Emissions Gap Report 2025: Chapter 2 – Global Emissions Trends

[5-6 pages total, 3500-4200 words, excluding references]

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Key messages

- Global greenhouse gas emissions in 2024 reached a record high of 57.7 $GtCO_2e$, growing by 2.6 per cent (1.4 $GtCO_2e$). The growth rate was high compared to recent years and another opportunity was missed to peak emissions.
- A large share of this years' emissions growth was due to deforestation and forest degradation emissions in the land use, land-use change and forestry (LULUCF) sector. However, emissions from fossil fuels also continued to increase.
- Most countries within the G20 registered an increase in GHG emissions, excluding LULUCF.
- The highest absolute growth in total GHG emissions, excluding LULUCF was observed in India and China, while Indonesia recorded the fastest relative growth in emissions. Several historic high emitting countries such as the United States of America and the Russian Federation have much higher emissions compared to the global average and increased their emissions in 2024.
- Renewable energy deployments and climate policies avoided even higher emissions growth in 2024, but increased effort will be required to bring a peak in global GHG emissions.

2.1 Introduction

This chapter assesses greenhouse gas (GHG) emissions trends up to and including 2024. It aims to describe emissions trends from multiple perspectives, including total emissions across gases and sources (section 2), emissions by major sectors (section 3), and the emissions of major emitters, including their per capita and historic contributions (section 4). These different perspectives offer insight into the drivers of emissions, as well as inequalities in contributions to climate change.

As in previous years, the Emissions Gap Report focuses on total net GHG emissions across all major groups of anthropogenic sources and sinks reported under the United Nations Framework Convention on Climate Change (UNFCCC). This includes: CO_2 emissions from fossil fuels and industry (fossil CO_2); CO_2 emissions and removals from land use, land-use change and forestry (LULUCF CO_2); methane emissions (CH_4); nitrous oxide emissions (N_2O); and fluorinated gas (F-gas) emissions covered under UNFCCC reporting. This set of sources is consistent with global Integrated Assessment Modelling (IAM) benchmarks reported in chapter 4, as well as other major assessments (Forster et al., 2024; IPCC, 2022). It excludes ozone depleting substances regulated under the Montreal Protocol as well as the cement carbonation sink, neither of which are currently covered in UNFCCC reporting. It also excludes fire emissions that are not directly caused by humans. Including these various sources would increase global emissions by approximately 1.8 $GtCO_2e$ per year (Lamb et al., 2025). Where estimates are reported at a national level, these are based on territorial accounting.

The reporting of net LULUCF CO_2 emissions is also consistent with previous years. The global bookkeeping approach is used to report global estimates of net LULUCF CO_2 emissions, and the national inventory approach is used to report national estimates of net LULUCF CO_2 emissions. This ensures that global estimates are consistent with chapter 4, as well as the carbon cycle and climate science literature; while national estimates are consistent with those reported by countries to the UNFCCC. As this chapter reports, total net LULUCF CO_2 emissions differ substantially between these two approaches, due to known differences in system boundaries and other assumptions (Grassi et al., 2018). A translation between global emissions based on bookkeeping models and the national GHG inventories reported by countries is available and is updated annually (European Commission, 2025; Friedlingstein et al., 2025; Schwingshackl et al., 2022) (see Box 2.1).

The principal sources in this chapter include the EDGAR dataset for fossil CO_2, CH_4, N_2O and F-gas emissions (Crippa et al., 2025); the Global Carbon Budget for global LULUCF CO_2 estimates, taking the average of four bookkeeping models (Friedlingstein et al., 2025); and (European Commission, 2025) for national inventory-based LULUCF CO_2 (with updates to the latest inventories for the major emitters). Throughout this report, 100-year global warming potentials from the latest Intergovernmental Panel on Climate Change Sixth Assessment (IPCC AR6) Working Group I Report (Forster et al., 2021) are used where GHG emissions are aggregated to CO_2 equivalents. Alternative metrics can be used to highlight the differing impacts of short lived gases, but are not explored here. Further methodological and data choices are detailed in the technical appendix of this chapter, which is available online.

2.2 Global emissions trends

Ten years on from the Paris Agreement, global GHG emissions continue to increase. In 2024, they reached a record high of 57.7 $GtCO_2e$, growing by 2.6 per cent (1.4 $GtCO_2e$) from the previous year (figure 2.1, table 2.1) (Crippa et al., 2025). This rate is fast compared to emissions growth in the

2000s (on average 2.2 per cent per year), the 2010s (0.6 per cent per year) and last year (1.6 per cent). At the same time, atmospheric CO_2 concentrations rose to [PLACEHOLDER] ppm in 2024 [WMO 2024 REFERENCE] and will continue to do so until annual CO_2 emissions are reduced sufficiently to be balanced by removals (net-zero).

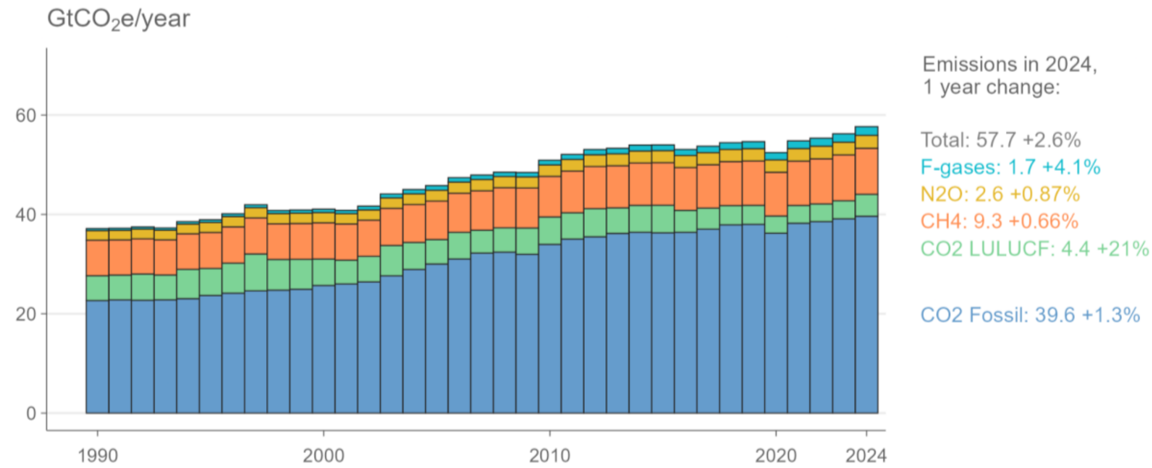


Figure 2.1: Total net greenhouse gas emissions by gas. Sources: Crippa et al. (2025), Friedlingstein et al. (2025).

Fossil CO_2 emissions account for approximately 69 per cent of current GHG emissions. These emissions are driven by the combustion of coal, oil and gas in the energy sector, as well as industrial processes associated with the manufacture of metals, cement, and other materials (Figure 2.2). Multiple datasets agree that fossil CO_2 emissions grew in 2024: EDGAR (used here) estimates an increase of 1.3 per cent or (Crippa et al., 2025), compared to +1 per cent reported by the Energy Institute (2025) (energy sector only) and +0.8 per cent forecast by the Global Carbon Budget (Friedlingstein et al., 2025). Overall, the change in Fossil CO_2 emissions was substantive at +0.55 $GtCO_2$, but not as fast as last year when the increase was +0.88 $GtCO_2$.

Together, CH_4, N_2O and F-gas emissions account for about 24 per cent of total GHG emissions. All these gases continued to grow in 2024, with F-gas emissions the fastest at 4.1 per cent, followed by CH_4 at 0.87 per cent and N_2O at 0.66 per cent (Figure 2.2). Anthropogenic CH_4 emissions are currently the second largest source of GHG emissions, and are mainly attributable to agricultural sources including ruminant livestock, manure management and rice cultivation. Venting from oil and gas operations, coal mine methane leaks, and waste management are also significant sources (figure 2.2).

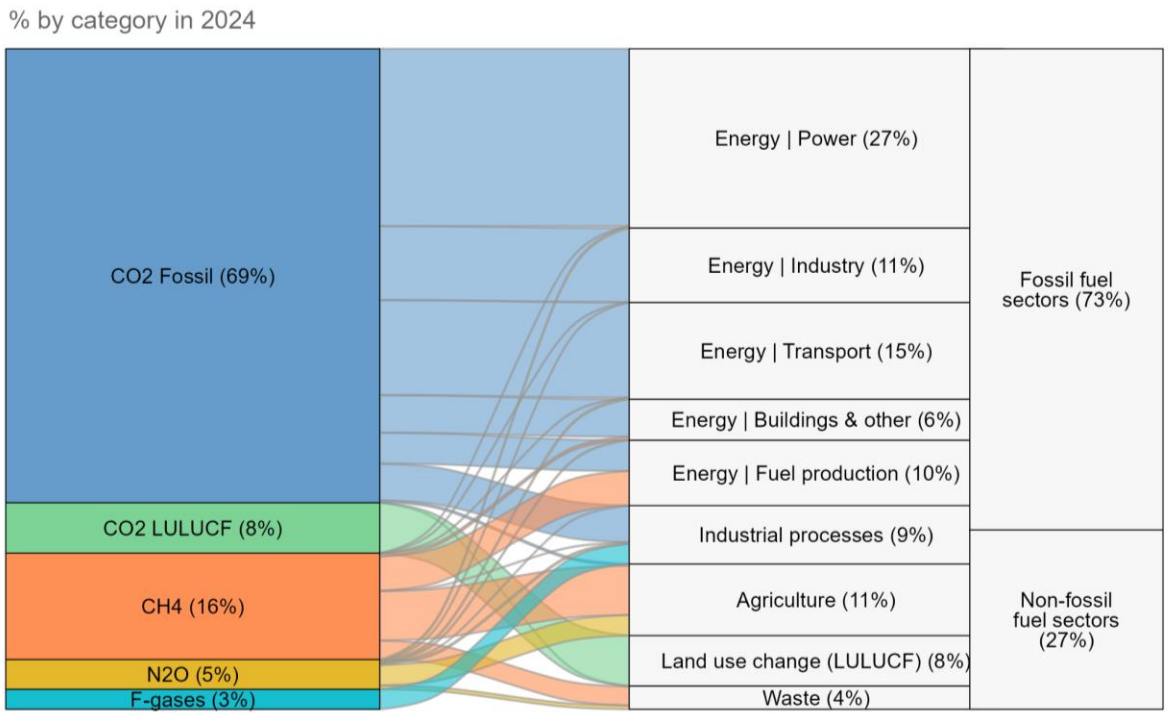


Figure 2.2 Total net greenhouse gas emissions by gas, sector and fossil/non-fossil category. Sources: Crippa et al. (2025), Friedlingstein et al. (2025).

Total emissions across all gases that are associated with fossil fuel extraction, production and combustion were 42 $GtCO_2e$ in 2024, accounting for ~73% of the total (Figure 2.2). Most growth in emissions over the past few decades was also associated with fossil fuels (Appendix figure 1).

Despite the key role of fossil fuels in driving total emissions, deforestation and land use change was decisive for the rapid increase in 2024 emissions. Global net LULUCF CO_2 emissions - using the global bookkeeping approach - was projected to increase by 21 per cent (0.77 $GtCO_2$) in 2024 and was thereby responsible for the largest share of the overall change in emissions (53% compared to 36% for Fossil CO_2). The bookkeeping approach calculates emissions and removals based on land-use activity data and carbon response curves, but extrapolates the most recent year (here 2024) based on the interannual variability of the emission estimates from tropical deforestation and degradation fires, and Southeast Asian peat fires (Friedlingstein et al., 2025). Emissions from tropical deforestation and degradation fires in South America were among the highest ever recorded since 1997 at 1.2 $GtCO_2$ in 2024 (van der Werf et al., 2017; Friedlingstein et al., 2025). They were likely exacerbated by El Niño conditions that started in mid-2023 and ended in mid-2024, which drive increased temperatures and drought risk, and are known to increase the odds that anthropogenic fires used for agricultural management or forest clearing activities 'escape' and have larger than anticipated effects (Friedlingstein et al., 2025; Lamb et al., 2025). The dry conditions even caused fires and drove emissions up in the wetlands of the Pantanal. In contrast to South America, land-use emissions from Southeast Asia have dropped in 2024, as the El Niño conditions ceased (Friedlingstein et al., 2025). The interactions between climate change, deforestation and biodiversity are becoming important drivers of emissions, as well as key sources of mitigation potential in the coming decades (see Box 1).

Note to reviewers: Box 1 will be added later.

Table 2.1 Total global emissions by source

GtCO2e	**2010-2019 (average)**	**2022**	**2023**	**2024**
GHG	53.3±5.4	55.3±5.1	56.2±5.2	57.7±5.5
Fossil CO_2	36.3±2.9	38.5±3.1	39.1±3.1	39.6±3.2
LULUCF CO_2 (global bookkeeping)	4.9±3.4	3.5±2.5	3.6±2.5	4.4±3.1
LULUCF CO_2 (national inventory*)	-3.6±-2.5	-4.2±-2.9	-4.2±-3	-
CH_4	8.6±2.6	9.1±2.7	9.2±2.8	9.3±2.8
N_2O	2.4±1.4	2.5±1.5	2.6±1.5	2.6±1.6
F-gases	1.2±0.35	1.6±0.48	1.7±0.5	1.7±0.52

Note: Non-CO_2 greenhouse gases are converted to CO_2 equivalents using global warming potentials with a 100-year time horizon from the IPCC WGI AR6 (Forster et al., 2021). * Inventory-based LULUCF CO_2 is excluded from total GHG emissions, but all other sources are included. Sources: Crippa et al. (2025), Friedlingstein et al.(2025), European Commission (2025).

Although LULUCF CO_2 emissions were high in 2024, they remain below the average for the 1990s and 2000s where annual emissions were often above 5 GtCO$_2$ (Appendix Fig 2). They are also based on an early projection of land use activity with relatively high uncertainties (Friedlingstein et al., 2025). This category of emissions is generally considered to have the largest uncertainties of all gases considered here, both in terms of absolute levels and year to year trends (Appendix Fig 3).

An additional complication of LULUCF CO_2 emissions is that global bookkeeping and national inventory-based accounts diverged by more than 8 Gt CO_2 in the period 2010-2019 (Grassi et al., 2025) (table 2.1; Appendix Fig 2). This is due to known differences in system boundaries between each approach, in particular the fact that bookkeeping models consider only “direct” human-induced fluxes as anthropogenic (e.g. deforestation, afforestation and other land-use-related vegetation changes), whereas national inventories typically also include most of the “indirect” human-induced fluxes (e.g. enhanced vegetation growth due to increased atmospheric CO_2) that occur on managed land (Grassi et al., 2021). As a result, national inventories globally sum up to a small net LULUCF CO_2 removal, but include a large portion of removals that are not the result of management action and will not be sustained once atmospheric CO_2 levels stabilise and decline (Gidden et al., 2023). This has significant implications for tracking national and global emissions, and for evaluating collective progress towards the Paris Agreement goals (see Box 2).

Box 2: Implications of different definitions of anthropogenic land use emissions

Land use is essential in the path towards net zero. For example, recent studies have shown the LULUCF sector accounts for up to one quarter of pledged mitigation effort in the NDCs (Roman-Cuesta et al., 2025). However, the mismatch between global bookkeeping and national inventory-based LULUCF estimates due to different definitions of what to count towards anthropogenic land-use fluxes complicates the assessment of the role of land use, and in addition has important implications for evaluating collective climate progress (Allen et al., 2025; Gidden et al., 2023; Grassi et al., 2021, 2018).

A recent IPCC Expert Meeting (IPCC, 2024) brought together key experts from global models, Earth observation, and national GHG inventories to foster a common understanding, promote collaboration and translate between different estimation approaches. An important question concerns the direction of this translation. While the direct observations typically used in national GHG inventories cannot accommodate the global model approach, global models are more flexible and can, in principle, be adapted to approximate inventory-based methods. This understanding is reflected in the approved outlines for the IPCC 7th assessment report (IPCC, 2025), which indicate that estimates and scenarios for land use CO_2 fluxes will align with national inventory definitions.

Furthermore, the implications of this alignment for emission pathways at both global and national levels must be clearly communicated (Grassi et al., 2025), including the fact that under the national inventory definition, the carbon budget is smaller and that achieving net-zero CO_2 alone is insufficient to halt global warming (Allen et al., 2025).

The ultimate goal is to achieve more credible and comparable LULUCF estimates across communities, enabling a more consistent and confident assessment of collective climate progress. This will require efforts from both the GHG inventory community — by enhancing transparency and the quality of estimates — and the global modeling community, which should improve translation methodologies and implement them at the country level. At the same time, policymakers need to understand the implications and scale up their climate targets accordingly (Allen et al., 2025; Grassi et al., 2025). This is particularly important for forest-rich countries, where the contribution of "natural" sinks to climate targets can be significant.

2.3 Emissions trends of major sectors

When emissions are allocated to major economic sectors, power generation was the largest contributor in 2024 at 15.6 $GtCO_2e$, followed by transport (8.4 $GtCO_2e$) and industry (6.5 $GtCO_2e$) (Figure 2.2; Appendix Figure 4). Emissions grew across most sectors in 2024, but growth was particularly pronounced in international aviation (+7.4 per cent). Robust emissions growth also occurred in the solid fuel production sector (+2.5 per cent); from fuel combustion in the industry sector (+2.1 per cent); as well as from industrial processes in the metals (+1.8 per cent) and chemicals (+1.7 per cent) sectors. There was a significant decrease in process emissions from cement (-3.4 per cent), primarily occurring in China (Andrew, 2025) where a slowdown in construction is underway.

Focusing on the energy sector, overall energy demand increased by 2.2 per cent in 2024, which was higher than the average rate of demand increase observed between 2013 and 2023 (IEA, 2025a). On the supply side, the demand for coal based power generation increased by 1% in 2024, however, there has been a progressive decline in the growth rate as well as its share in the total energy mix (IEA, 2025a). 2024 was another record year for renewable electricity generation (EMBER, 2025). Combined with a recovery of hydropower generation, much of the increase in energy demand in 2024 was met by non-fossil sources (IEA, 2025a). One recent estimate suggests that renewable energy development led to the avoidance of an additional 9.8 GtCO2 in 2024 compared to a counterfactual scenario where wind, solar, nuclear and hydropower were not available (Deng et al., 2025). The increased adoption of renewable energy combined with the declining share of thermal power, and energy efficiency improvements have resulted in a steady decline in the global CO_2 intensity of electricity since 2007 (Peng et al., 2025).

Despite positive trends on the supply side, 2024 was also a year of extreme heat waves around the globe, which pushed up electricity demand for cooling (EMBER, 2025; IEA, 2025a). In addition, a combination of factors including increasing consumption in the industry sector, electric vehicles, data centers and artificial intelligence along with the progressive rebound of the aviation sector since the COVID-19 pandemic led to an overall increase in energy related 2024 emissions (EMBER, 2025; IEA, 2025a).

Growth in sales of new electric cars continued in 2024, increasing by 25 per cent compared to previous year. China continues to lead, followed by the US. China's EV car market benefited significantly with the introduction of a new trade-in scheme that offers incentives to replace older vehicles (IEA, 2025b). Another noteworthy trend is the steady increase in electricity demand from AI including data centres and associated infrastructure, which accounted for around 1.5 per cent of global electricity consumption in 2024 (IEA, 2025c). There are concerns that the pace and scale of AI adoption and associated infrastructure needs is undermining progress on renewable energy (Lee, 2025). From a macroeconomic perspective, the future growth of AI and associated emissions is uncertain and depends significantly on gains in efficiency; it is also likely to be small relative to the overall energy sector emissions (IEA, 2025c). There is a need to further understand the full range of impacts associated with near-term digitalisation trends.

2.4 Emissions trends of the top emitters

Currently, the six largest emitters in terms of total GHG emissions are China, the United States of America, India, the European Union, the Russian Federation and Indonesia. Preliminary estimates for 2024 (which exclude national-level LULUCF CO_2 for which data is only available up to 2023) show an increase in GHG emissions compared with 2023 in all of these, with the exception of the European Union (Figure 2.3).

The G20 group accounted for 77 per cent of global GHG emissions in 2024, excluding the African Union (Appendix Figure 8). Least Developed Countries - which include many African Union members - remain a minor contributor to global emissions at 3 per cent of the total. Most of the G20 countries recorded an increase in emissions in 2024 with the highest growth in absolute emissions occurring in India, China, the Russian Federation and Indonesia. In terms of growth rate, Indonesia showed the highest increase (4.5 per cent) followed by India (3.6 per cent) while emissions growth in the Russian Federation, Saudi Arabia and South Africa was significantly higher than the global average. Emissions growth in China (0.6 per cent in 2024) was lower than the previous year. However, many countries outside of G20 also showed significant increases in emissions in 2024 (Figure 2.3; Figure 2.4).

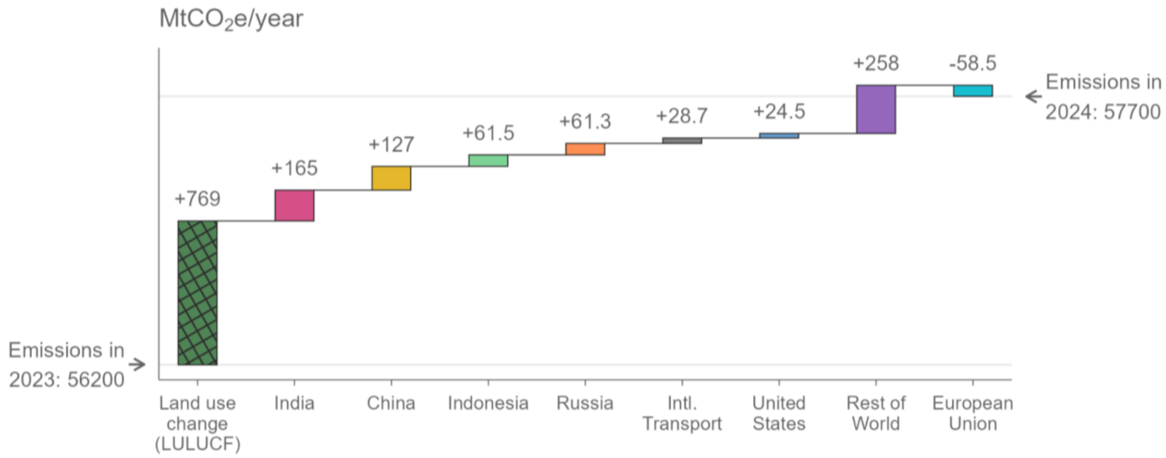
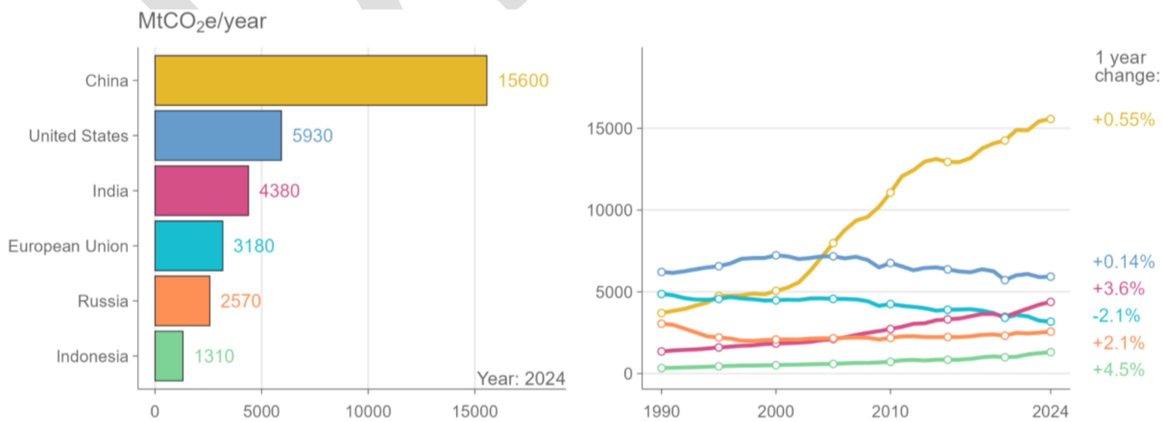


Figure 2.3: Contributions to the change in 2024 greenhouse gas emissions. Sources: Crippa et al. (2025)**,** Friedlingstein et al. (2025). The hatched land use change (LULUCF) estimate refers to the global change. **Note to reviewers: country names will be updated in line with United Nations official country names.**

Contributions by current, per capita and historic emissions differ across the high emitters and world regions. Per capita GHG emissions are above the world average of 6.4 tons of CO_2 equivalent (tCO2e) in the United States of America, the Russian Federation, China and the European Union, and remain significantly below it in Indonesia and India. The per capita emissions of Least Developed Countries is 1.5 tCO2e. In terms of historic cumulative CO_2 emissions (including LULUCF), the United States of America has produced the most global CO_2 emissions to date, followed by China and the European Union (Appendix Figure 10). By contrast, India, the Least Developed Countries and the African Union have only produced a minor share of historic cumulative emissions, despite being highly populous countries and regions. A swathe of countries with high per capita and historic emitters have still to peak in their emissions, including the Russian Federation and the United States of America, which this year returned to growth.



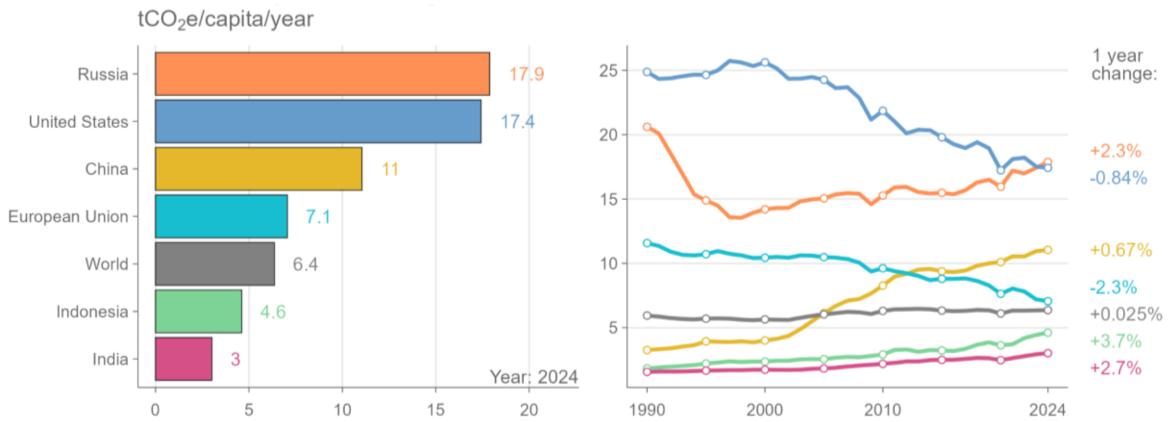


Figure 2.4: Total and per capita greenhouse gas emissions of the top six emitters. Sources: Crippa et al. (2025), World Bank (2025). Emissions from land use change (LULUCF) are excluded. **Note to reviewers: country names will be updated in line with United Nations official country names.**

Box 3: Transparency in national greenhouse gas emissions reporting

At the the twenty-fourth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP24) in Katowice, countries agreed to submit Biennial Transparency Reports (BTRs) by December 31, 2024. These were to contain, among other documents, a set of Common Reporting Tables (CRTs) with the national greenhouse gas inventory of each country. Annex I countries have been submitting national inventories in a similar format for many years, but for many other countries the BTRs have led to substantially improved emissions data gathering under the agreement.

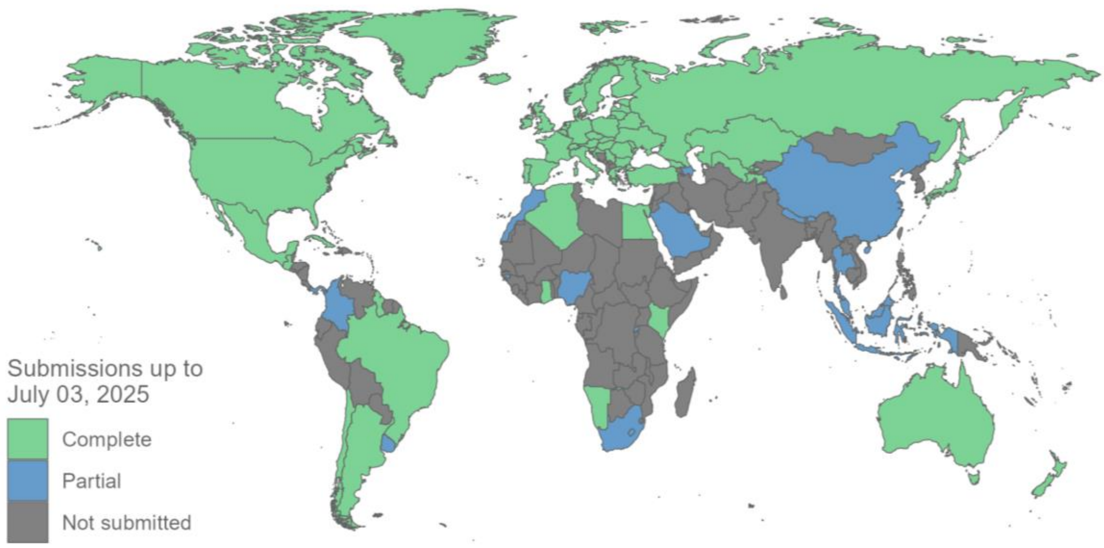


Figure 2.5: Completeness of Common Reporting Tables in the first Biennial Transparency Reports. ***Please note that this is a draft version; the map will be revised according to UN guidelines.***

As of July 3rd, 83 countries have submitted a CRT with their BTR (Figure 2.5). Of these, 61 CRTs are complete in that they cover the period 1990 to 2021 across the full scope of gases and sectors under the Paris Agreement. While least developed countries and small island developing states may choose to submit BTRs at their discretion, 8 have done so (Cuba, Guinea-Bissau, Guyana, Maldives, Mauritius, Nepal, Rwanda and Singapore).

By contrast, many countries have yet to provide either partial or complete CRTs. Among the high emitters these include India, while China reported just 3 years of data. A further 6 countries submitted CRTs, but did so with inconsistent, missing or incorrectly formatted data (Lamb, 2025). It should also be noted that the United States of America failed to submit a National Inventory Report in 2025, which is an obligation for Annex I countries under the agreement.

The BTRs offer a first step towards a harmonised, transparent and timely global approach to emissions reporting, which is instrumental for informing national pledges and tracking progress towards them. Nonetheless, further improvements in reporting are required before a complete assessment of global emissions based on the inventories can be made.

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Technical Appendix

Uncertainties and methodological choices

Uncertainties in emissions estimates are reported following the IPCC AR6 Working Group III assessment of ±8% for fossil CO2, ±70% for LULUCF CO2, ±30% for CH4 and F-gases, ±60% for N2O (Dhakal et al., 2022). Reflecting these uncertainties, global emissions estimates are rounded to the first decimal place of billions of tons of CO2 equivalent, while current national emissions estimates are reported to three significant figures in millions of tons of CO2 equivalent. Rates of change are reported to the first decimal place and fractions are rounded to the nearest 1. Chapter 2 follows a territorial-based accounting of emissions (i.e. emissions are allocated to the sectors and nations where they occur) unless otherwise noted. The latest years of emissions data should be treated as preliminary - particularly in the case of LULUCF CO2 and non-CO2 GHG emissions - due to the use of provisional methodologies based on available activity data. Emissions are generally reported up to 2024. However, due to data limitations, this is not possible for inventory-based LULUCF CO2.

Comparison of estimates to previous Emissions Gap Reports

The EDGAR and the Global Carbon Budget datasets are updated on a yearly basis using the latest available statistical information. These updates not only add additional years of data as it becomes available, but they also apply revisions to previously published data. This implies changes compared to prior reporting in the Emissions Gap Report, as summarized in Table 2 for the year 2019. While differences can be substantial, particularly for non-Fossil CO_2 emissions, they all lie within the standard uncertainty ranges used by Chapter 2.

$GtCO_2e$	**Emissions Gap Report 2022**	**Emissions Gap Report 2023**	**Emissions Gap Report 2024**	**Emissions Gap Report 2025**
GHG	56.4±5.4	56.9±5.6	55.9±5.5	54.6±5.1
Fossil CO_2	38±3	37.8±3	38.1±3	38±3

LULUCF CO_2 (Bookkeeping)	3.8±2.7	4.6±3.2	4.6±3.2	3.79±2.7
LULUCF CO_2 (Inventory)	-1.9±-1.3	-2.4±-1.7	-2.8±-2	-3.55±-2.5
CH_4	10.6±3.2	10.5±3.2	9.3±2.8	8.95±2.7
N_2O	2.6±1.6	2.6±1.5	2.5±1.5	2.49±1.5
F-gases	1.4±0.42	1.4±0.42	1.4±0.42	1.41±0.4

Appendix Table 1: Emissions in 2019 as reported in previous Emissions Gap Reports

On the use of national inventories versus third party emissions data

Chapter 2 of the Emissions Gap Report provides estimates of greenhouse gases up to one year prior to publication (this year: up to 2024). One of the challenges in providing this timely update is that national emissions inventories (hereafter ‘inventories’) are not usually available for the prior year at the time of publication. The National Inventory Reports (NIRs), published by Annex I countries, and the Biennial Transparency Reports (BTRs), published by all countries, typically include emissions up to two years prior. In addition, submitted BTRs are not always complete in terms of gases, sectors and years, or are simply not available for all countries (see Box 3 in Chapter 2).

As a result, the analysis in Chapter 2 relies on third-party data to track global, national and sectoral emissions. Table 2 describes a selection of third-party datasets. The choice of EDGAR as the primary dataset for GHG emissions in Chapter 2 reflects its comprehensive coverage of gases and timely update schedule, which can provide estimates for the prior year at the time of publication.

Besides the timing of inventories and third-party data releases, a key consideration is data quality. It can be argued that compared to third-party data, inventories often use more detailed methodologies and can apply country-specific emissions factors, reflecting considerable national investments in data gathering and analysis. This may especially be the case for Annex I countries, which have accumulated significant experience in reporting inventories. It should be noted that the EDGAR database used in this chapter is predominantly based on Tier 1 emission factors, whereas inventories often use more detailed Tier 2 or Tier 3 emission factors. On the other hand, a number of studies have found that inventories tend to diverge from top-down atmospheric inversions of CH_4 emissions, indicating that further improvements are needed in specific sectors such as agriculture, waste and fossil fuel production (Deng et al., 2022; Janardanan et al., 2024; Scarpelli et al., 2022; Tibrewal et al., 2024).

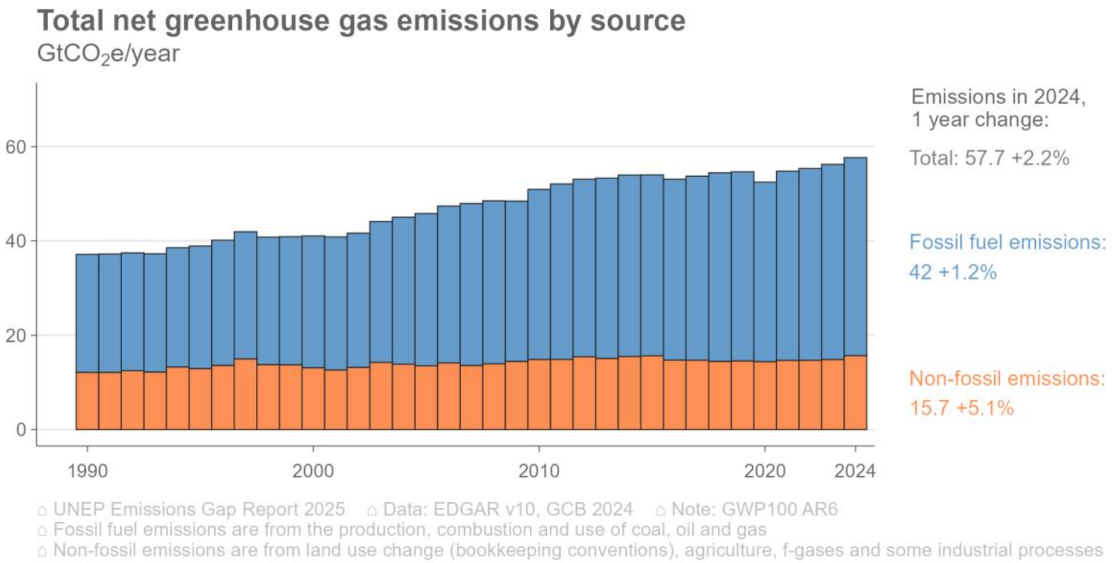
Dataset name	Version	Gases	Time period	Link
Emissions Database for Global Atmospheric Research (EDGAR)	10	CO_2-FFI, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	1970-2024	https://edgar.jrc.ec.europa.eu/
Potsdam Real-time Integrated Model for probabilistic Assessment of emissions Paths (PRIMAP)	2.6.1	CO_2-FFI, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3	1750-2023	https://zenodo.org/records/15016289
Community Emissions Data System (CEDS)	2025.03.18	CO_2-FFI, CH_4, N_2O	1970-2023	https://zenodo.org/records/15059443
Global Carbon Budget (GCB)	2024	CO_2-FFI, CO_2-LULUCF	1850-2023 (national); 1850-2024 (global)	https://globalcarbonbudget.org/

Appendix Table 2: Overview of selected global datasets of GHG emissions. Note that details are subject to change, as these datasets are in continuous development.

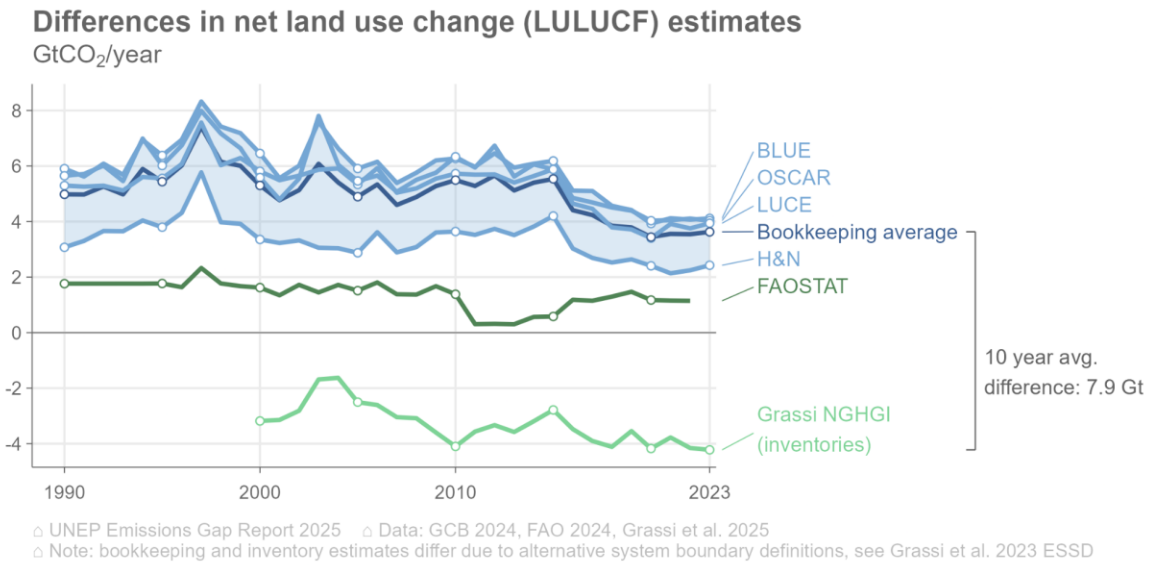
Data and code availability

The code and data used to produce all emissions estimates in this chapter are available here: [Link].

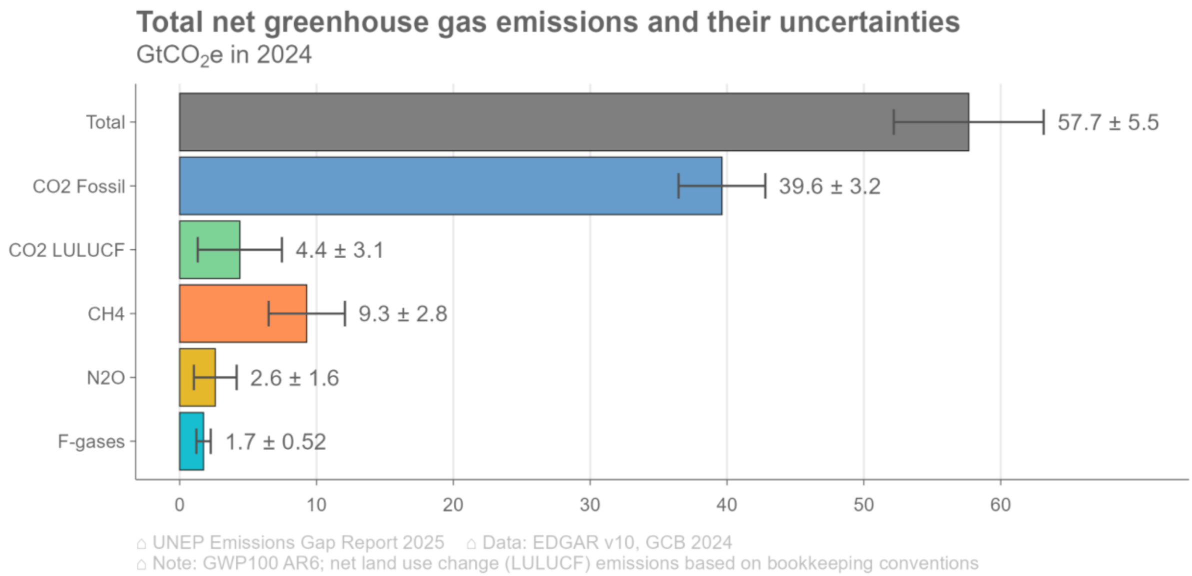
Additional Figures



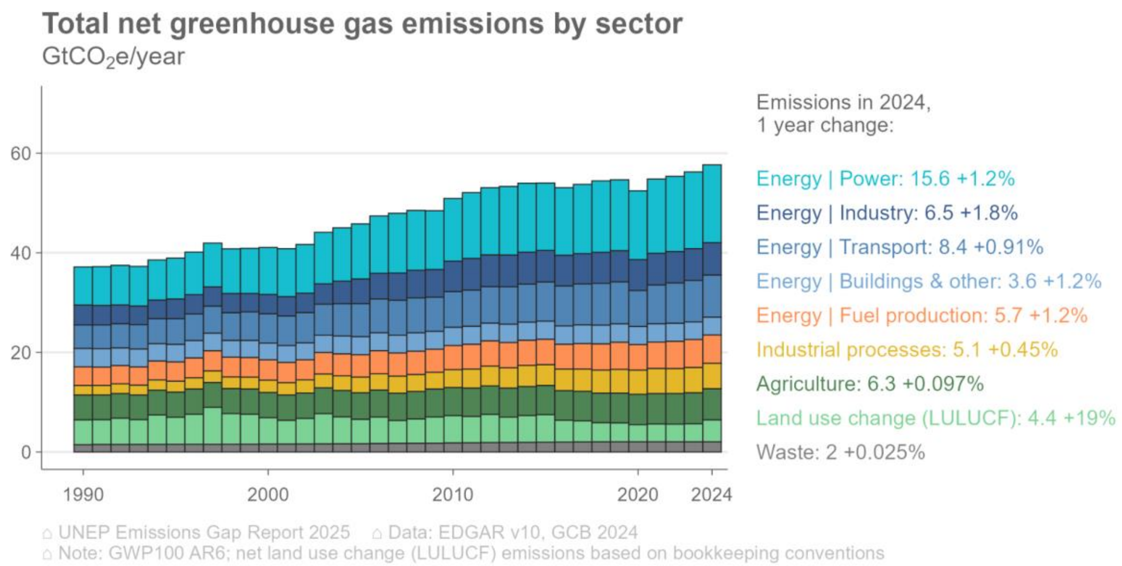
Appendix Figure 1: Total net greenhouse gas emissions by source



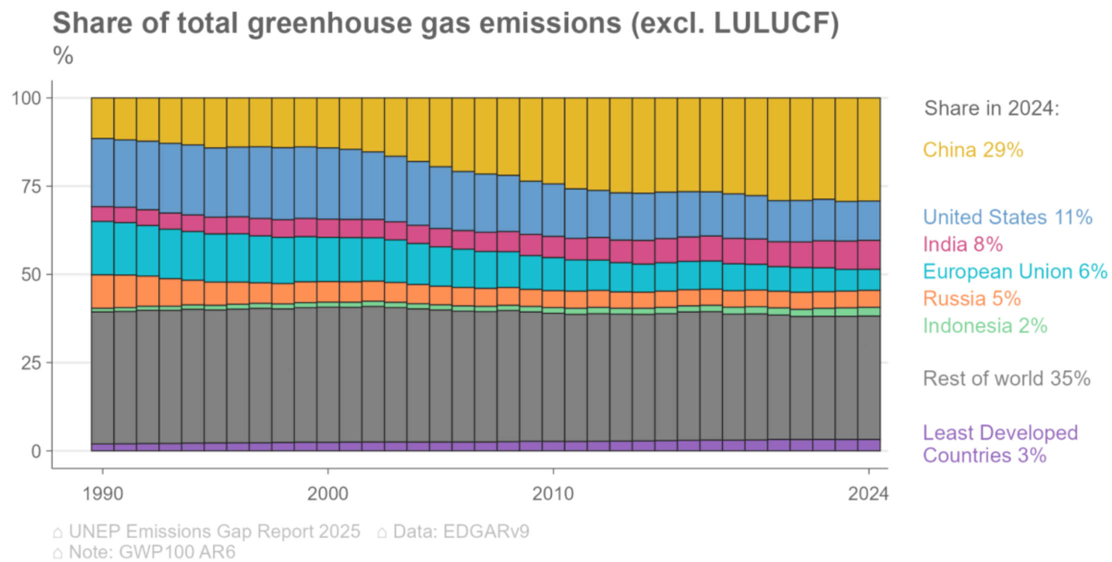
Appendix Figure 2: Differences in net land use change (LULUCF) estimates



Appendix Figure 3: Total net greenhouse gas emissions and their uncertainties

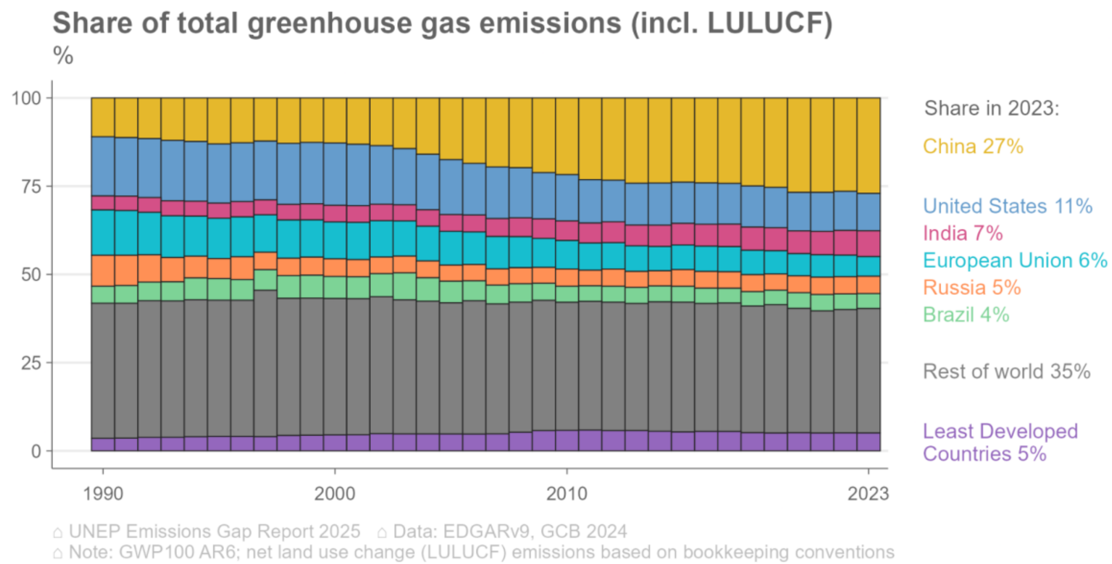


Appendix Figure 4: Total net greenhouse gas emissions by sector.



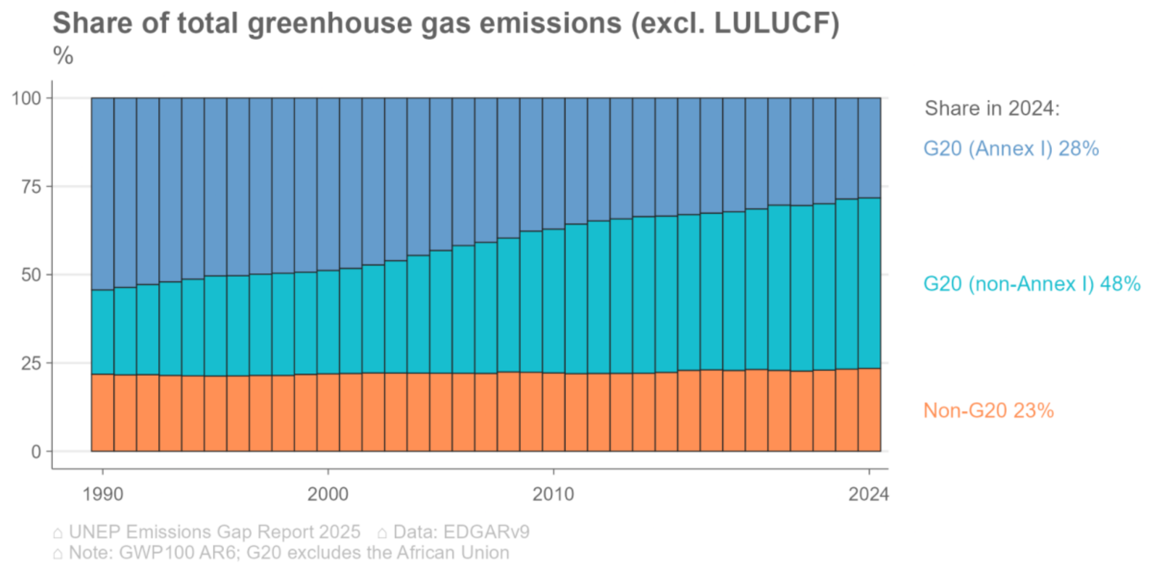
Appendix Figure 6: Share of total greenhouse gas emissions by major emitters, excluding LULUCF

Note to reviewers: country names will be updated in line with United Nations official country names.

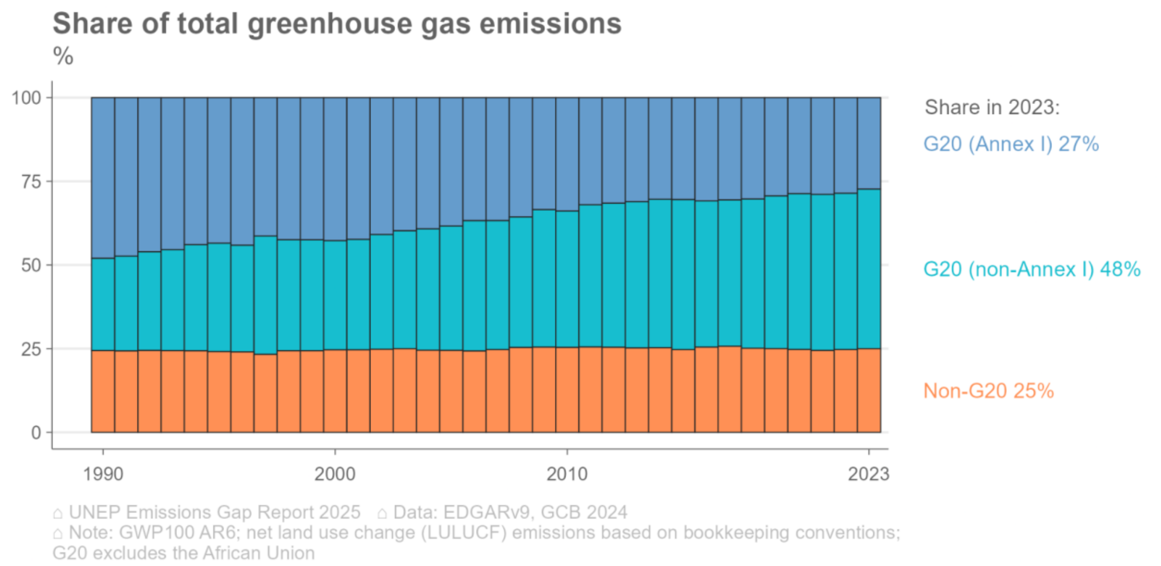


Appendix Figure 7: Share of total greenhouse gas emissions by major emitters, including LULUCF

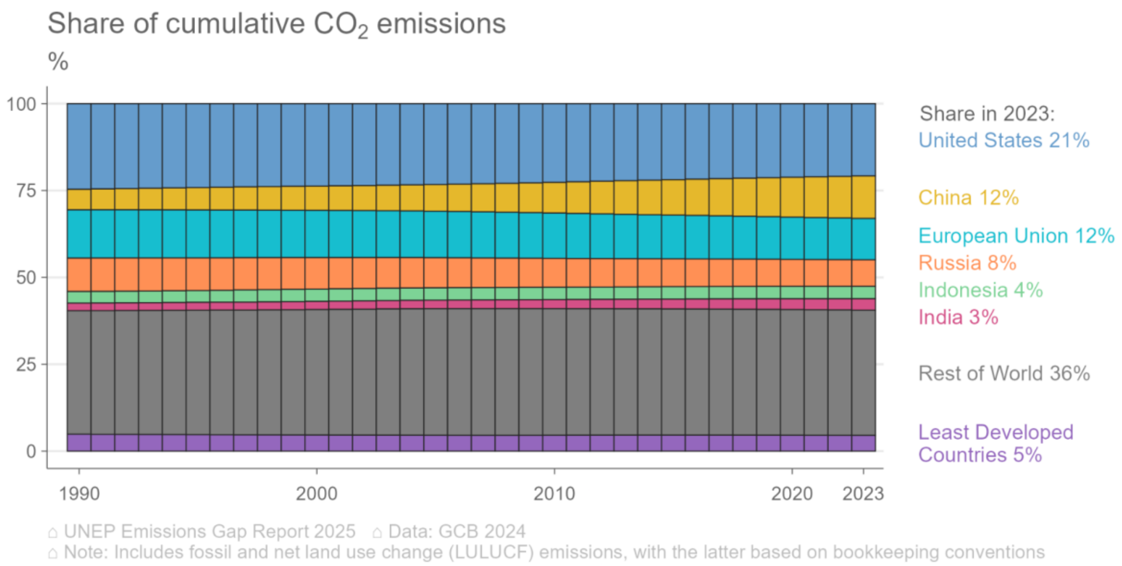
Note to reviewers: country names will be updated in line with United Nations official country names.



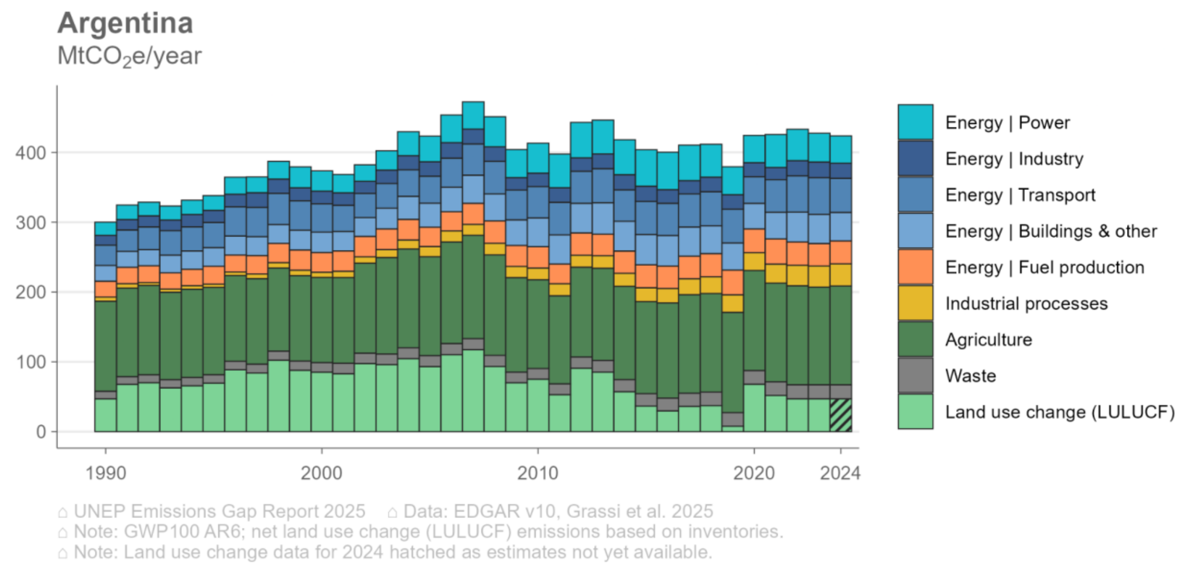
Appendix Figure 8: Share of total greenhouse gas emissions by country category, excluding LULUCF

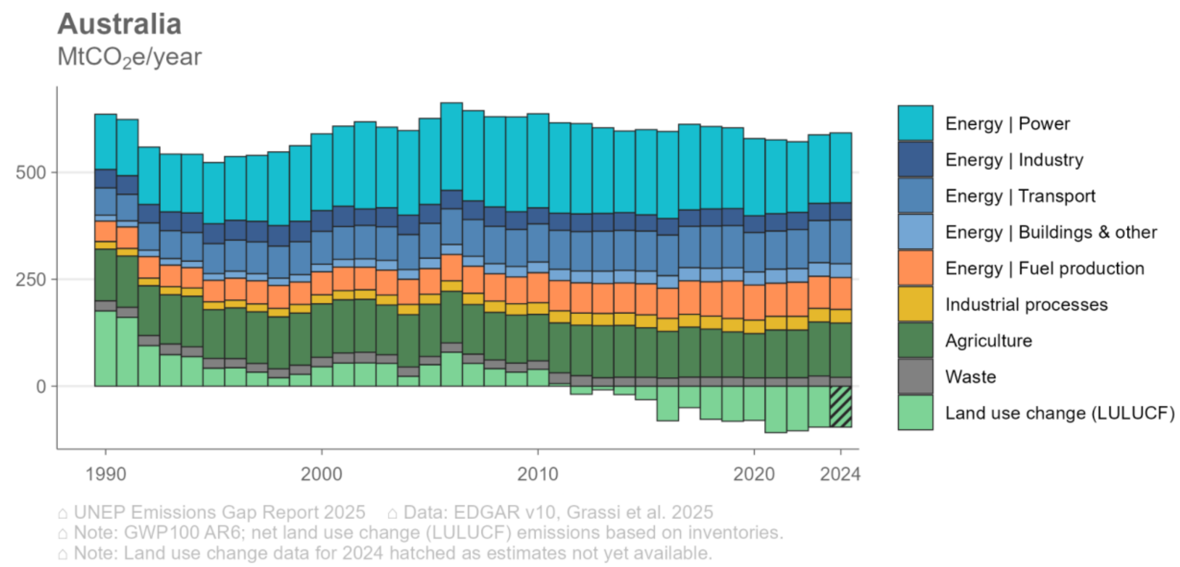


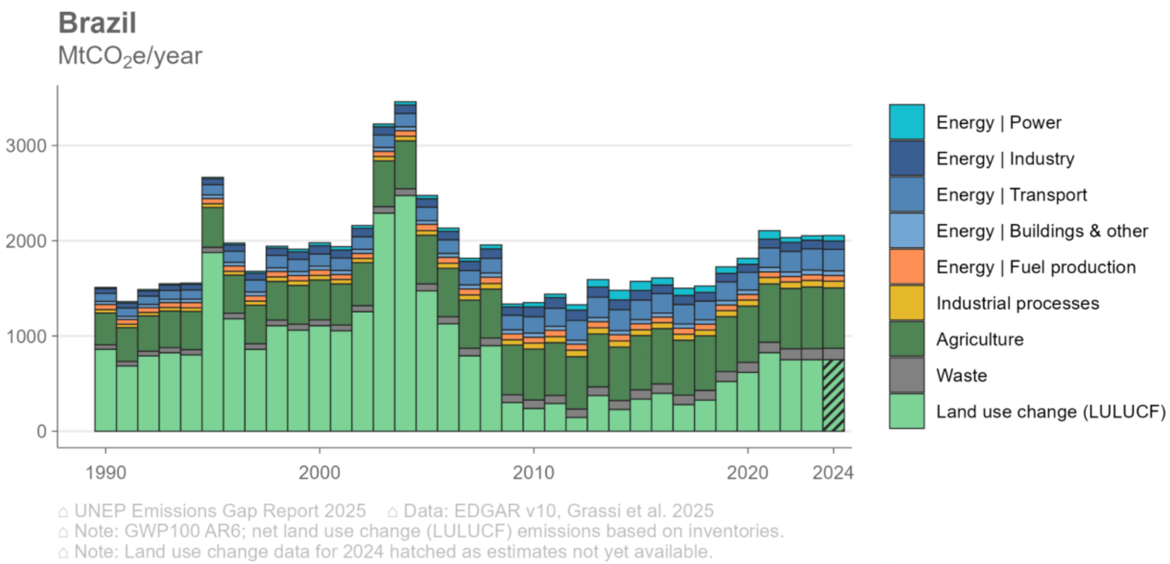
Appendix Figure 9: Share of total greenhouse gas emissions by country category, including LULUCF

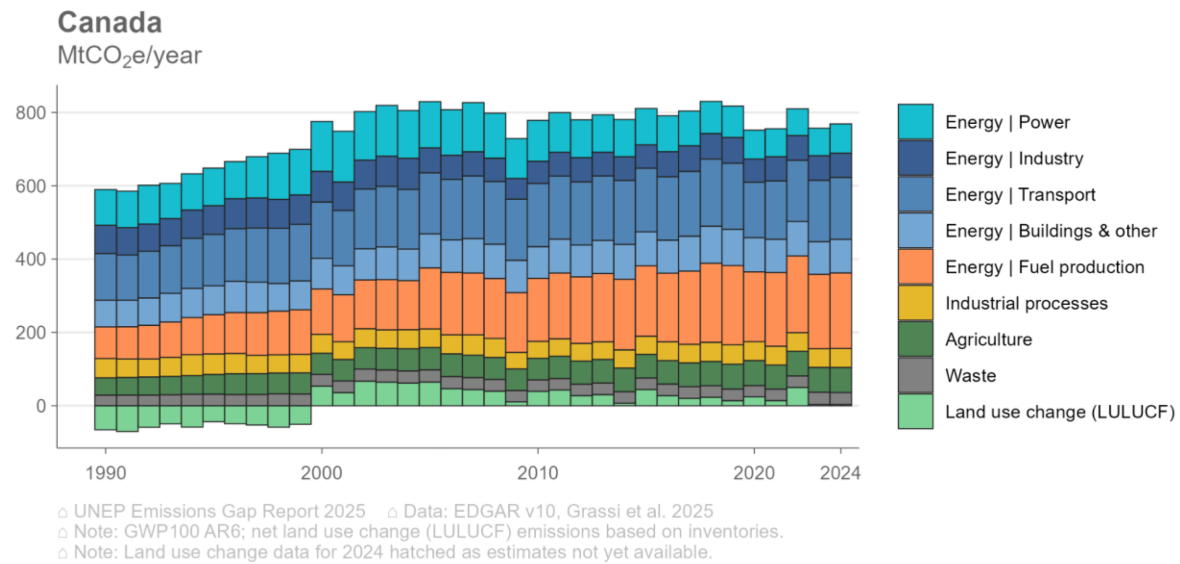


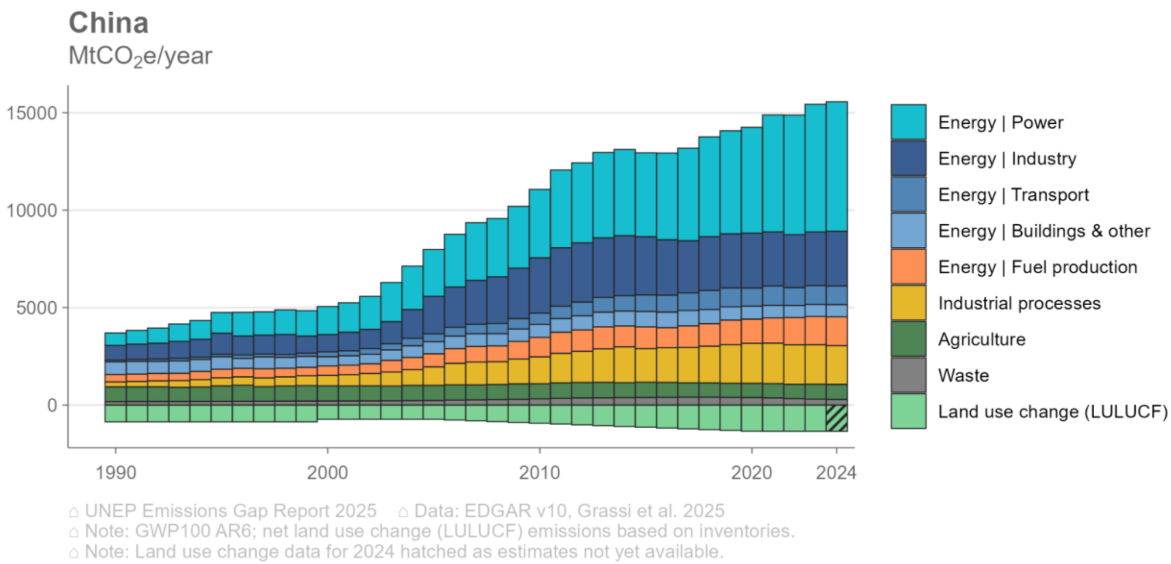
Appendix Figure 10: Share of cumulative CO_2 emissions from 1850 by high emitter, including LULUCF. Note to reviewers: country names will be updated in line with United Nations official country names.

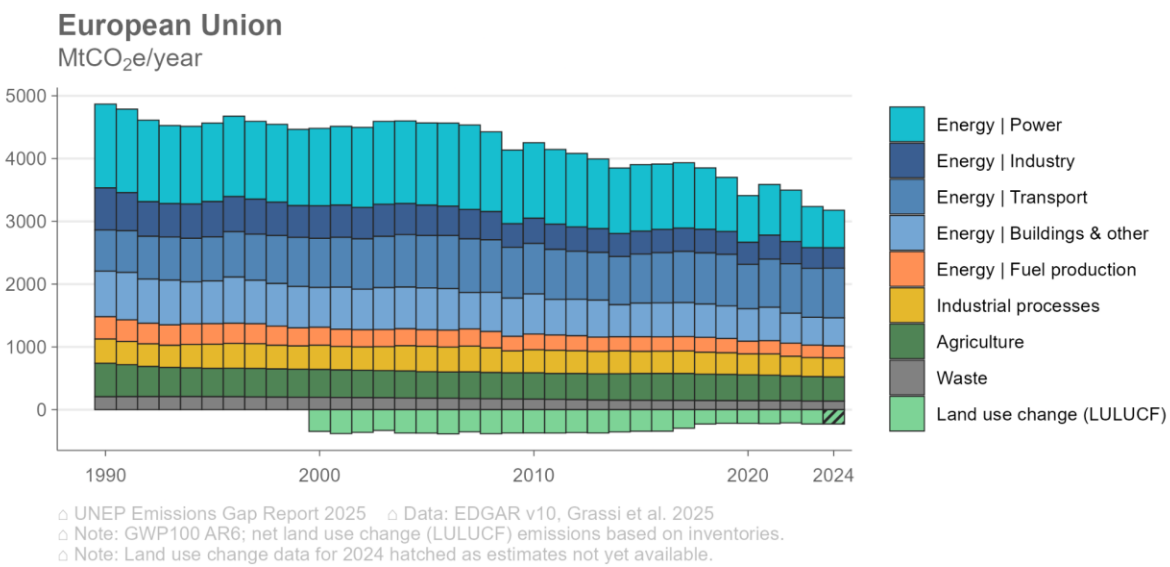

Argentina
MtCO2e/year
400
300
200
100
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.

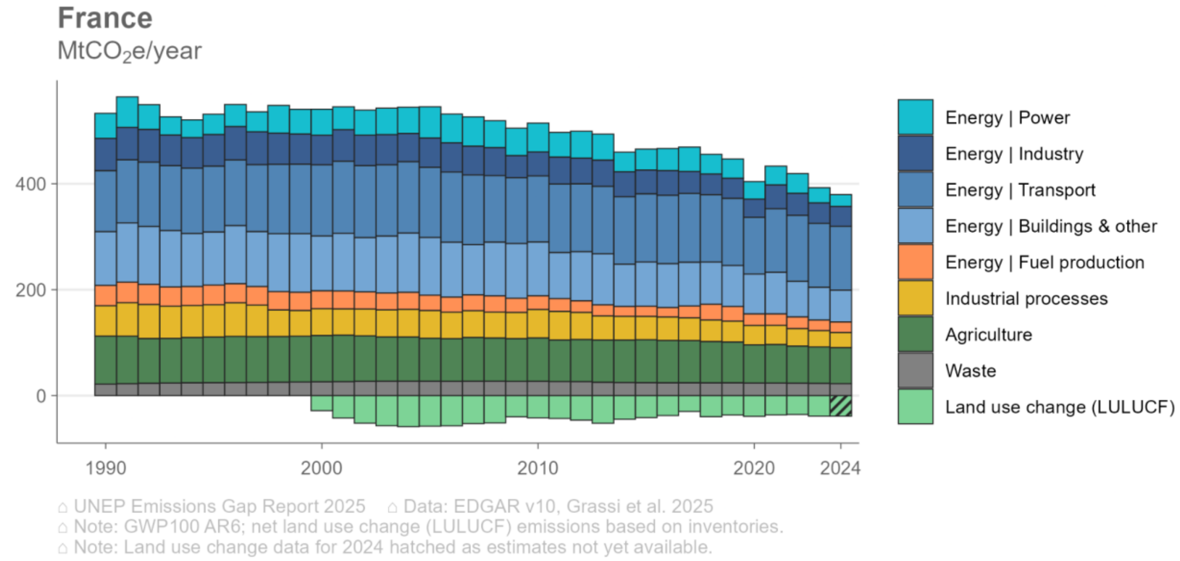

Australia
MtCO2e/year
500
250
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.


Brazil
MtCO2e/year
3000
2000
1000
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.


Canada
MtCO2e/year
800
600
400
200
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.


China
$MtCO_2e$/year
15000
10000
5000
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025 Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.


European Union
$MtCO_2e$/year
5000
4000
3000
2000
1000
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025 Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.


France
MtCO2e/year
400
200
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.

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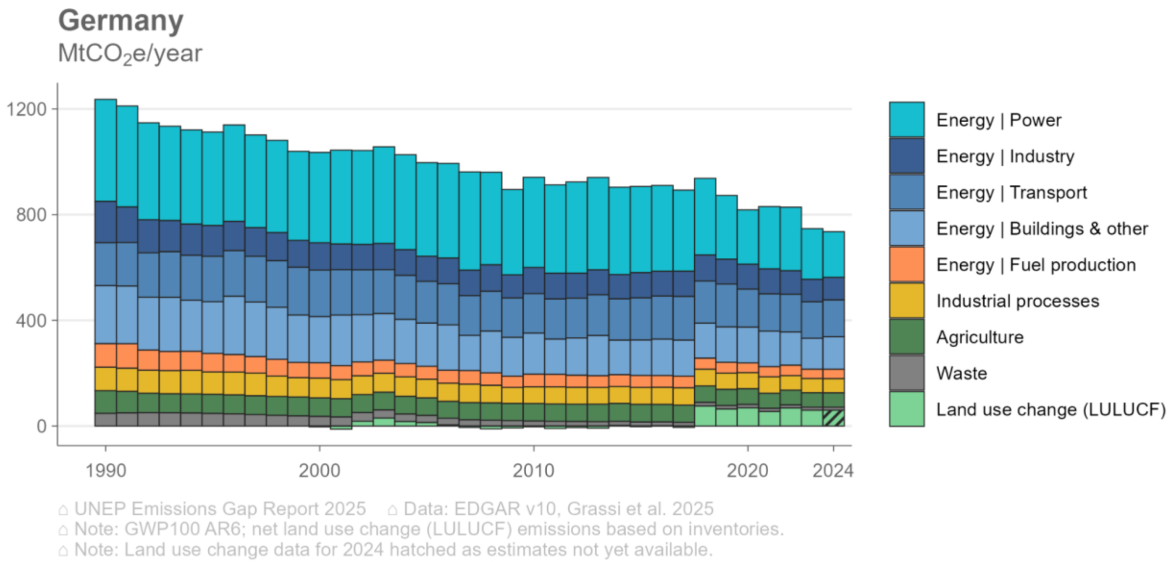
Germany
MtCO2e/year
1200
800
400
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.

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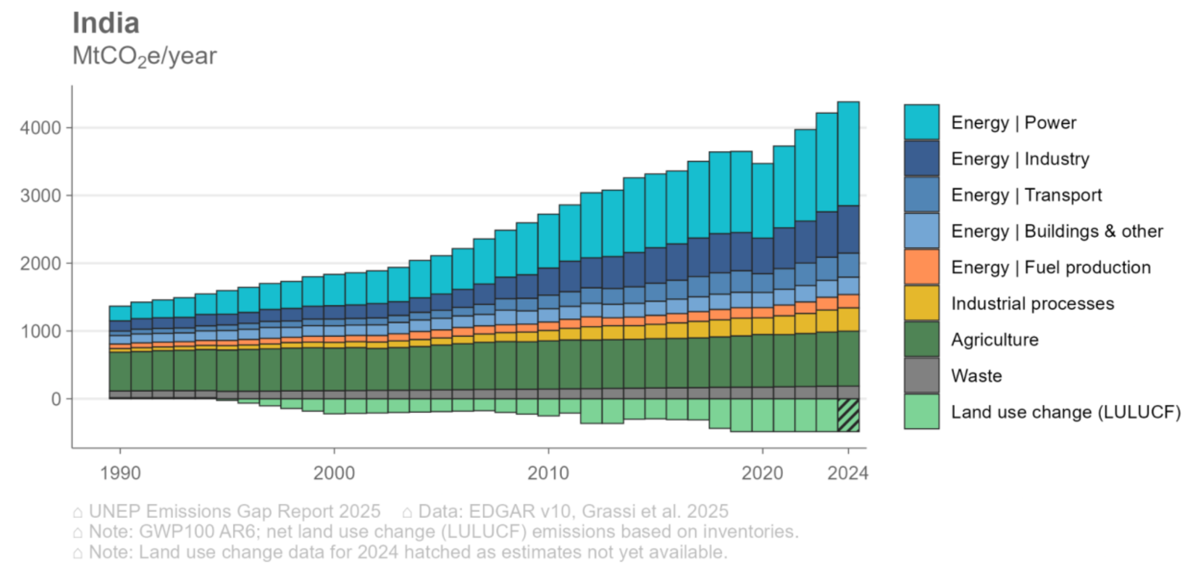
India
MtCO2e/year
4000
3000
2000
1000
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.

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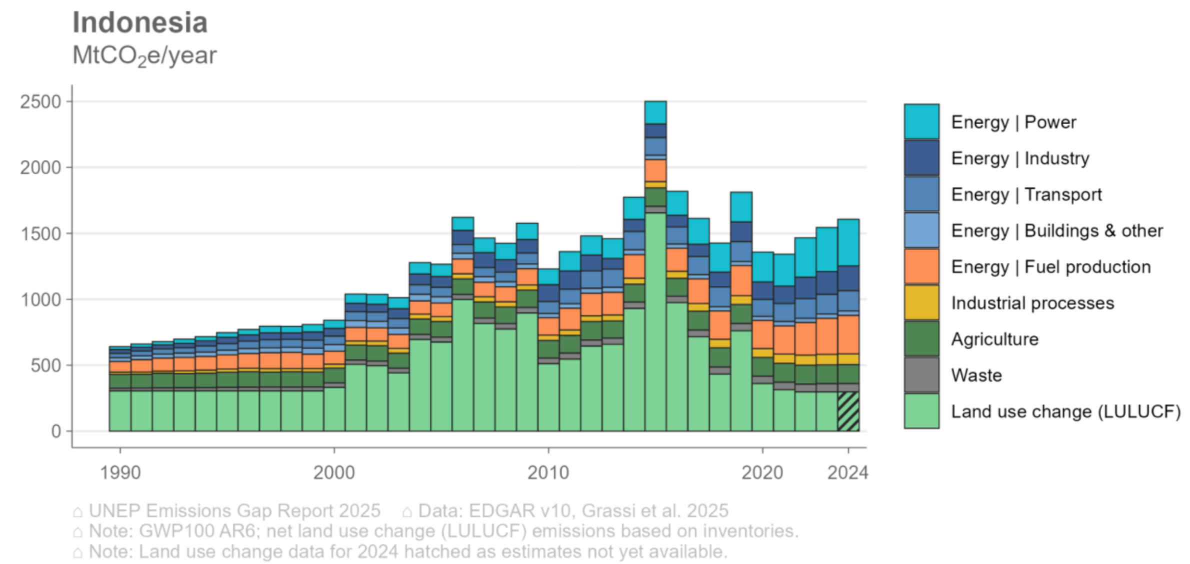
Indonesia
MtCO2e/year
2500
2000
1500
1000
500
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
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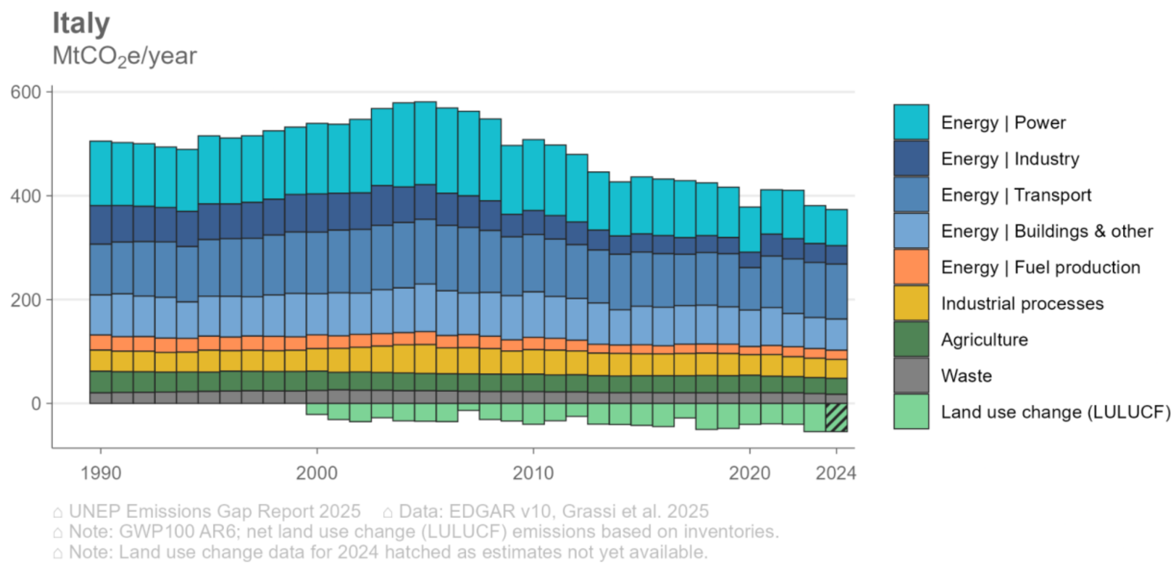
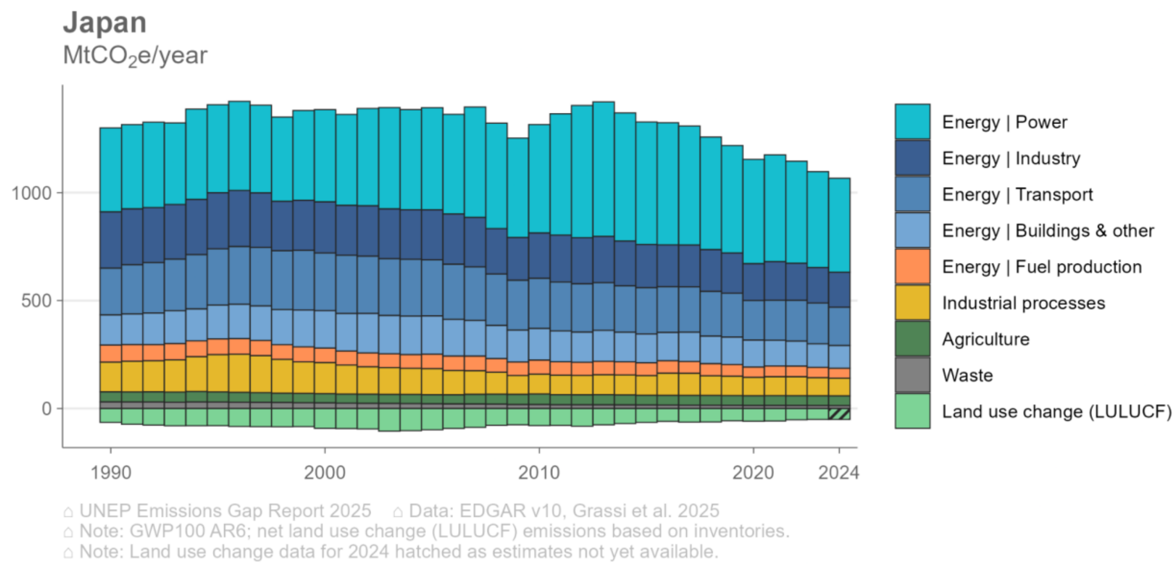
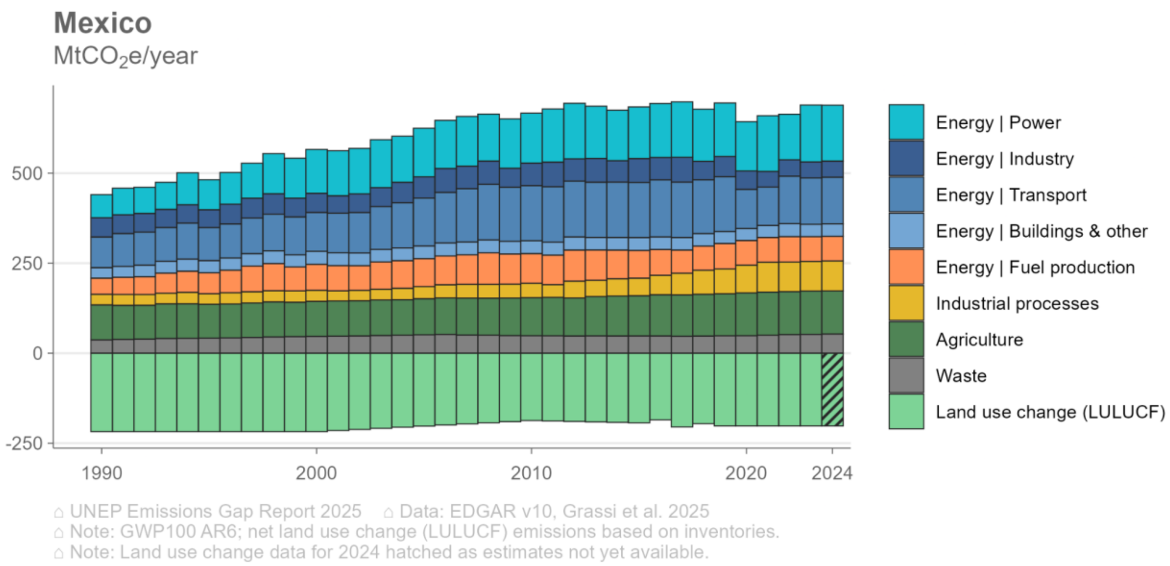
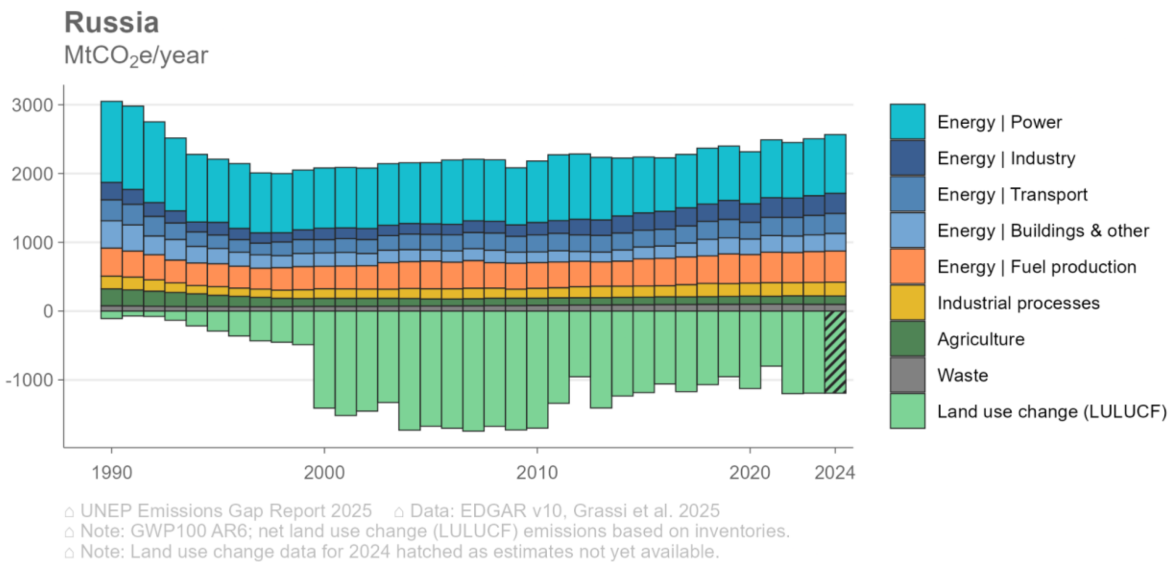
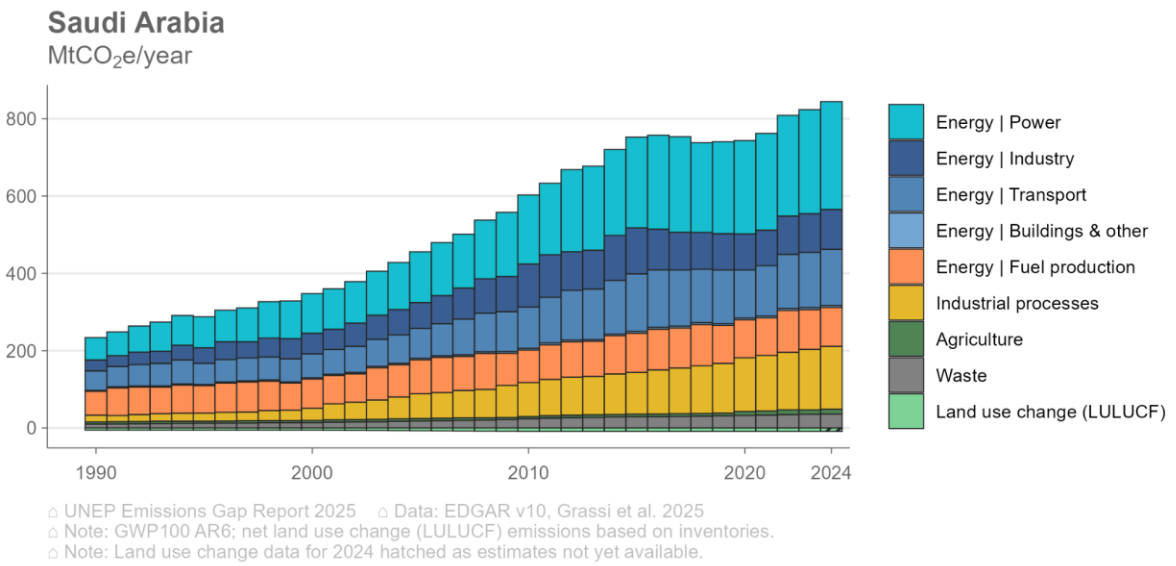

Italy
MtCO2e/year
600
400
200
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.


Japan
MtCO2e/year
1000
500
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.

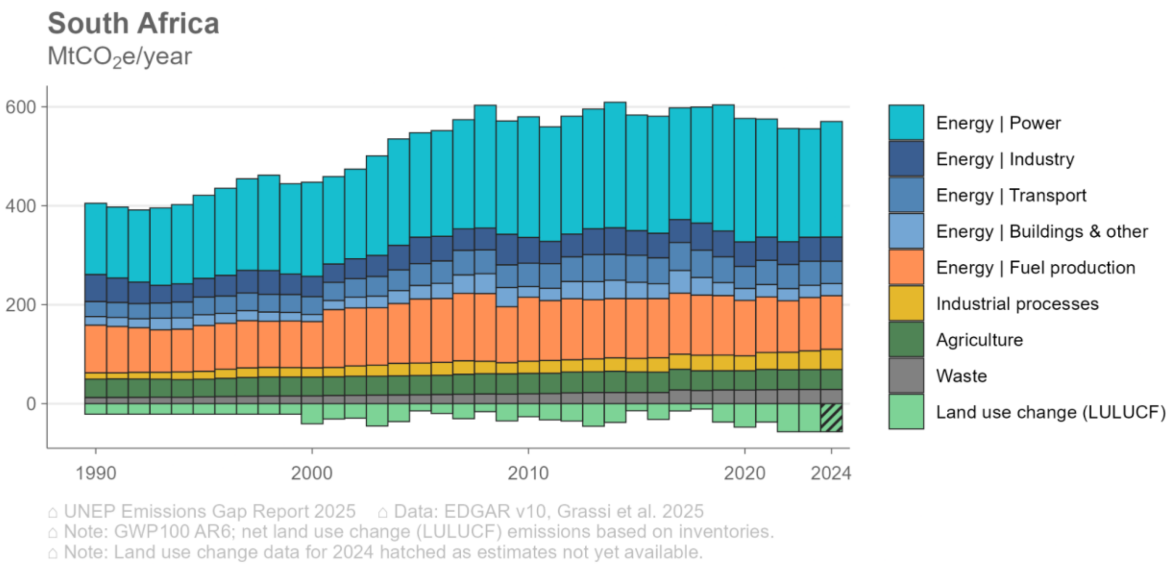




Note to reviewers: country names will be updated in line with United Nations official country names.


Saudi Arabia
MtCO2e/year
800
600
400
200
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
Agriculture
Waste
Land use change (LULUCF)
UNEP Emissions Gap Report 2025
Data: EDGAR v10, Grassi et al. 2025
Note: GWP100 AR6; net land use change (LULUCF) emissions based on inventories.
Note: Land use change data for 2024 hatched as estimates not yet available.

519


South Africa
MtCO2e/year
600
400
200
0
1990
2000
2010
2020
2024
Energy | Power
Energy | Industry
Energy | Transport
Energy | Buildings & other
Energy | Fuel production
Industrial processes
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Land use change (LULUCF)
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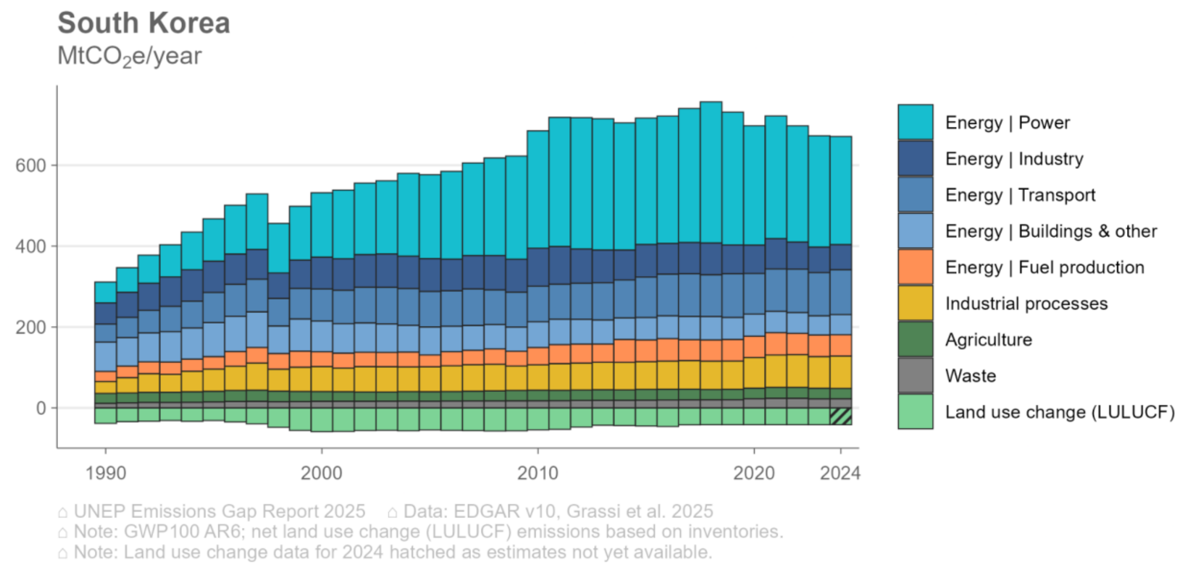
520



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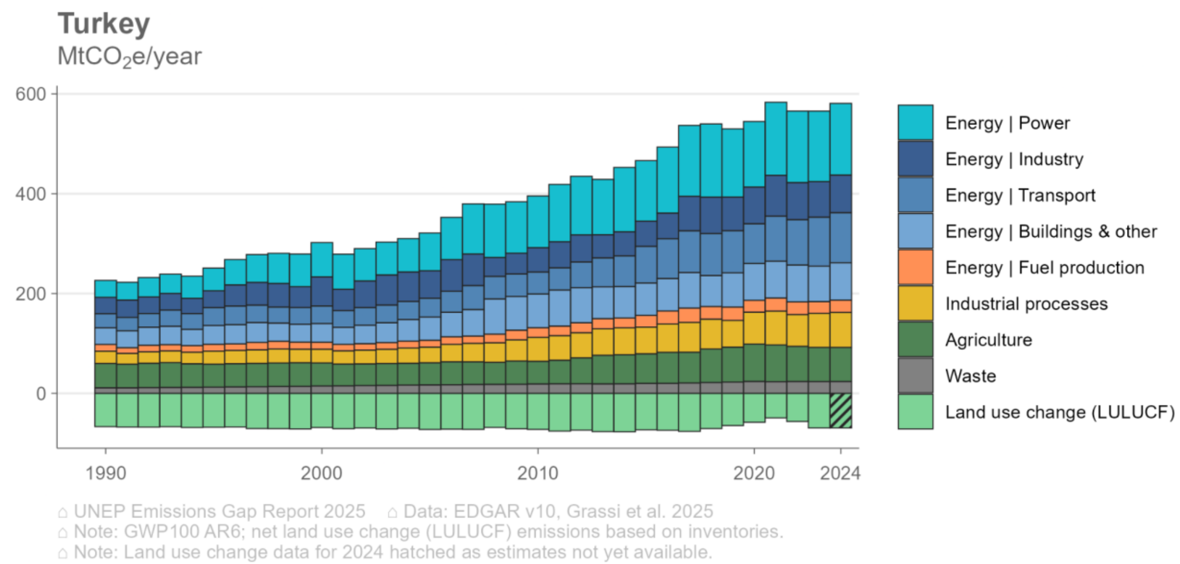

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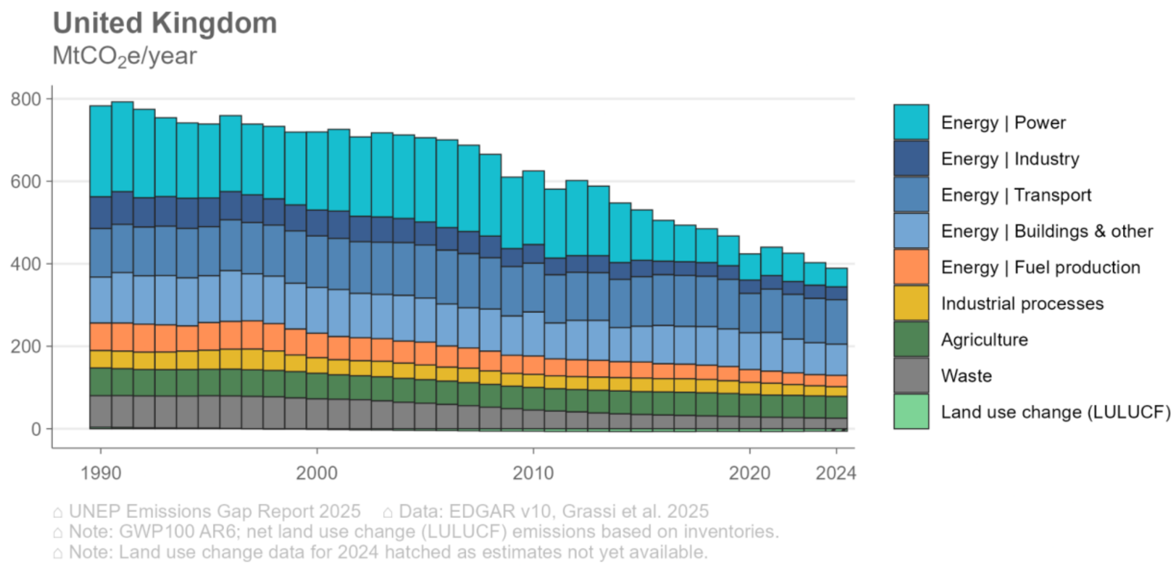

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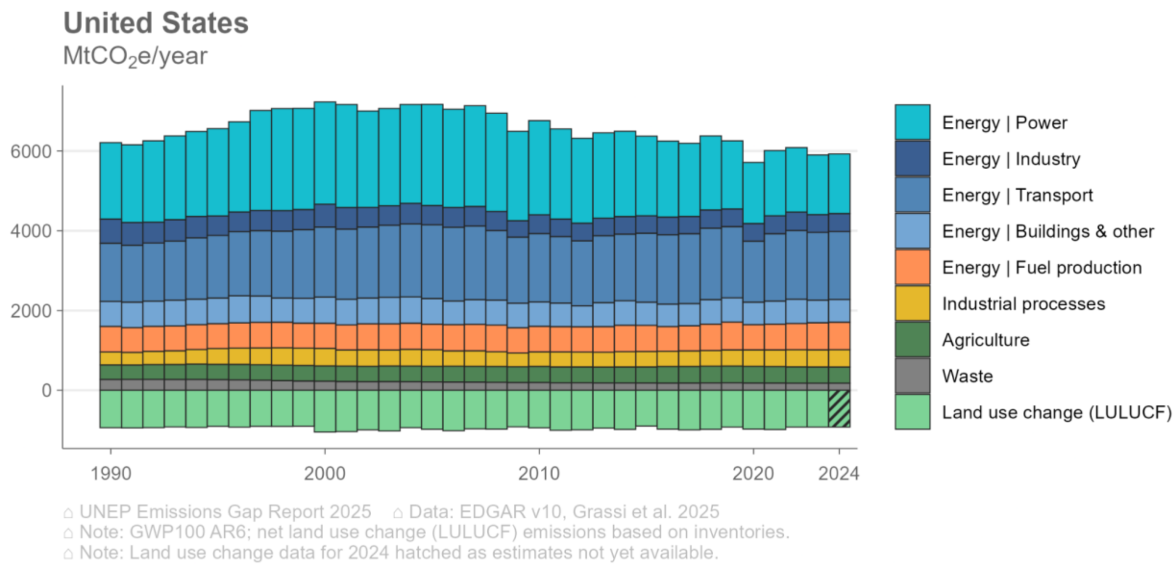

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