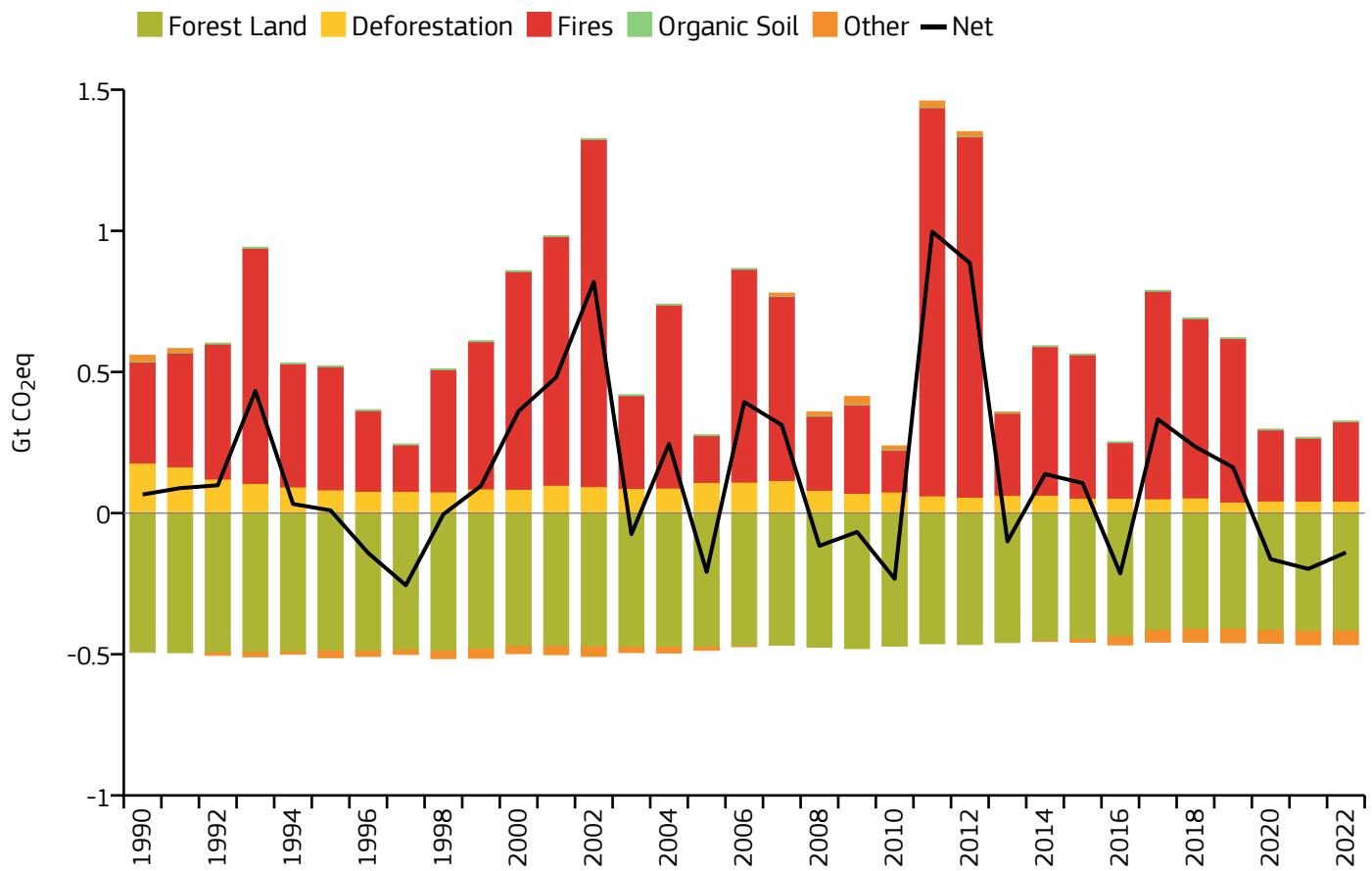


Countries included in Africa:

Algeria; Angola; Benin; Botswana; Burkina Faso; Burundi; Cabo Verde; Cameroon; Central African Republic; Chad; Comoros; Congo; Côte d'Ivoire; Democratic Republic of the Congo; Djibouti; Egypt; Equatorial Guinea; Eritrea; Eswatini; Ethiopia; Gabon; Ghana; Guinea; Guinea-Bissau; Kenya; Lesotho; Liberia; Libya; Madagascar; Malawi; Mali; Mauritania; Mauritius; Morocco; Mozambique; Namibia; Niger; Nigeria; Rwanda; Réunion; Saint Helena, Ascension and Tristan da Cunha; Senegal; Seychelles; Sierra Leone; Somalia; South Africa; Sudan and South Sudan; São Tomé and Príncipe; Tanzania; The Gambia; Togo; Tunisia; Uganda; Western Sahara; Zambia; Zimbabwe.

Asia-Pacific Developed

GHG emissions and removals from LULUCF sector

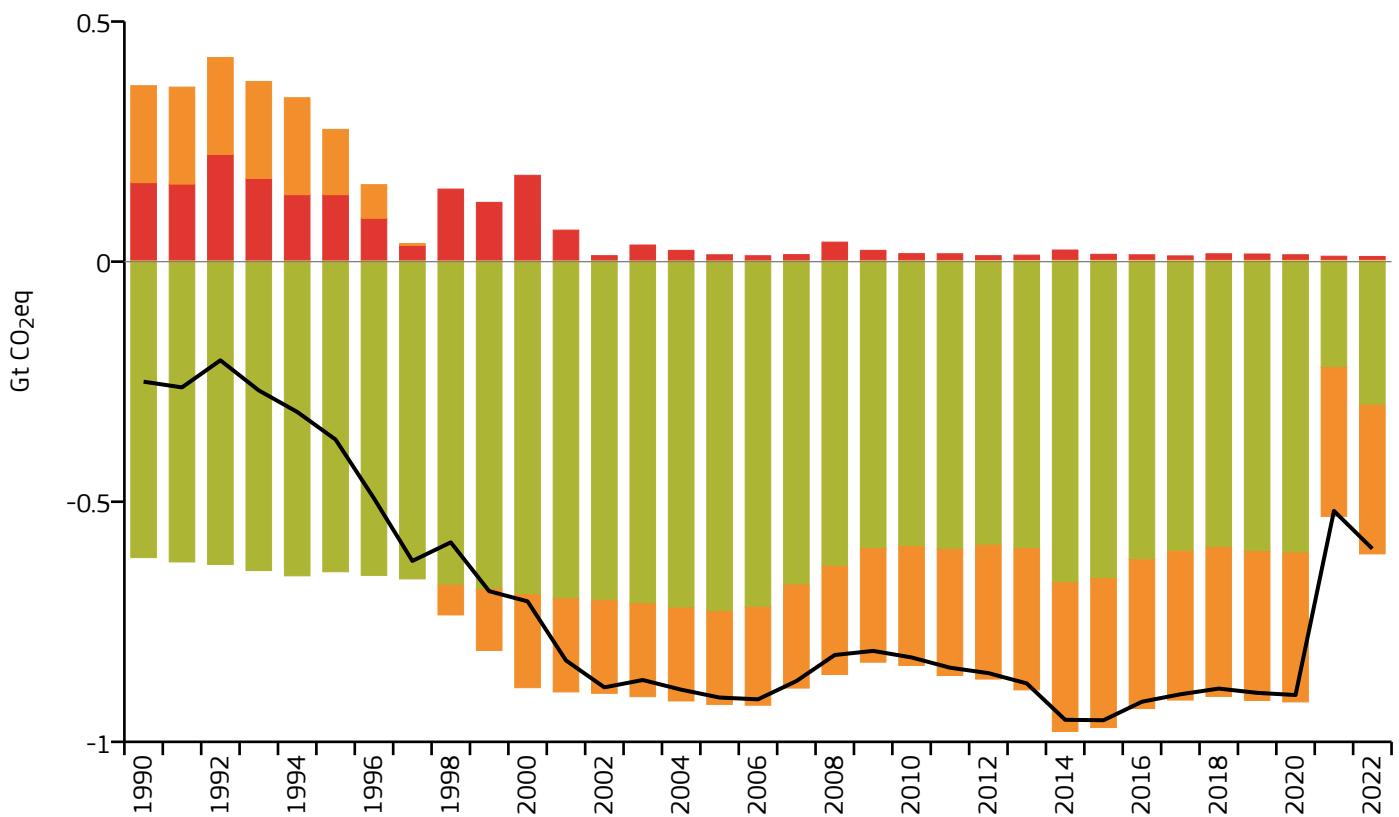


Countries included in Asia-Pacific Developed:
Australia; Japan; New Zealand.

Eastern Asia

GHG emissions and removals from LULUCF sector

Forest Land Deforestation Fires Organic Soil Other Net



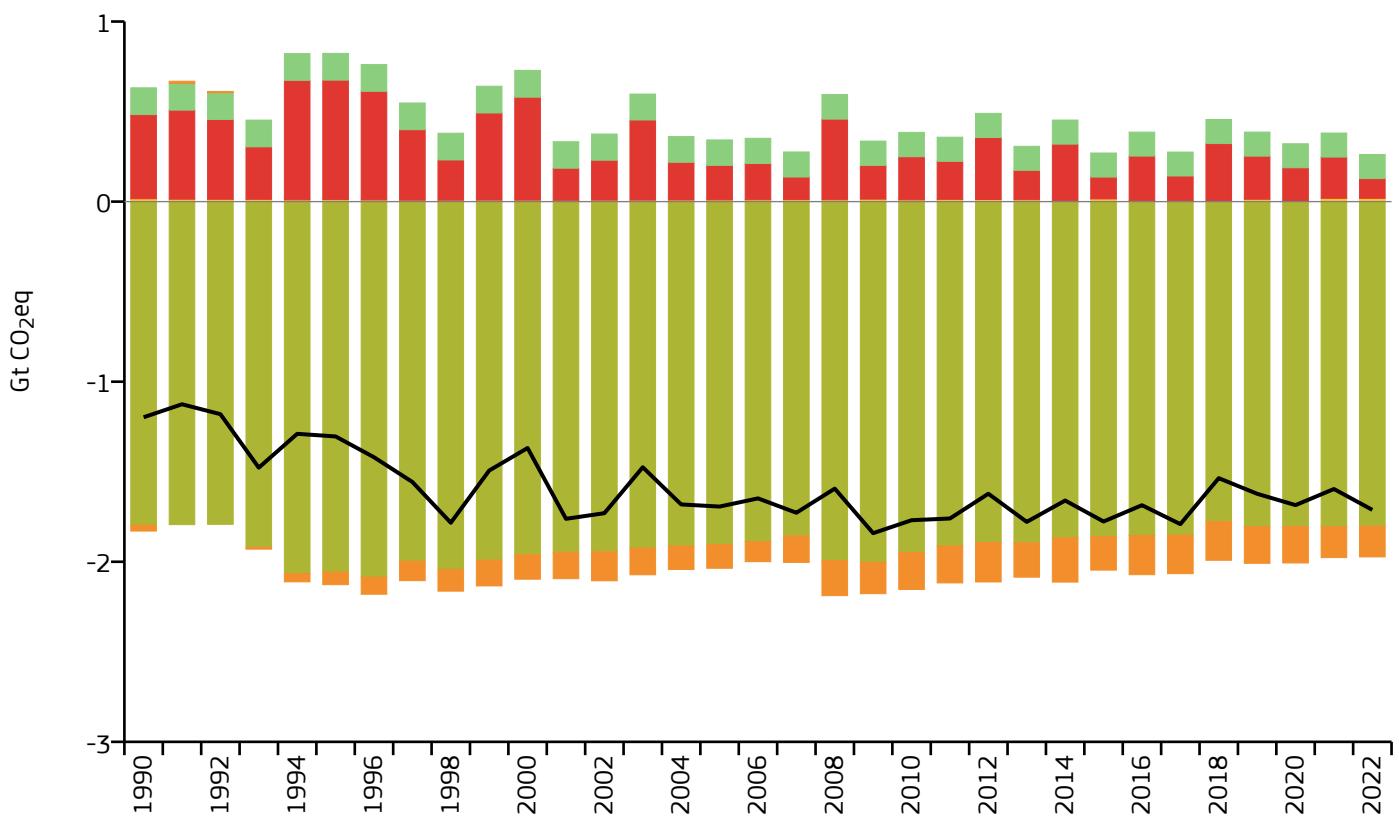
Countries included in Eastern Asia:

China; Hong Kong; Macao; Mongolia; North Korea; South Korea; Taiwan.

Eurasia

GHG emissions and removals from LULUCF sector

Forest Land Deforestation Fires Organic Soil Other Net



| Year | 1990 | 2000 | 2015 | 2022 |
|--------------------------------------|--------|--------|--------|--------|
| Net flux (Gt CO ₂ eq /yr) | -1.198 | -1.368 | -1.776 | -1.712 |

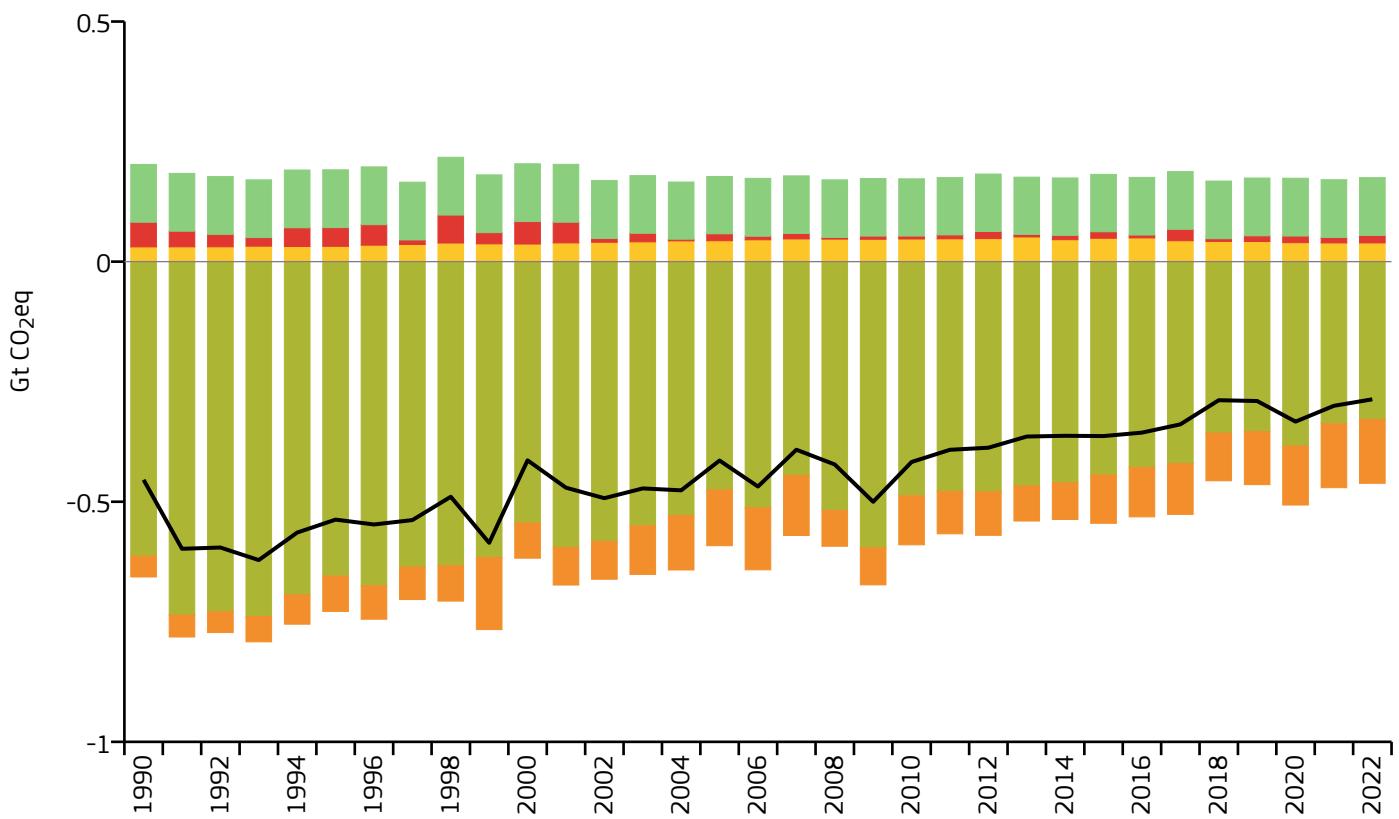
Countries included in Eurasia:

Armenia; Azerbaijan; Belarus; Georgia; Kazakhstan; Kyrgyzstan; Moldova; North Macedonia; Russia; Serbia and Montenegro; Tajikistan; Turkmenistan; Uzbekistan.

Europe

GHG emissions and removals from LULUCF sector

Forest Land Deforestation Fires Organic Soil Other Net



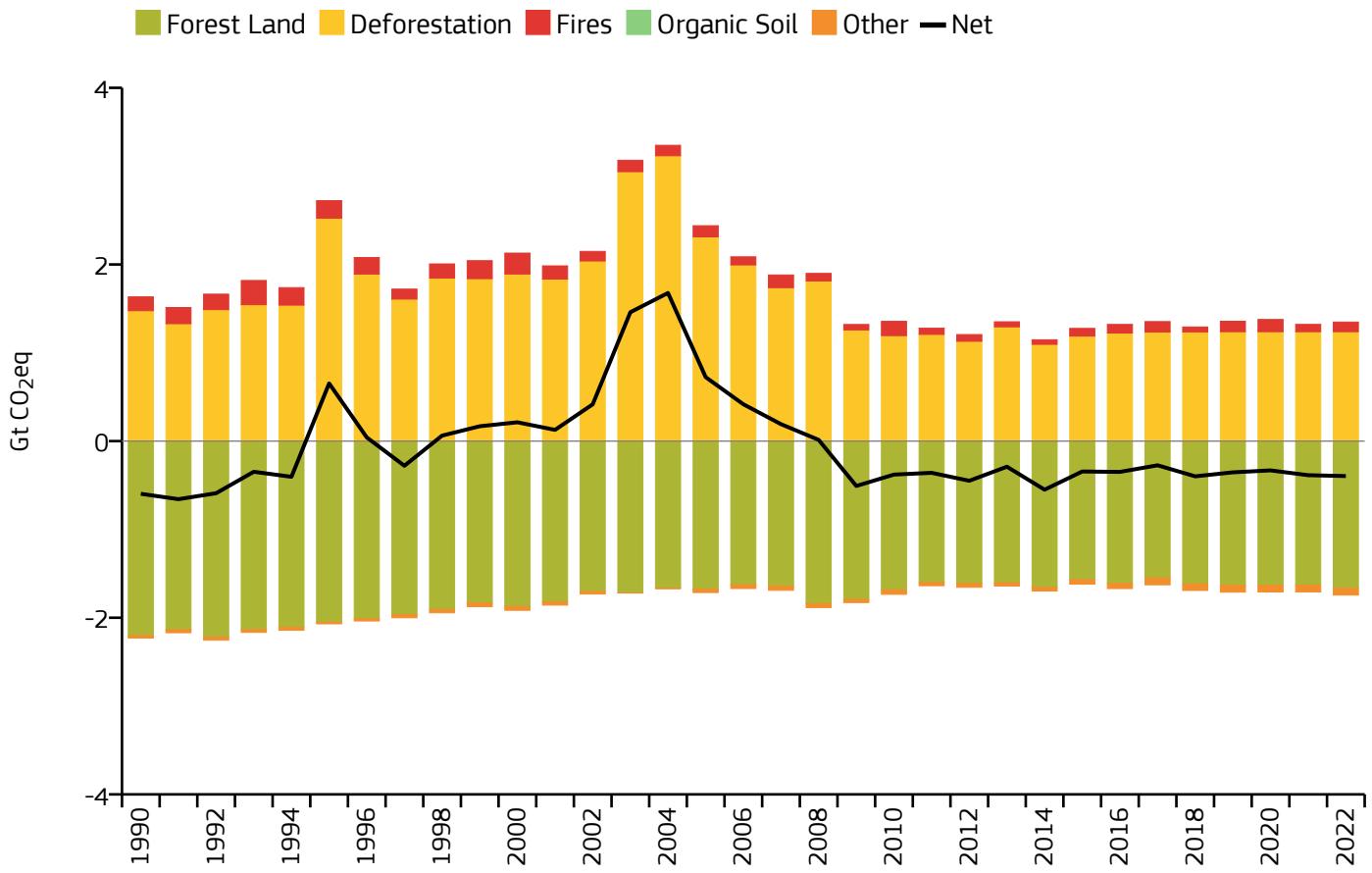
| Year | 1990 | 2000 | 2015 | 2022 |
|--------------------------------------|--------|--------|--------|--------|
| Net flux (Gt CO ₂ eq /yr) | -0.454 | -0.414 | -0.363 | -0.287 |

Countries included in Europe:

Albania; Austria; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Czechia; Denmark; Estonia; Faroe Islands; Finland; France and Monaco; Germany; Gibraltar; Greece; Hungary; Iceland; Ireland; Italy; San Marino and the Holy See; Latvia; Lithuania; Luxembourg; Malta; Netherlands; Norway; Poland; Portugal; Romania; Slovakia; Slovenia; Spain and Andorra; Sweden; Switzerland and Liechtenstein; Türkiye; Ukraine; United Kingdom.

Latin America and Caribbean

GHG emissions and removals from LULUCF sector



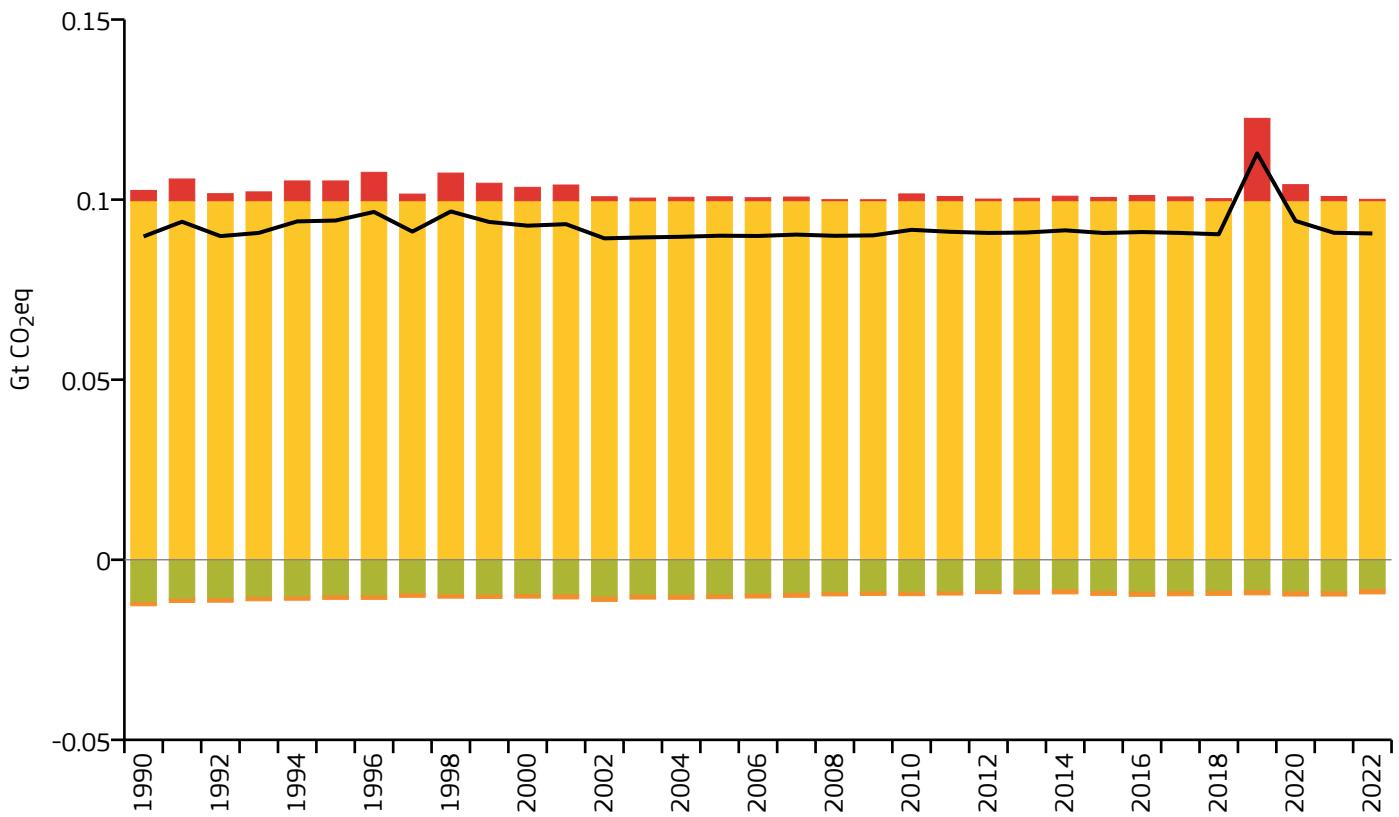
Countries included in Latin America and Caribbean:

Anguilla; Antigua and Barbuda; Argentina; Aruba; Bahamas; Barbados; Belize; Bolivia; Brazil; British Virgin Islands; Cayman Islands; Chile; Colombia; Costa Rica; Cuba; Curaçao; Dominica; Dominican Republic; Ecuador; El Salvador; Falkland Islands; French Guiana; Grenada; Guadeloupe; Guatemala; Guyana; Haiti; Honduras; Jamaica; Martinique; Mexico; Nicaragua; Panama; Paraguay; Peru; Puerto Rico; Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Suriname; Trinidad and Tobago; Turks and Caicos Islands; Uruguay; Venezuela.

Middle East

GHG emissions and removals from LULUCF sector

Forest Land Deforestation Fires Organic Soil Other Net



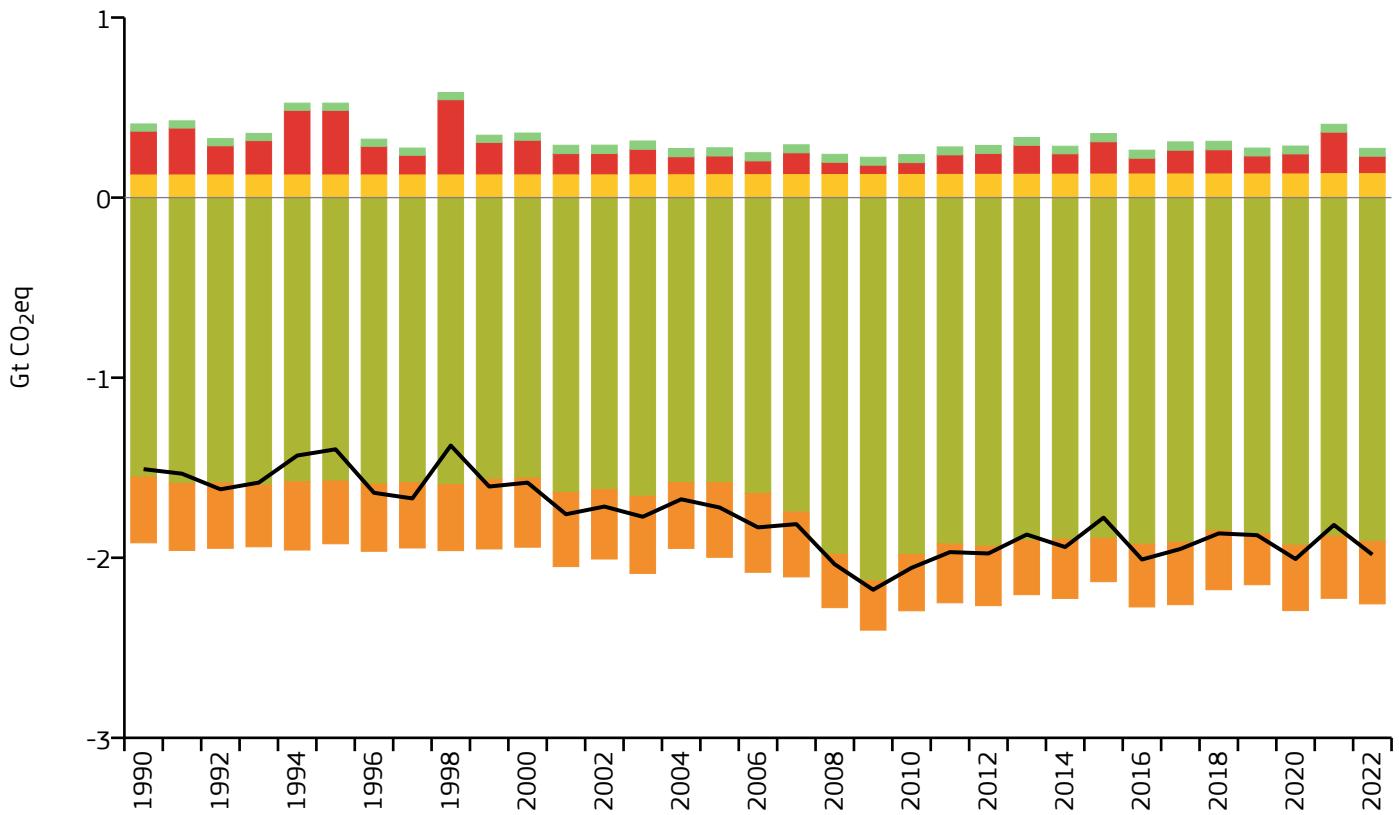
Countries included in Middle East:

Bahrain; Iran; Iraq; Israel and Palestine, State of; Jordan; Kuwait; Lebanon; Oman; Qatar; Saudi Arabia; Syria; United Arab Emirates; Yemen.

North America

GHG emissions and removals from LULUCF sector

Forest Land Deforestation Fires Organic Soil Other Net



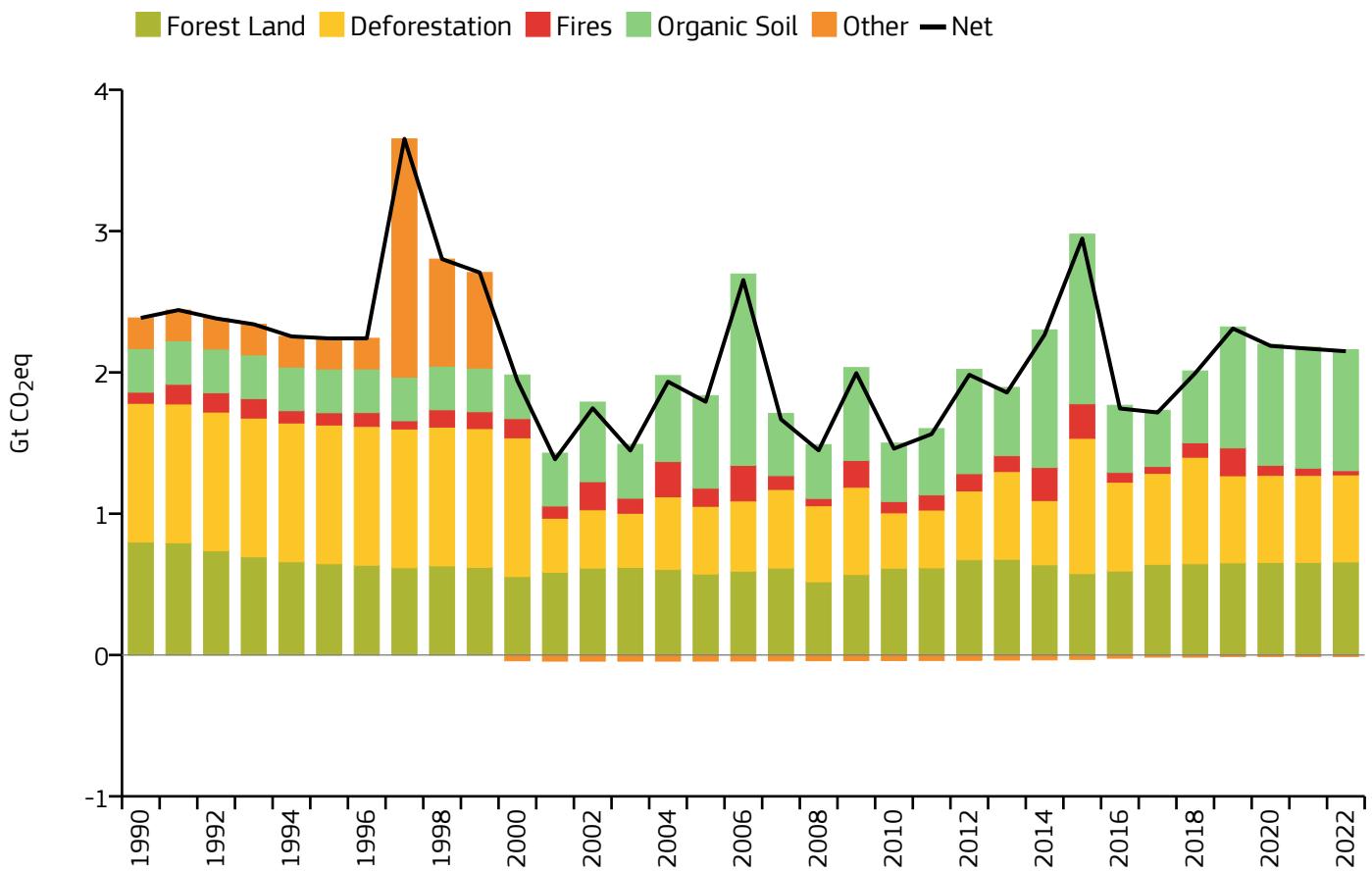
| Year | 1990 | 2000 | 2015 | 2022 |
|--------------------------------------|--------|--------|--------|--------|
| Net flux (Gt CO ₂ eq /yr) | -1.508 | -1.583 | -1.777 | -1.982 |

Countries included in North America:

Bermuda; Canada; Greenland; Saint Pierre and Miquelon; United States.

South-East Asia and developing Pacific

GHG emissions and removals from LULUCF sector



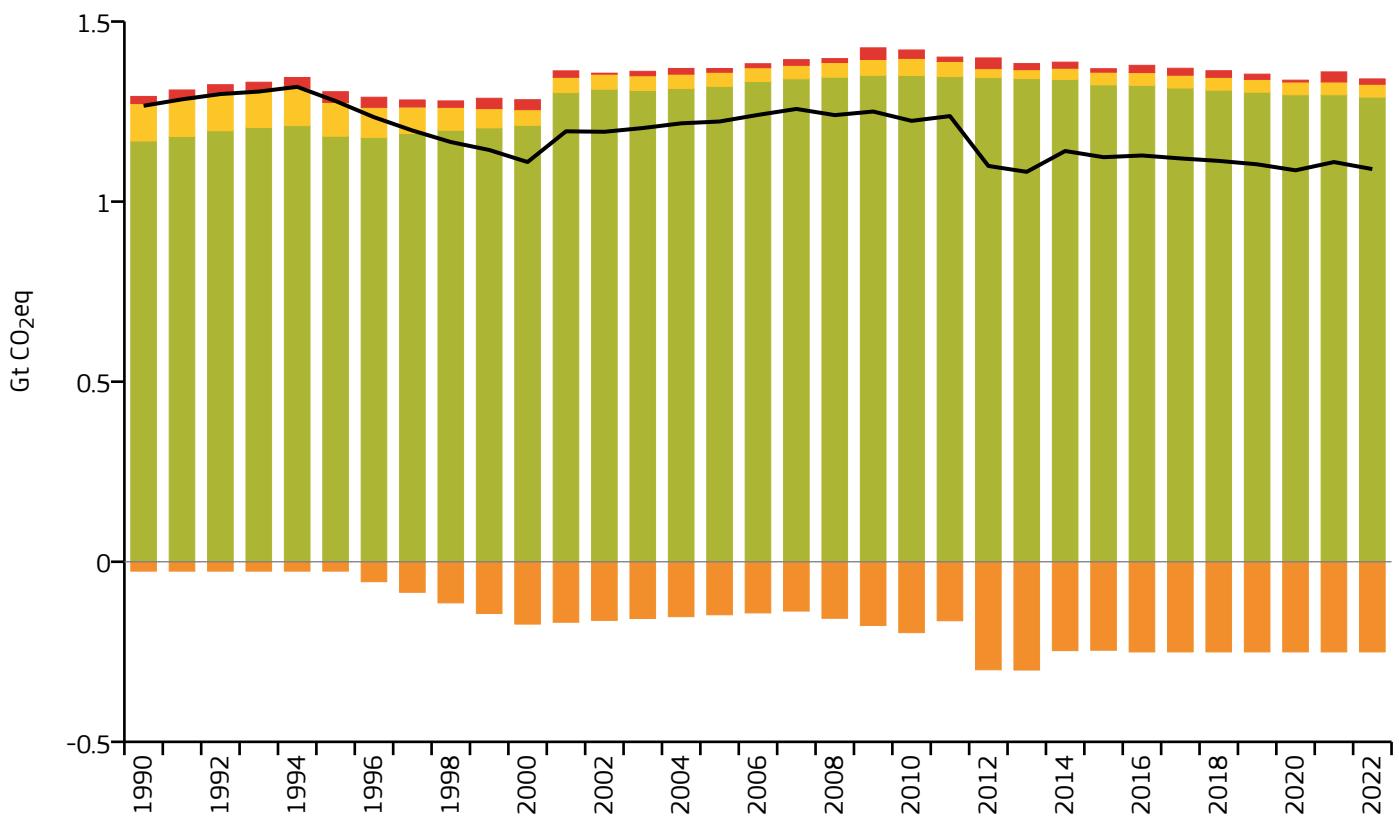
Countries included in South-East Asia and developing Pacific:

Brunei; Cambodia; Cook Islands; Fiji; French Polynesia; Indonesia; Kiribati; Laos; Malaysia; Myanmar/Burma; New Caledonia; Palau; Papua New Guinea; Philippines; Samoa; Singapore; Solomon Islands; Thailand; Timor-Leste; Tonga; Vanuatu; Vietnam.

Southern Asia

GHG emissions and removals from LULUCF sector

Forest Land Deforestation Fires Organic Soil Other Net



| Year | 1990 | 2000 | 2015 | 2022 |
|--------------------------------------|-------|-------|-------|-------|
| Net flux (Gt CO ₂ eq /yr) | 1.266 | 1.110 | 1.123 | 1.090 |

Countries included in Southern Asia:

Afghanistan; Bangladesh; Bhutan; India; Maldives; Nepal; Pakistan; Sri Lanka.

Disclaimer

This publication presents GHG emissions from all countries, while GHG emissions from LULUCF are presented for EU27 and by macro-regions without any prejudice to the status or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory. Country names are consistent with the Interinstitutional Style Guide of the European Commission available at <http://publications.europa.eu/code/en/en-370100.htm>, the "Short name" definition listed in the "List of countries, territories and currencies" table at <http://publications.europa.eu/code/en/en-5000500.htm> has been used (updated on 04/07/2023).

Without prejudice to the rules applying to the information and data made available by the European Union (in particular the European Commission), as available [here](#) and to the maximum extent permitted by applicable law, the European Union ("the Union") and the International Energy Agency ("IEA") disclaim all responsibility or liability in relation to any and all information distributed, published or otherwise made available by them on the EDGAR website, in this dataset and/or in this publication. The Union and the IEA provide any such information as-is and as-available, and make no representations, conditions or warranties of any kind concerning this information, whether express, implied, statutory, or other (including, without limitation, any warranties or conditions of title, non-infringement, merchantability, or fitness for a particular purpose). To the maximum extent permitted by applicable law, in no event shall the Union or the IEA be liable to any third party on any legal theory (including, without limitation, negligence) or otherwise for any direct, special, indirect, incidental, consequential, punitive, exemplary, or other losses, costs, expenses, or damages arising out of the distribution, publication, making available or use of any such information.

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696,
- via the following form: european-union.europa.eu/contact-eu/write-us_en.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

Open data from the EU

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

Science for policy

The Joint Research Centre (JRC) provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society



EU Science Hub

joint-research-centre.ec.europa.eu

@EU_ScienceHub

EU Science Hub - Joint Research Centre

EU Science, Research and Innovation

EU Science Hub

@eu_science



Publications Office
of the European Union