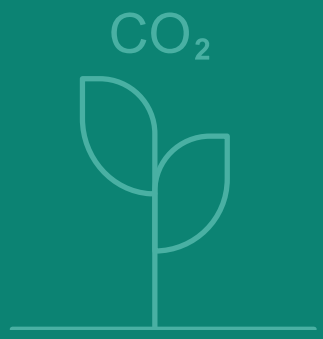
European Environment Agency

8th Environment Action Programme

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



8TH EAP HEADLINE INDICATOR, 2024

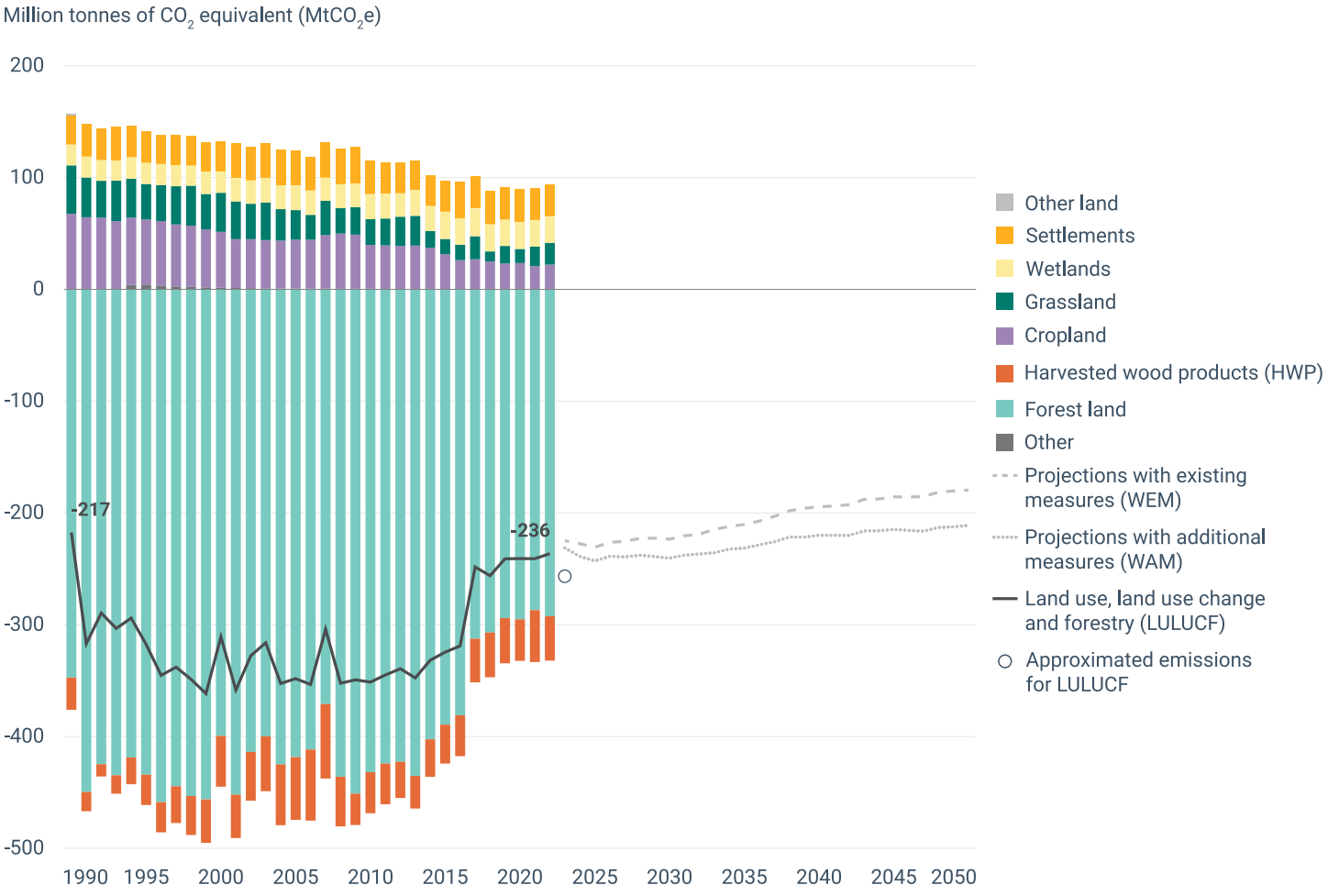
European Environment Agency

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

Published 31 Oct 2024

The land use, land use change and forestry (LULUCF) sector plays a key role in achieving the European Union's goal of zero net emissions by 2050. LULUCF activities removed net 236 million tonnes of CO_2 equivalent ($MtCO_2e$) from the atmosphere in 2022, equal to 7% of the EU's annual greenhouse gas emissions. Removals are estimated to have grown to 257$MtCO_2e$ in 2023. The LULUCF Regulation sets an EU-level net removal target of an additional 42$MtCO_2e$ by 2030, as compared to the 2016-2018 average. Based on Member State projections submitted, this target will not be met. Projections that include planned additional measures foresee a reduction in removals compared with the 2016-2018 average. The 2024 update of National energy and climate plans is expected to contribute to bridging the gap toward the target.

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



The EU aims to be **climate neutral** by 2050, as set out in the European Climate Law. Achieving this depends on reducing greenhouse gas emissions, and on 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 an additional 42MtCO_2e by 2030 as compared to the 2016-2018 average. In 2024, this is reported to be removals of 274MtCO_2e. In 2022, the EU's LULUCF sector accounted for the net removal of 236MtCO_2e, equal to 7% of the EU's total greenhouse gas emissions and it is estimated to account for 257MtCO_2e in 2023. Overall, removals have decreased in the past 10 years, mainly as a result of increased harvesting of wood and lower sequestration of carbon by ageing forests.

Natural disturbances (e.g. wind throws, forest fires, droughts) cause inter-annual variations, and their increasing frequency has been negatively affecting long-term trends. A decreased 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 large proportion of these emissions, although such "organic soils" are only found in wetter and colder parts of Europe.

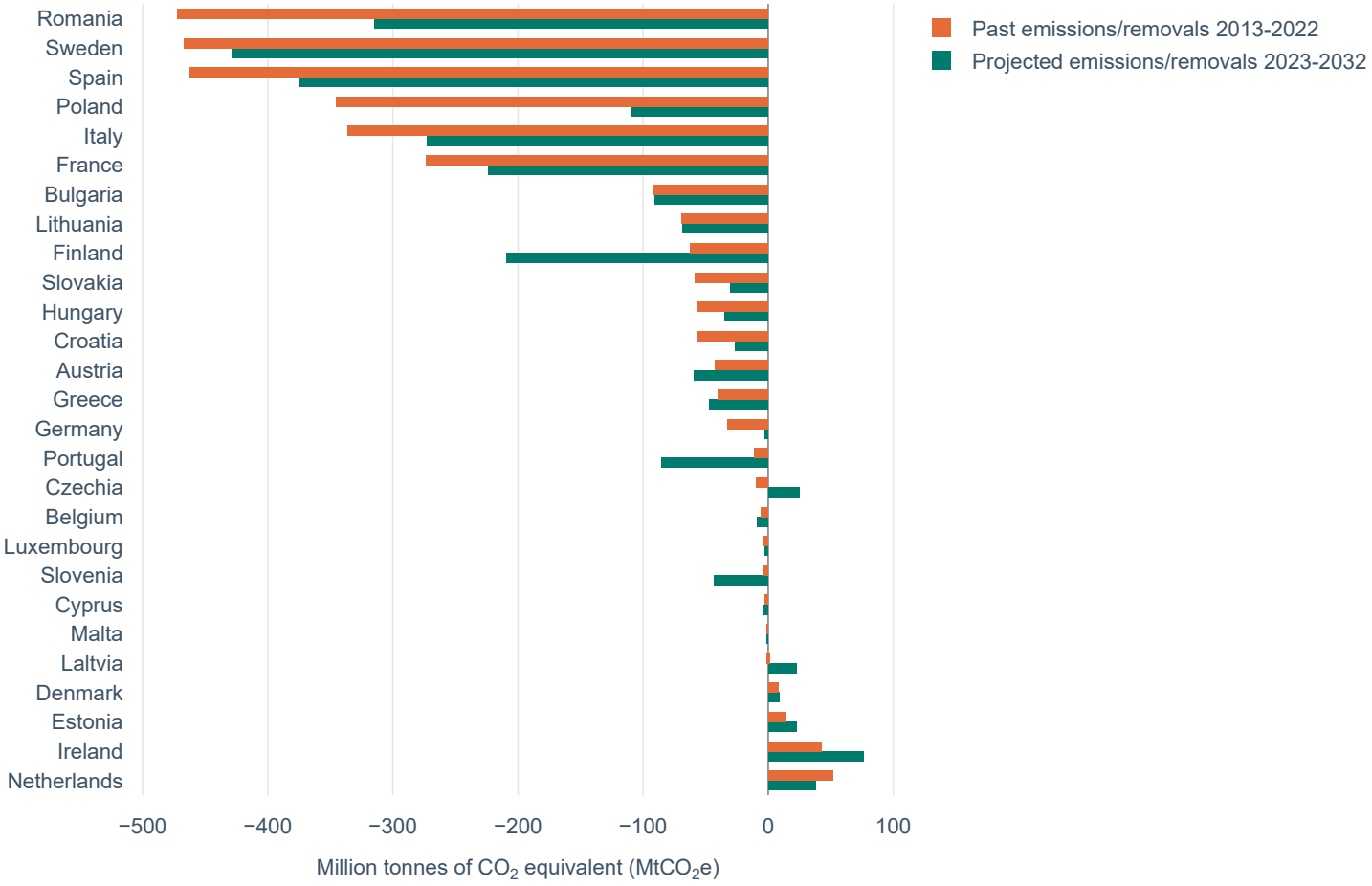
Member State projections submitted in 2023 and 2024 suggest that net removals will decrease at EU level, from an average of 315MtCO_2e per year in 1990-2021 to 206MtCO_2e in 2022-2050 with existing measures. Additional measures reported by Member States are expected to increase average net removals in 2022-2050 (by 10% compared to existing measures scenario). Projections show that 2030 net removals of 224MtCO_2e are expected with existing measures and 240MtCO_2e with planned additional measures. This means at present, the EU is **not on track** to meet the 2030 net removal target of additional 42MtCO_2e compared to the 2016-2018 average.

The combination of less carbon sequestration in forests as they age, increased harvesting levels, faster decomposition of dead organic matter in ecosystems driven by higher temperatures and other climate change impacts make it challenging to increase carbon stocks and **reverse the current trend.**

Discounting preliminary 2023 data, the last 10-year trend has consistently pointed in the **wrong direction**. There is, therefore, a need to both reverse the trend as well as to accelerate in the right direction. This requires significantly more ambitious removal measures to be implemented in the coming years.

Measures with additional mitigation potential are increased afforestation, decreased deforestation, improved forest management, reduced harvesting levels, rewetting of drained soils with a high carbon content such as peatlands, improved crop rotation and improved grassland management. The challenge for many measures is the time lag between when a mitigation measure is implemented and the results.

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



Among the EU Member States, Romania, Sweden, Spain, Italy, Poland, and France were responsible for the **largest** cumulative net removals from the LULUCF sector in the past 10 years, contributing to approximately 85% of the EU's LULUCF sink. Although these countries are expected to remain large contributors, all project a reduction in removals in the coming decade.

However, Austria, Belgium, Cyprus, Finland, Greece, Netherlands, Portugal and Slovenia project increasing cumulative removals in the next decade. The LULUCF sectors in Denmark, Estonia, Ireland, Latvia, Malta and the Netherlands were a **net source** of emissions in the past decade and are projected to remain so in the coming decade. Czechia which had net cumulative removals in the past decade is projected to have net emissions in the coming decade.

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_2equivalent. 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_2equivalent, 1 tonne N_2O = 265 tonne CO_2equivalent and 1 tonne CO_2 = 1 tonne CO_2equivalent.

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

- National emissions reported to the UNFCCC and to the EU under the Governance Regulation, April 2024, 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
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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
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