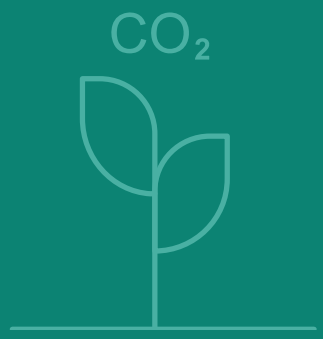
European Environment Agency

8th Environment Action Programme

Greenhouse gas emissions from land use, land use change and forestry in Europe



8TH EAP HEADLINE INDICATOR, 2025

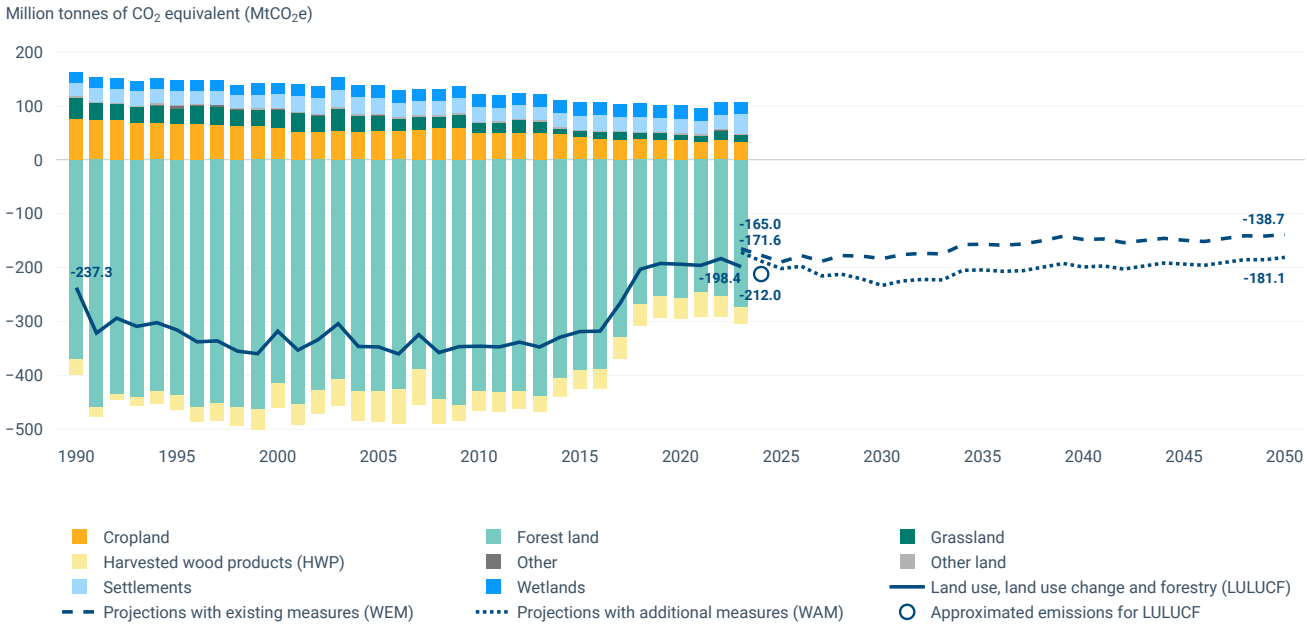
European Environment Agency

Greenhouse gas emissions from land use, land use change and forestry in Europe

Published 06 Nov 2025

The land use, land use change and forestry (LULUCF) sector plays a key role in achieving the EU's goal of net zero emissions by 2050. LULUCF activities removed net 198 million tonnes of CO_2 equivalent ($MtCO_2e$) from the atmosphere in 2023, equal to 6% of the EU's annual greenhouse gas emissions. Removals are estimated to have increased to $212MtCO_2e$ in 2024. The LULUCF Regulation set an EU-level net removal target of $310MtCO_2e$ by 2030. Based on Member States' projections, the current implemented and planned measures will not suffice to meet the target, requiring renewed efforts and further policies to enhance Europe's carbon sink.

Figure 1. EU emissions and removals of the LULUCF sector by main land use category



The European Union aims to be **climate neutral** by 2050, as set out in the European Climate Law. Achieving this depends both on reducing greenhouse gas emissions and increasing CO_2 removals from the atmosphere. The land use, land use change and forestry (LULUCF) sector has the potential to contribute by removing CO_2 from the atmosphere.

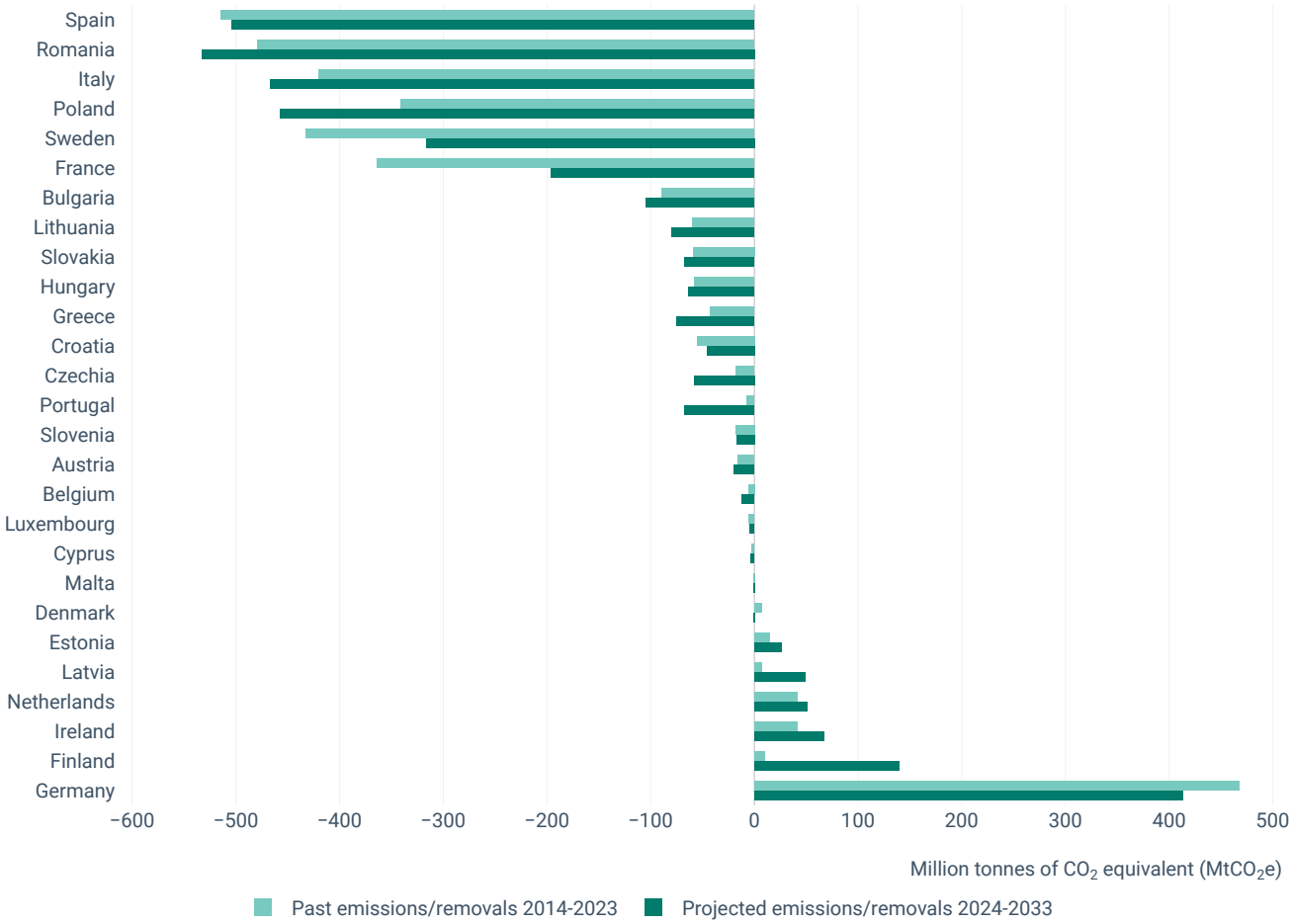
The LULUCF Regulation [1] sets an EU-level **net removal target** of $310MtCO_2e$ by 2030, calculated as a reduction of $42MtCO_2e$ compared to the 2016-2018 EU average, with national targets for each Member State. In 2023, the EU's LULUCF sector accounted for the net removal of $198MtCO_2e$, equal to 6% of the EU's total greenhouse gas emissions and is estimated to have accounted for $-212MtCO_2e$ in 2024. Overall, removals have decreased in the past 10 years, mainly as a result of climate change and natural disturbances impacts on forests, increased harvest of wood as well as lower sequestration of carbon by ageing forests.

Natural disturbances (e.g. wind throws, forest fires, droughts) cause inter-annual variations, and their increasing frequency negatively affects long-term trends. A slower rate of net forest area gain has also contributed to the **reduction** in removals. Cropland, grassland, wetland and settlements are sources of LULUCF emissions at EU level. Soils containing large proportions of organic matter (mainly peat) account for a significant share of these emissions, although such "organic soils" are only found in wetter and colder parts of Europe.

The most recent Member State projections suggest that net removals will decline at EU level from an average of $307MtCO_2e$ per year in 1990-2022 to a level between 160 and $201MtCO_2e$ in 2023-2050, depending on the scenario. The projections show that for 2030, current policies and measures would deliver net removals of $183MtCO_2e$. A removal level of $233MtCO_2e$ by 2030

appears within reach if all Member States' planned additional measures are swiftly implemented. This means at present, the EU 2030 target of 310MtCO_2e is not on track. The target will be difficult to achieve without significantly more ambitious removals measures in the coming years, the effects of which will become more evident in the long term.

Figure 2. Comparison of cumulative historical and projected LULUCF emissions and removals per Member State



Among the EU Member States, Austria, Estonia, Finland, Germany, Ireland, Latvia, Malta and Netherlands experienced positive emissions from LULUCF in 2023. This accounts for 25% of all the EU LULUCF emissions in that year. The remaining Member States contributed with net removals, contributing to approximately 75% of the **EU's LULUCF sink**.

Looking towards 2050, seven Member States (Estonia, Finland, Germany, Ireland, Latvia, Malta and Netherlands) expect to have **positive LULUCF emissions** (20% of EU LULUCF). The remaining Member States all foresee contributing to the carbon sink (80% of EU LULUCF).

Across Europe, Member States are currently applying the LULUCF regulation's requirements to progressively increase the accuracy of LULUCF inventories. Such efforts, while beneficial, may introduce variability in historical data for the Member States.

Supporting information

Definition

Land use categories:

• Forest land: land areas covered by forests and woody vegetation as defined by the national forest definition. Forest land areas can be temporarily without trees if harvest or storms occurred and if trees will re-grow on this land area.

• Cropland: cropped land including orchards, vineyards or agro-forestry systems if the woody vegetation falls below the thresholds of the national forest definition.

• Grassland: rangelands, pastures or grassland. Woody vegetation on grassland is included if the woody vegetation falls below the thresholds of the national forest definition.

• Wetlands: areas covered or saturated by water for all or part of the year such as peatlands or water reservoirs.

• Settlements: areas with human settlements or infrastructure.

• Other lands: bare soil, rock, ice and land that does not fall in the other categories above.

CO_2 equivalent:

There are three greenhouse gases relevant for the LULUCF sector: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2 equivalent is a common unit that allows these different gases to be added up based on their warming potential. Following the IPCC 5th Assessment report and as agreed for the Paris Agreement, 1 tonne CH_4 = 28 tonne CO_2 equivalent, 1 tonne N_2O = 265 tonne CO_2 equivalent and 1 tonne CO_2 = 1 tonne CO_2 equivalent.

Organic soils and mineral soils:

Organic soils are soils with a high carbon content while the rest is mineral soils. In the EU only 8% of the soils are organic soils according to the GHG inventories. Due to the higher carbon content, organic soils have generally higher emissions than mineral soils.

Methodology

Methodology for indicator calculation

Historical and projected emissions estimates from all 27 EU Member States and aggregated for the EU-27 were obtained from the publicly available databases published by the EEA based on official submissions by the Member States.

For individual Member State emissions and removals, the cumulative 10-year LULUCF total for 2013-2022 and the projected 10-year LULUCF total for 2023-2032 for the 'with existing measures' scenario are shown.

The latest available version of the historical inventory and projected emissions were used to compile the indicator, but it should be noted that this may introduce slight inconsistencies between the historical and projected emissions, if projections for some Member States are not based on the latest inventory data submitted and recalculations have been made.

Methodology for gap filling

No methodology for gap filling has been specified.

Policy/environmental relevance

This indicator is a headline indicator for monitoring progress towards the 8th Environment Action Programme (8th EAP). It contributes mainly to monitoring aspects of the 8th EAP priority objective Article 2a. that shall be met by 2030: 'swift and predictable reduction of greenhouse gas emissions and, at the same time, enhancement of removals by natural sinks in the Union to attain the 2030 greenhouse gas emission reduction target as laid down in Regulation (EU) 2021/1119[2], in line with the Union's climate and environment objectives, whilst ensuring a just transition that leaves no one behind;' (EU, 2022). For the purposes of the 8th EAP monitoring framework, this indicator assesses specifically whether the EU will 'increase net GHG removals by carbon sinks from the LULUCF sector to -310 million tonnes CO_2 equivalent by 2030' (EC, 2022).

Accuracy and uncertainties

No uncertainties have been specified.

Data sources and providers

- Total GHG emissions and removals in the EU, European Environment Agency (EEA)
- Greenhouse gas inventory and GHG projections, European Environment Agency (EEA)

Metadata

DPSIR

State

Topics

Climate change mitigation # Land use # Forests and forestry

Tags

CLIM057 # 8th EAP # Land use # LULUCF # Land use change # Trends and projections

Temporal coverage

1990-2050

Geographic coverage

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

Typology

Policy-effectiveness indicator (Type D)

UN SDGs

SDG13: Climate action

Unit of measure

Million tonnes of CO_2 equivalent ($MtCO_2e$)

Frequency of dissemination

Once a year

References and footnotes

1. EU, 2023, Regulation (EU) 2023/839 of the European Parliament and of the Council of 19 April 2023 amending Regulation (EU) 2018/841 as regards the scope, simplifying the reporting and compliance rules, and setting out the targets of the Member States for 2030, and Regulation (EU) 2018/1999 as regards improvement in monitoring, reporting, tracking of progress and review
2. EU, 2021, Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), OJ L 243, 9.7.2021, p. 1-17., Regulation (EU) 2021/1119