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Piecing together the jigsaw: Forests in the EU's Fit for 55 Package

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Abstract

This article considers the intricate regulatory jigsaw of forest governance that has emerged from the Fit for 55 Package. It focuses on the 2023 revision of the Land Use, Land-use Change and Forestry Regulation, the treatment of forest biomass in the 2023 Renewables Directive, and Regulation on carbon removals and carbon farming. The article explores the interconnections between these instruments, their relationship with other relevant EU Law instrument, and their projected impacts. Recognising the evolving nature of law and policy in this area, we offer an initial assessment of this regulatory jigsaw, highlighting the challenges of balancing the cultural, economic, social, political, and scientific considerations intersecting in EU forest governance.

1 | INTRODUCTION

Parties to the Paris Agreement are committed to achieve 'a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century.'[1] Forests are essential to achieve this balance,[2] but regulating emissions and removals in this sector is particularly challenging. The forest sector is influenced by complex and often competing societal interests, including the provision of food, fuel, recreation, cultural heritage, and biodiversity. Additionally, it encompasses activities with the potential to function both as sources and sinks of greenhouse gases (GHGs).[3] The CO_2 absorbed and released by forests arises from the interplay of natural and human-induced processes, which make it difficult to distinguish their respective impacts. The carbon stored in forests is susceptible to release into the atmosphere due to a range of factors, both natural (e.g. wildfires, storms, diseases) and anthropogenic (e.g. logging).[4] This in turn poses risk to the long-term stability of forest carbon sinks.[5]

Globally land use, land use change, and forestry (LULUCF) activities are responsible for approximately 9% of CO_2 emissions, contributing around 5.9 $GtCO_2$ per year in net anthropogenic emissions, mainly from deforestation and land conversion.[6] In the EU, the sector has long been a net carbon sink absorbing approximately −12.5 $GtCO_2$ per year through natural processes like forest regrowth and soil carbon sequestration.[7] Forests are the largest contributors to the EU's carbon sink.[8] However, forest sinks in the EU are dwindling,

[1]Paris Agreement (adopted 12 December 2015, in force 4 November 2016) 3156 UNTS, art 4(1).
[2]IPCC, 'Summary for Policymakers' in PR Shukla et al (eds), 'Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems' (IPCC 2019) 24.
[3]For definitions of the terms 'source' and 'sink' see IPCC (n 2) Annex I.
[4]S Ogle and W Kurz, 'Land-based Emissions' (2021) 11 Nature Climate Change 382, 382–383.
[5]G Grassi et al, 'Science-based Approach for Credible Accounting of Mitigation in Managed Forests' (2018) 13 Carbon Balance and Management 8.
[6]H Lee et al, 'Section 2: 'Current status and trends', in H Lee and J Romero (eds), Climate Change 2023: Synthesis Report (Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Geneva Switzerland) 33, 44.
[7]EEA, 'Greenhouse Gas Emissions from Land Use, Land Use Change and Forestry in Europe' (2024) <www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-land>; IPCC 2023 (n 6) 44.
[8]EEA, 'Annual European Union Greenhouse Gas Inventory 1990–2021 and Inventory Report 2023' (2023) <www.eea.europa.eu//publications/annual-european-union-greenhouse-gas-2>. According to the Annual European Union Greenhouse Gas Inventory 1990–2021 and Inventory Report 2023, the forest land category is a sink in all but two EU Member States, namely Czechia and Estonia.

posing a threat to the EU's long-term climate and biodiversity goals.[9] Projections by the European Environmental Agency (EEA) indicate that net removals in the EU are expected to decrease to 190 million metric tons of CO_2 equivalent by 2030.[10] Some EU Member States have reported significant reductions in their forest carbon sinks, driven by a combination of declining forest growth and higher felling rates, largely due to the demand for wood pulp and biomass.[11] As a result, forest carbon sinks in the EU are becoming increasingly variable, fragile, and sensitive to extreme weather events and human intervention. At the same time, achieving carbon neutrality demands rigorous accounting for these fluctuations and effective management of the associated risks.[12]

Until recently, the forest sector played only a marginal role in EU climate change law and policy, largely due to its inherent complexities. The Fit for 55 Package has dramatically shifted this dynamic by introducing a series of instruments—most notably those addressing the accounting and reporting of emissions from LULUCF activities,[13] the certification of carbon removals,[14] and the regulation of forest biomass use[15]—significantly increasing the scope and sophistication of EU forest governance. This article conceptualises this collection of instruments as a 'jigsaw' and examines their interconnections, their relationship with other relevant EU legal frameworks, and their anticipated impacts. Recognising that policymaking in this area remain in flux, the article concludes with a reflection on the EU's evolving approach to regulating forest emissions and removals, highlighting the role of law in balancing the cultural, economic, social, political, and scientific factors intersecting in forest governance.

2 | THE FOREST JIGSAW

For several years, Member States vigorously resisted the EU's efforts to expand the *acquis* to regulate more pervasively emissions and removals from the forest sector.[16] The Fit for 55 Package has broken new ground and brought about innovations, which were painstakingly and sometimes acrimoniously negotiated. While some national stakeholders have expressed concerns over the EU's increasing influence on Member States' land and forest policies,[17] the EU's regulatory activity in this area was both inevitable and overdue. This is especially true in light of unprecedented global temperature rises, the shrinking window of opportunity to meet the 1.5°C temperature goal set by the Paris Agreement, and the critical need for all sectors to contribute to emission reductions.

As noted above, the Fit for 55 Package has introduced numerous new elements, significantly increasing the complexity of EU forest governance. This complexity is illustrated in Figure 1, which depicts the forest jigsaw.

This jigsaw comprises various interconnected elements. The adoption of Regulation 2018/841 on the inclusion of greenhouse gas emissions and removals from land use, land use change, and forestry in the 2030 climate and energy framework ('2018 LULUCF Regulation')[18] marked the beginning of the shift in the EU's approach to the sector.[19] It established the EU legal framework for *accounting*—i.e. comparing reported emissions and removals with GHG mitigation targets—and *reporting*, which involves documenting changes in emissions and removals in the LULUCF sector over time. The Regulation also laid the foundation for assessing Member States' compliance with these requirements, integrating the LULUCF sector into the EU's climate targets under the Effort Sharing Regulation for the first time.[20]

Like other instruments in the EU's 2030 climate and energy framework, however, the 2018 LULUCF Regulation was revised as part of the Fit for 55 Package.[21] The revised regulation, published in 2023 ('2023 LULUCF Regulation'),[22] aims to create the conditions to ensure that removals from the land use sector contribute more

[9] A Korosuo et al, 'The Role of Forests in the EU Climate Policy: Are We on the Right Track?' (2023) 18 Carbon Balance and Management 1, 10; G Grassi et al, 'Brief on the Role of the Forest-based Bioeconomy in Mitigating Climate Change Through Carbon Storage and Material Substitution' (European Commission 2021) 5; G Forzieri et al, 'Emergent Vulnerability to Climate-driven Disturbances in European Forests' (2021) 12 Nature Communications 7, 7–8.

[10] EEA 2023 (n 8).

[11] FLUXES The European Greenhouse Gas Bulletin, 'Are Carbon Sinks at Risk?' (2022) Integrated Carbon Observation System 1/2022 <www.icos-cp.eu/fluxes>.

[12] Forzieri et al (n 9) 8.

[13] Regulation (EU) 2018/841 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) 525/2013 and Decision 529/2013/EU [2018] OJ L156/1 (2018 LULUCF Regulation).

[14] Commission, 'Proposal for a Regulation of the European Parliament and of the Council establishing a Union certification framework for carbon removals' COM(2022) 672 final, 30 November 2022, 2022/0394 (COD) (Commission proposal for a CRCF Regulation). The European Parliament adopted the final text in April 2024. The Council must now approve the CRCF Regulation before its publication in the Official Journal of the EU.

[15] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources [2018] OJ L328/82 (2018 Renewable Energy Directive). The 2018 Renewable Energy Directive has been amended twice. The latest revision is Directive (EU) 2023/2413 of the European Parliament and of the Council amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 [2023] OJ L2023/2413 (2023 Renewable Energy Directive).

[16] See e.g., A Savaresi and L Perugini, 'The Land Sector in the 2030 EU Climate Change Policy Framework: A Look at The Future (2019) 16 Journal for European Environmental and Planning Law 148; A Savaresi, L Perugini and MV Chiriacò, 'Making Sense of the LULUCF Regulation: Much Ado about Nothing?' (2020) 29 Review of European, Comparative and International Environmental Law 212.

[17] See e.g., Finnish Government, 'New EU Forest Strategy is Partly Stepping Over the Competence of Member States on Forests, Different Aspects of Sustainability Included Better than Anticipated' (Press release, 16 July 2021) <https://valtioneuvosto.fi/en/-//1410837/new-eu-forest-strategy-is-partly-stepping-over-the-competence-ofmember-states-on-forests-different-aspects-of-sustainability-included-better-than-anticipated>; and Louise Guillot, 'Sweden to EU: Hands off Our Forests (Politico, 7 December 2022) <www.politico.eu/article/sweden-un-woke-policy-forest-european-climate-law>.

[18] 2018 LULUCF Regulation (n 13).

[19] Savaresi and Perugini 2019 (n 16); Savaresi, Perugini and Chiriacò (n 16); S Romppanen, 'The LULUCF Regulation: The New Role of Land and Forests in the EU Climate and Policy Framework' (2020) 38 Journal of Energy and Natural Resources Law 261; A Savaresi and L Perugini, 'Balancing Emissions and Removals in the Land Sector: The View from the EU' (2021) 15 Carbon and Climate Law Review 49 ('Savaresi and Perugini 2021a').

[20] Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 [2018] OJ L156/26 (2018 Effort Sharing Regulation).

[21] Commission, 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality' (Communication) COM(2021) 550 final, 14 July 2021.

[22] 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 targets of the Member States for 2030, and Regulation (EU) 2018/1999 as regards improvement in monitoring, reporting, tracking of progress and review [2023] OJ L107/1 (2023 LULUCF Regulation).

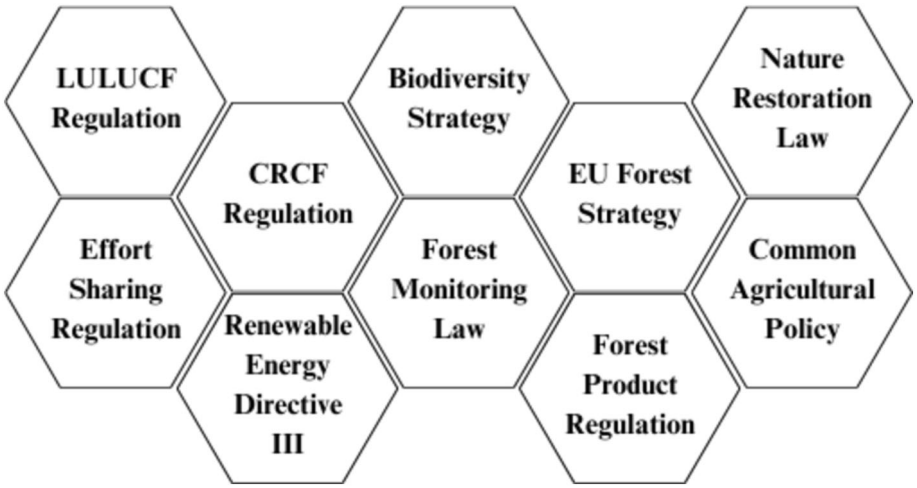

FIGURE 1 The forest jigsaw in the Fit for 55 Package.

robustly to achieving the EU's revised 2030 climate change mitigation target.[23]

The 2023 LULUCF Regulation is not the only component of the Fit for 55 Package that directly addresses the climate impacts of the forest sector. Other key measures are the Regulation establishing a certification framework for carbon removals[24]; and sustainability criteria concerning the use of forest biomass under the 2023 Renewable Energy Directive.[25] Finally, there is a range of instruments that, while not directly addressing climate law and policy, are relevant to the forest sector. These include the Biodiversity Strategy,[26] the Forest Strategy,[27] the Forest Monitoring Law,[28] the Forest Product Regulation,[29] the Nature Restoration Law,[30] and the Common Agricultural Policy.[31] The following sections examine each of these elements in turn. Section 3 focuses on the LULUCF Regulation, highlighting the innovations introduced in its 2023 revision. Sections 4 and 5 examine the Carbon Removals and Carbon Farming Regulation and the treatment of forest biomass under the Renewable Energy Directive, respectively. Section 6 explores the intersections and overlaps between these 'core' instruments and other components of the Fit for 55 Package.

3 | THE LULUCF REGULATION

Accounting for and reporting anthropogenic emissions and removals in the forest sector is notoriously challenging. Research points to complexities in calculating CO_2 emissions due to discrepancies between the models used in IPCC assessment reports and national greenhouse gas inventories.[32] These differences largely stem from how forest CO_2 fluxes are categorised, and can significantly affect estimates of the global carbon budget and evaluations of progress towards net-zero.[33] As a result of this complexity, the development of rules and methodologies for accounting and reporting emissions and removals in the land use sector has been protracted at both international[34] and EU levels.[35]

The 2018 LULUCF Regulation linked LULUCF with the other sectors regulated under the Effort Sharing Regulation (ESR). The ESR assigns each EU Member State a specific target for reducing GHG emissions by 2030 for sectors outside the scope of the EU Emissions Trading System, such as domestic transport (excluding aviation), buildings, agriculture, small industry, and waste. LULUCF debits and credits contribute, to a limited extent, to achieving the emission reduction targets set by the ESR for the 2020–2030 decade.[36]

The 2018 Regulation drew criticism for not including explicit provisions preventing Member States from reducing their carbon sinks

[23]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 [2021] OJ L243/1 (European Climate Law).
[24]Commission proposal for a CRCF Regulation (n 14).
[25]2023 Renewable Energy Directive.
[26]Commission, 'EU Biodiversity Strategy for 2030. Bringing nature back into our lives' (Communication) COM(2020) 380 final, 20 May 2020.
[27]Commission, 'New EU Forest Strategy for 2030' (Communication) COM(2021) 572 final, 16 July 2021.
[28]Commission, 'Proposal for a Regulation of the European Parliament and of the Council on a monitoring framework for resilient European forests' COM(2023) 728 final, 22 November 2023, 2023/0413 (COD).
[29]Regulation (EU) 2023/1115 of the European Parliament and of the Council of 31 May 2023 on the making available on the Union market and the export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010 [2023] OJ L150/206 (Forest Product Regulation).
[30]Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 on nature restoration and amending Regulation (EU) 2022/869 [2024] OJ L2024/1991.
[31]Consolidated text: Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) No 1305/2013 and (EU) No 1307/2013 [2021] OJ L435 (02021R2115–20,240,525).
[32]G Grassi et al, 'Harmonising the Land-use Flux Estimates of Global Models and National Inventories for 2000–2020' (2023) 15 Earth System Science Data 1093; G Grassi et al, 'Critical Adjustment of Land Mitigation Pathways for Assessing Countries' Climate Progress' (2021) 11 Nature Climate Change 425.
[33]Grassi et al 2023 (n 32) 1100–1102.
[34]See e.g., K Dooley and A Gupta, 'Governing by Expertise: The Contested Politics of (Accounting for) Land-based Mitigation in a New Climate Agreement' (2017) 17 International Environmental Agreements: Politics, Law and Economics 483; J Krug, 'Accounting of GHG Emissions and Removals from Forest Management: A Long Road from Kyoto to Paris' (2018) 13 Carbon Balance and Management 1; A Savaresi and L Perugini, 'Article 5: Sinks, Reservoirs of GHGs and Forests' in G van Calster and L Reins (eds), *The Paris Agreement on Climate Change: A Commentary* (Edward Elgar Publishing 2021) 133 (Savaresi and Perugini 2021b).
[35]Savaresi and Perugini 2019 (n 16); Savaresi, Perugini and Chiriacò (n 16); Romppanen 2020 (n 19); Savaresi and Perugini 2021a (n 19).
[36]For discussion, see S Romppanen, 'Targets, Timetables and Effort Sharing as Governance Tools: Emergence, Scope and Ambition' in T Rayner et al (eds), *Handbook on European Union Climate Change Policy and Politics* (Edward Elgar Publishing 2023) 216.

and for lacking sufficient incentives to enhance them.[37] The 2023 LULUCF Regulation was introduced to address the reduction in the EU forest carbon sink and encourage Member States to improve their forest management practices.[38] The forest sector will as a result play a crucial role in achieving the EU's 2030 mitigation target of reducing net greenhouse gas emissions by at least 55%, and ultimately, reaching climate neutrality by 2050.[39] To achieve these objectives, the 2023 LULUCF Regulation has, for the first time, established an EU-wide target for the LULUCF sector, along with binding targets for each EU Member State.[40] Specifically, the 2023 Regulation introduced an EU-wide target for achieving 310 Mt CO_2eq of net removals by 2030.[41] This target is, however, controversial. According to some scholars, the target is rather modest, compared with the mitigation potential of the EU's sink.[42] According to others, the EU should not have relied on the LULUCF sector at all, prioritising reducing emissions in other sectors instead.[43]

Meanwhile, the gradual implementation of the reforms introduced by the 2023 LULUCF Regulation means that different rules will apply across two distinct compliance periods. During the first period (2021–2025), the rules from the 2018 LULUCF Regulation will largely remain in place, with only minor adjustments. In the second period (2026–2030), substantially revised accounting rules will be applied. The following sections review the key aspects of the rules applicable in each compliance period.

3.1 | The first compliance period (2021–2025)

The 2018 LULUCF Regulation introduced the so-called 'no-debit rule', which mandates that EU emissions from the LULUCF sector should not exceed removals, ensuring that the sector does not become a net source of GHG emissions.[44] The rule did not prevent Member States from decreasing their GHG sinks, nor did it provide incentives to actively enhance them.[45] However, the growing importance of removals in meeting the EU's revised emission reduction target under the Fit for 55 Package prompted a reconsideration of the no-debit rule. The rule will be phased out in the second compliance period and replaced by specific targets for both the EU as a whole and individual Member States.

3.1.1 | Accounting rules and the forest reference levels

In the first compliance period, emissions and removals are accounted for, based on six land use categories: afforested land, deforested land, managed cropland, managed grassland, managed forest land, and managed wetland.[46] However, the latter should only be accounted for, if a Member State has notified the Commission of its intention to include managed wetland in the scope of its LULUCF activities.[47] Member States can exclude from their accounts emissions and removals caused by natural disturbances on forest land—like fires, storms, large pest outbreaks, etc.—but only according to specific criteria.[48]

Accounting during the first compliance period follows the 'forest reference level' approach. First introduced with the 1997 Kyoto Protocol, this approach deploys a business-as-usual benchmark for accounting emissions by comparing the change in the forest carbon sink against an earlier point in time.[49] The forest reference levels approach is therefore grounded on the assumption of continuity of existing practices.[50] Unlike the Kyoto Protocol, however, the 2018 LULUCF Regulation relies on historical data, projecting current policies into the future without accounting for potential changes. EU Member States' emissions are calculated comparing them with past forest management practices from 2000 to 2009.[51]

Implementing forest reference levels under the 2018 LULUCF Regulation has proven to be both technically and politically complex.[52] Member States faced significant challenges in developing their forest reference levels. For example, they struggled to select a suitable modelling framework that accurately replicated historical trends and aligned with their GHG inventories.[53] Data limitations, differences in reported periods and unreported harvesting activities led to discrepancies between reported and actual harvesting levels.[54] Accurately simulating age-related changes in forests and addressing the differing capacities and resources among Member States posed additional challenges.[55]

[37]Climate Action Network (CAN), 'Climate Action Network Europe Position Paper on the Revision of the EU LULUCF Regulation' (2021) <https://caneurope.org/position-paper-on-the-revision-of-the-eu-lulucf-regulation/>.
[38]See Commission, 'Proposal for a Regulation of the European Parliament and of the Council amending Regulations (EU) 2018/841 as regards the scope, simplifying the compliance rules, setting out the targets of the Member States for 2030 and committing to the collective achievement of climate neutrality by 2035 in the land use, forestry and agriculture sector, and (EU) 2018/1999 as regards improvement in monitoring, reporting, tracking of progress and review' COM(2021) 554 final, 14.7.2021, 2021/0201 (COD), Explanatory Memorandum, section 3.
[39]2023 LULUCF Regulation, recital 7.
[40]ibid recital 8.
[41]ibid art 4(2).
[42]See eg H Böttcher, J Reise and K Hennenberg, 'Exploratory Analysis of an EU Sink and Restoration Target' (Öko-Institut e.V. 2021) 18.
[43]Climate Action Tracker, 'EU – country summary' (2023) <https://climateactiontracker.org/countries/eu/>.
[44]2023 LULUCF Regulation, art 4(1).
[45]Romppanen 2020 (n 19) 272.
[46]See 2023 LULUCF Regulation, art 2(1) for the definition of these land use categories. The LULUCF Regulation uses the categories identified by the IPCC Good Practice Guidance for Land Use, Land-use Change and Forestry (GPG-LULUCF 2003).
[47]2018 LULUCF Regulation, art 2(3).
[48]2023 LULUCF Regulation, art 10(1).
[49]Grassi et al 2018 (n 5) 2–3.
[50]G Giacomo and R Pilli, 'Projecting the EU Forest Carbon Net Emissions in Line with the "Continuation of Forest Management": The JRC Method' (Publications Office of the European Union 2017) 6.
[51]2018 LULUCF Regulation, art 8(5).
[52]Commission, 'Accompanying the document Proposal for a Regulation of the European Parliament and the Council amending Regulations (EU) 2018/841 as regards the scope, simplifying the compliance rules, setting out the targets of the Member States for 2030 and committing to the collective achievement of climate neutrality by 2035 in the land use, forestry and agriculture sector, and (EU) 2018/1999 as regards improvement in monitoring, reporting, tracking of progress and review' SWD(2021) 609 final, 14 July 2021.
[53]M Vizzarri et al, 'Setting the Forest Reference Levels in the European Union: Overview and Challenges' (2021) 16 Carbon Balance and Management 1, 11.
[54]ibid.
[55]ibid.

More generally, scientists warned that forest reference levels were based on the assumption that Member States' forest management practices would remain relatively unchanged and did not account for the impacts of future policy changes.[56] Nabuurs et al specifically criticised the presumption of the continuation of existing forest management practices embedded in forest reference levels.[57] They cautioned that, under the 2018 LULUCF Regulation, future harvesting in the EU could reach a level close or even exceeding 90% of the annual growth or increment, raising concerns over the sustainability and stability of the EU forest carbon sink.[58] This concern stemmed from the inclusion of projected policies in the baseline, which allows for a potential increase in harvesting.[59] While absolute wood harvests might increase without creating debits relative to the forest reference level, the continuation of current forest management practices over time raised concerns that future harvesting could become unsustainable.[60] These predictions seem to have proven correct, at least in the case of Finland.[61] Finland's 2021 greenhouse gas inventory showed that its LULUCF sector emitted 0.9 million tonnes of carbon dioxide, a stark contrast to 2020, when it removed over 9.2 million tonnes of carbon dioxide.[62] Although fluctuations in carbon sinks are normal, the decline in Finland's forest carbon sink was unprecedented, driven by increased logging and reduced forest growth.[63]

3.1.2 | The flexibility arrangements

The 2018 LULUCF Regulation introduced the so-called 'flexibility arrangements'.[64] These arrangements allow EU Member States to balance their GHG accounts across different land use categories, between the LULUCF and other sectors covered by the ESR, or between Member States.[65] These flexibilities are commonly regarded as a means for facilitating cost-effective GHG emission reductions, where it is cheaper and more effective to do so.[66]

Firstly, Member States have the option to adjust annual emissions allocations to balance any overall net emissions resulting from the LULUCF sector.[67] Secondly, the ESR allows for some flexibility in how emissions reductions are managed across different sectors. Each Member State can utilise a portion of their net removals resulting from land management that go above their ESR targets.[68] If a Member State accrues total net removals in the LULUCF sector, these can compensate, up to a point, its emissions under the ESR.[69] There are however restrictions on utilising removals from the LULUCF sector, which are detailed for each Member State. Thirdly, Member States can transfer surplus removals between themselves, enabling those with excess carbon removals to assist others who are struggling to meet their targets.[70] However, the ESR imposes a 10-year cap of 280 Mt CO_2 on the amount of net removals that can be counted towards compliance, with this limit allocated among Member States.[71]

3.2 | The second compliance period (2026–2030)

As noted above, the key innovation introduced with the 2023 LULUCF Regulation is the EU-wide target of 310 Mt CO_2eq. This target is coupled with individual binding targets for EU Member States. Each Member State must ensure that by 2030, its GHG emissions and removals across diverse land categories do not exceed their designated target.[72] These targets were calculated using Member States' GHG inventories from 2016, 2017, and 2018, combined with the proportion of each country's share of the EU land area.[73]

Moreover, national 'budgets' for each Member State will serve as indicative limits for LULUCF emissions and removals in the years up to 2030.[74] The aim of these budgets is to track each Member State's progress in meeting their emission reduction target. Each Member State's budget calculation will be based on two primary factors.[75] The first factor are each Member State's annual emission and removal limit values, following a linear trajectory leading towards the target.[76] The approach is similar to that applied under the ESR, which requires the Member States to reduce emissions along a steady linear trajectory between 2021 and 2030.[77] Under the 2023 LULUCF Regulation, the trajectory starts in 2022 and provides a steady decline in emissions and an increase in removals. The second factor consists of the average of each Member State's GHG emissions reported in inventories for 2021, 2022, and 2023, which will be used as the benchmark to measure emissions and removals.[78]

Based on Member States' projections submitted in 2023, the EEA estimates that the EU is not on course to achieve its 2030 target for the LULUCF sector.[79] For most Member States, the 2023 LULUCF Regulation targets exceed the projected net carbon sink trajectories

[56] H Böttcher et al, 'EU LULUCF Regulation Explained. Summary of Core Provisions and Expected Effects' (Öko-Institut e.V. 2019) 16.
[57] G Nabuurs, E Arets and M Schelhaas, 'Understanding the Implications of the EU-LULUCF Regulation for the Wood Supply from EU Forests to the EU' (2018) 13 Carbon Balance and Management 1, 9.
[58] ibid.
[59] ibid.
[60] ibid.
[61] K Kulovesi et al, 'Finland's First Climate Lawsuit: Watching the Forest Sink' (CCEEL blog, 14.2.2023) <https://sites.uef.fi/cceel/finlands-first-climate-lawsuit-watching-the-forest-sink/>.
[62] Statistics Finland, 'Greenhouse Gas Emissions in 2021 Became Revised – The Land Use Sector Was Confirmed a Source of Emissions' (2021) <www.stat.fi/en/publication/cktldez2g39g20c53gh3lp5jo>.
[63] YLE News, 'Logging Exceeds Sustainable Levels in Southern Finland, Says Natural Resources Institute' (YLE News, 3.6.2022) <https://yle.fi/a/3-12475861>.
[64] For an analysis, see Savaresi and Perugini 2019 (n 16); Savaresi, Perugini and Chiriacò 2020 (n 16); Romppanen 2020 (n 19).
[65] 2018 LULUCF Regulation, arts 11 and 12.
[66] S Romppanen, 'Towards Net Zero – The LULUCF Regulation and the Fit for 55 Package' (2022) 1 Oil, Gas and Energy Law.
[67] 2018 LULUCF Regulation, art 13(1).
[68] 2018 Effort Sharing Regulation, art 7(1).
[69] 2018 LULUCF Regulation, art 12(1).
[70] Ibid art 12(2).
[71] 2018 Effort Sharing Regulation, art 7 and Annex III.
[72] 2023 LULUCF Regulation, art 4(1).
[73] ibid.
[74] ibid art 4(4).
[75] ibid.
[76] ibid.
[77] Romppanen 2023 (n 36) 217.
[78] 2023 LULUCF Regulation, art 4(4)(b).
[79] EEA 2023 (n 8).

for 2030, resulting in an EU shortfall of 298 Mt CO_2eq.[80] Only a few EU Member States—specifically Portugal, Denmark, the Netherlands, Slovenia, Hungary, and Romania—are expected to meet their national targets by 2030, as their targets are lower than their projected carbon sinks.[81] All other Member States need to bolster their carbon sinks, significantly improving the way in which forests are managed.[82] Experts have however cautioned that EU forests threaten to release large amounts of CO_2 due to natural disturbances, such as fires, insect outbreaks and windthrow.[83]

3.2.1 | The new accounting and reporting rules

The 2018 LULUCF Regulation locked in assumptions concerning the continuation of past land use patterns into Member States' projected emissions and removals.[84] As a result, the accounting rules under the 2018 LULUCF Regulation failed to adequately account for the potential loss of carbon sinks. The 2023 EU Inventory Report notes a high level of uncertainty (39.9%) in the measurement of CO_2 emissions from the LULUCF sector.[85] This uncertainty is associated with the data sources and methodologies used.

The 2023 LULUCF Regulation set out to improve the accuracy and precision of the monitoring, reporting and verification of emissions and removals, with a view of bringing reporting and accounting procedures closer together, through so-called 'reporting-based targets.'[86] As noted above, the 2023 LULUCF Regulation discarded the forest reference level approach and introduced a new accounting system. The new system simplifies and aligns the accounting rules with the reporting categories that Member States already use to report emissions and removals under the UNFCCC.[87]

Between 2026 to 2030, therefore, Member States are required to report on emissions and removals using ten revised categories: forest land; cropland; grassland; wetlands; settlements; other land; harvested wood products; other; atmospheric deposition; nitrogen leaching and run-off.[88]

The 2023 LULUCF Regulation also aims to enhance the monitoring and reporting of emissions and removals by utilising 'advanced technologies', such as satellite observations.[89] The recital highlights the need to harmonise and refine databases that store information on activities emitting greenhouse gases, as well as databases of emission factors.[90] These improvements are expected to deliver 'geographically explicit information' which should in turn help identify priority areas for achieving climate targets and better integrate land-based mitigation with other EU policies.[91]

Finally, the 2023 LULUCF Regulation introduced the notion of 'methodological adjustments.'[92] These adjustments are aimed to neutralise the effect of changes in methodology on the assessment of the achievement of the 2030 EU wide target.[93] The Regulation also recommends that Member States streamline their reporting processes and data collection efforts, with a view to gain a more comprehensive understanding of the sources and impacts of greenhouse gas emissions.[94] The objective is that to enhance the precision and sophistication of Member States' reporting, by providing guidance on the use of 'tier levels' to enhance estimation accuracy progressively. In line with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, each tier entails a different level of complexity, with tier 1 being the basic, and tier 3 the most sophisticated.[95] For the period 2021–2025, tier 1 methods can still be used, except for significant carbon sinks, constituting 'at least 25% of emissions or removals in a source or sink category.' Starting with 2028, tier 2 methods must be used. From 2030, at the latest, Member States must use tier 3 methods for all estimates of carbon pool emission and removal falling in areas of high carbon stock land use units, land use units under protection or restoration and land use units facing high future climate risks.[96]

3.2.2 | The revised flexibility arrangements

The 2023 LULUCF Regulation provides Member States with so-called 'general flexibilities', enabling them to mitigate the risk of non-compliance.[97] These arrangements are however restricted, vis-à-vis those in the 2018 LULUCF Regulation. While it is still possible to balance removals between the LULUCF sector and the sectors covered in the ESR, and between Member States, transferring removals from one period to another is no longer permitted.[98] Between 2026-2030, compensating emissions resulting from managed forest land within a given accounting period is also no longer possible.[99] Between 2021-2025, when accounted emissions exceed removals, Member States can use compensatory measures only when LULUCF sector is a net carbon sink, and subject to specific conditions [Corrections made on 10 March 2025, after first online publication, the year has been updated from 2015 to 2025].[100] In addition, the 2023 LULUCF Regulation created the so-called 'land use mechanism' for natural disturbances.[101] This mechanism is aimed to compensate emissions, under

[80] M Hyyrynen, M Ollikainen and J Seppälä, 'European Forest Sinks and Climate Targets: Past Trends, Main Drivers and Future Forecasts' (2023) 142 European Journal of Forest Research 1207, 1217 and 1221.
[81] ibid 1217.
[82] Korosuo et al (n 9) 11.
[83] Forzieri et al (n 9) 7.
[84] CAN 2021 (n 37).
[85] EEA 2023 (n 8); Grassi et al 2023 (n 32).
[86] 2023 LULUCF Regulation, recital 29.
[87] H Böttcher et al, 'Analysis of the European Commission Proposal for Revising the EU LULUCF Regulation' (Öko-Institut e.V. 2022) 7.
[88] 2023 LULUCF Regulation, art 2(2).
[89] ibid.
[90] ibid.
[91] ibid recital 30.
[92] ibid recital 19.
[93] ibid.
[94] ibid Annex V.
[95] UNFCCC, 'Resource Guide for Preparing the National Communications of Non-Annex I Parties. Module 3: National Greenhouse Gas Inventories' (2009) <https://unfccc.int/resource/docs/publications/09_resource_guide3.pdf>.
[96] These categories are comprehensively detailed in 2023 LULUCF Regulation, Annex V(e).
[97] ibid art 12.
[98] ibid.
[99] ibid art 13.
[100] ibid.
[101] ibid 13(b).

certain conditions and limitations. Member States must, among other things, provide evidence of natural disturbances to be eligible for compensation.[102] Overall, the flexibilities within Member States and between the LULUCF and effort-sharing sectors are limited, and the rules governing these flexibilities are complex. Nevertheless, the implementation of flexibilities should be closely monitored, as it may increase the risk of free riders.[103]

3.3 | Compliance and review

The 2023 Regulation introduced a mechanism to incentivise Member States to meet their GHG targets and hold them accountable for any shortfalls.[104] This mechanism entails applying a 108% multiplier to the emissions that are above the 2026–2029 budget against their 2030 target.[105] Increasing future targets in response to past underperformance is meant to encourage Member States to take effective action to mitigate climate change and achieve their targets. Additionally, if they fail to make sufficient progress towards meeting their targets, Member States are required to put in place 'corrective action plans' under the supervision of the Commission.[106] As part of this process, Member States must provide an explanation for their lack of progress, as well as of additional planned measures and a clear timetable for implementation.

Reporting will take place in 2027 for the first compliance period, and in 2032 for the second compliance period. For each, Member States must provide the Commission with a report, detailing their total emissions and removals within all land categories.[107] The Commission will then examine the reports to evaluate Member States' compliance with the LULUCF targets. In its assessments, the Commission will pay specific attention to potential synergies between mitigation efforts and the preservation of biodiversity.[108] Member States' compliance reports must include an assessment of how they have taken into account the 'do no significant harm' principle when adopting policies and measures to comply with their target.[109] The latter principle is interpreted according to the Taxonomy Regulation,[110] which establishes criteria for determining whether economic activities are to be considered environmentally sustainable, with the aim of promoting green investments.

The 2023 LULUCF Regulation requires the Commission to conduct a comprehensive review of the EU's performance to ensure the 310 $MtCO_2eq$ target is met. This review must take into account international developments, efforts made to achieve the long-term objectives of the Paris Agreement, and the EU Climate Law.[111] While these measures are yet to be implemented, civil society organisations have expressed concerns over lack of dedicated sanctions, raising doubts about the EU's ability to address and rectify situations where emission reduction targets are not met.[112] They furthermore warn of a potential enforcement gap, raising doubts about Member States' ability to meet their obligations and ultimately achieve the EU's 2030 emission reduction target.

4 | CERTIFICATION FRAMEWORK FOR CARBON REMOVALS

In 2022, the European Commission introduced a legislative proposal for a voluntary certification framework for carbon removals, as a means of encouraging measures to increase carbon sinks.[113] In April 2024, the European Parliament approved the provisional agreement on the Carbon Removal Certification Framework ('CRCF').[114] The objective of this new legislative instrument is to introduce a system for offset certification, with a view to enhance the integrity and credibility of carbon removal efforts.

The text of the CRCF Regulation as approved by the Parliament defines carbon removals as 'the anthropogenic removal of carbon from the atmosphere and its durable storage in geological, terrestrial or ocean reservoirs, or in long-lasting products'.[115] The Regulation differentiates between permanent carbon removals, temporary carbon storage in products, temporary carbon storage from carbon farming, and soil emission reductions.[116]

Permanent carbon removals are aimed at achieving long-term reductions in atmospheric CO_2.[117] Operators of carbon removal projects must demonstrate that their activities are designed to store carbon for the long term.[118] However, permanence is neither ensured nor guaranteed.

By contrast, *temporary* carbon removals concern short-term reductions or storage of carbon, such as in soils or products, without guaranteeing long-term permanence. These removals typically involve activities where carbon is absorbed or stored for a limited period.[119] The CRCF Regulation specifies minimum storage durations. For carbon farming and soil emission reductions, the minimum storage period is 5 years. For long-lived products, such as wood, the Regulation mandates a minimum duration of 35 years.[120]

However, temporary storage offers significantly less climate mitigation potential compared with permanent removals.[121] Its inherently

[102] ibid.
[103] S Soimakallio, 'EU Rules on Land Use, Land Use Change and Forestry (LULUCF) – Evaluation' (The Finnish Climate Change Panel 2024) <https://ilmastopaneeli.fi/hae-lausuntoja/eu-rules-on-land-use-land-use-change-and-forestry-lulucf-evaluation-2/>.
[104] 2023 LULUCF Regulation, art 14.
[105] ibid art 13(c).
[106] ibid art 13(d).
[107] ibid art 14(1).
[108] ibid art 14(1)(d).
[109] ibid recital 5 and art 14(1)(b).
[110] Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088 [2020] OJ L198/13.
[111] 2023 LULUCF Regulation, art 17(1).
[112] CAN, 'Assessing Climate Action Under the "Fit For 55" Package' (2023) <https://caneurope.org/assessment-climate-action-fit-for-55-mind-the-gap/>.
[113] Commission proposal for a CRCF Regulation (n 14).
[114] ibid.
[115] ibid art 2(1)(a).
[116] ibid art 2(bb).
[117] ibid art 4(1).
[118] ibid art 6(1).
[119] ibid art 4(2)(2a).
[120] ibid art 2(h)(i).
[121] P Günther et al, 'Carbon Farming, Overestimated Negative Emissions and the Limits to Emissions Trading in Land Use Governance: The EU Carbon Removal Certification Proposal' (2024) 36 Environmental Sciences Europe 1, 13–14.

short-term and variable nature makes precise measurement challenging, reducing the reliability and credibility of associated carbon credits.[122] Removals through natural carbon storage, in particular, have been criticised for their vulnerability to non-permanence risks.[123] The CRCF Regulation does not distinguish carbon credits, suggesting that both types of permanent and temporary removals may be treated similarly. This presents a challenge, as treating credits from *temporary* carbon removals like short-term storage in products the same as permanent removals could undermine the attainment of the EU's mitigation targets. As demonstrated by the situation in Finland, the non-permanence of carbon sinks is an increasingly significant concern and is unlikely to be a temporary glitch.[124]

A recent study has therefore recommended excluding soil carbon removals from offset schemes under EU law.[125] It notes that since the benefits of these activities are already accounted for under the LULUCF Regulation, issuing certificates for offsetting could compromise the credibility of the EU carbon market and the achievement of the emission reduction targets.

The CRCF's reliance on standardised baselines to determine additionality and impact adds to the challenges.[126] Both permanent and temporary carbon removals must demonstrably exceed baseline carbon sequestration levels to show a measurable climate impact.[127] However, if baselines under the CRCF do not accurately reflect what would occur without the activity, they risk issuing credits for non-additional removals, undermining the credibility of offset schemes and inflating carbon reduction claims.[128] Additionally, standardised baselines heighten the risk of double counting, where multiple actors claim credit for the same carbon removal.[129] Double counting misrepresents actual emissions reductions, distorts progress, and damages the integrity of carbon markets. Such flaws erode trust, deter investment, and weaken climate action efforts.[130]

The CRCF Regulation introduced the QU.A.L.ITY framework to assesses quantification, additionality, storage, monitoring, liability, and sustainability.[131] However, concerns remain about the accurate quantification, additionality, non-permanence, and sustainability of removals.[132] Challenges in accounting for certified removals in national inventories arise from limitations in current methodologies used by Member States.[133]

Finally, the CRCF Regulation asserts that carbon removal activities should contribute to sustainability goals and provide co-benefits for biodiversity and ecosystems.[134] Positive biodiversity outcomes will require careful monitoring, enforcement, and clear guidelines to avoid trade-offs, such as prioritising carbon removals over ecological integrity.

While the Regulation sets carbon storage requirements, the specifics of managing reversals and ensuring accountability are left to the Commission's discretion, raising concerns about enforcement and the robustness of long-term carbon sequestration.[135] Leaving this responsibility to delegated acts, however, introduces uncertainty and risks inconsistent enforcement across Member States, potentially jeopardising the effectiveness of long-term carbon storage initiatives.

4.1 | Interplay with the LULUCF Regulation

The CRCF Regulation complements the LULUCF Regulation by introducing standardised monitoring and verification processes for carbon farming. The objective is not only to improve the reliability of carbon removals but also to support Member States in meeting their LULUCF targets. Integrating data emerging from CRCF projects can improve the accuracy of national GHG inventories and support the transition to higher tier reporting under the LULUCF Regulation.[136] Additionally, the CRCF mandates the European Commission to explore the possibility of integrating carbon storage products in future.[137] The implementation of the CRCF Regulation, however, faces significant challenges. Key concerns revolve around temporary carbon removals, which do not ensure long-term carbon sequestration, and the risk that the same carbon removal could be counted by multiple entities or systems. Furthermore, the regulation does not adequately consider co-benefits, such as biodiversity. If these issues are not properly addressed, the regulation will fail to make a meaningful contribution to, and may even undermine the achievement of, the EU's climate targets.

5 | FOREST BIOMASS

The term 'bioenergy' is used to refer to energy derived from any form of biomass—i.e. living or recently deceased organic material. Climate

[122] ibid 13.

[123] See Meyer-Ohlendorf et al, 'Certification of Carbon Dioxide Removals – Evaluation of the Commission Proposal. Interim Report' (German Environment Agency 2023); Bellona, 'Certifying Removals, an Essential Step for Net-Zero' (30 November 2022) <https://bellona.org/news/eu/2022-11-certifying-removals-an-essential-step-for-net-zero>.

[124] Natural Resources Institute Finland, 'Greenhouse Gas Inventory 2022: No Significant Changes in the Final Results for the Agriculture and LULUCF Sectors Compared to the Preliminary Data Published in December 2023' (15 March 2024) <www.luke.fi/en/news/greenhouse-gas-inventory-2022-no-significant-changes-in-the-final-results-for-the-agriculture-and-lulucf-sectors-compared-to-the-preliminary-data-published-in-december-2023>; and 'According to Preliminary GHG Inventory Data, Emissions from the Land Use Sector Increased in 2022' (14 December 2023) <www.luke.fi/en/news/according-to-preliminary-ghg-inventory-data-emissions-from-the-land-use-sector-increased-in-2022>.

[125] H McDonald et al, 'QU.A.L.ITY Soil Carbon Removals? Assessing the EU Framework for Carbon Removal Certification from a Climate-Friendly Soil Management Perspective' (Ecologic Institute 2023) 15–16.

[126] S Scherger, 'Unpacking the EU Carbon Removal Certification Framework: Implications for EU Climate and Agriculture Policy' (Institute for Agriculture and Trade Policy 2024) 7–8; S Scherger and S Sharma, '12 Problems with the European Commission's Proposal for a Carbon Removal Certification Framework' (Institute for Agriculture and Trade Policy 2023) 6–7.

[127] Commission proposal for a CRCF Regulation (n 14), art 4.

[128] Scherger and S Sharma (n 126) 7.

[129] ibid.

[130] ibid.

[131] Commission proposal for a CRCF Regulation (n 14), art 4–7.

[132] McDonald et al (n 125) 3.

[133] Meyer-Ohlendorf et al (n 123) 19–20.

[134] Commission proposal for a CRCF Regulation (n 14), art 7.

[135] ibid art 6(2)(b); N Meyer-Ohlendorf and A Siemons, 'Commission Proposal for an EU Carbon Removal Certification Framework – Is the Proposed Delegation of Power in Line with Article 290 of the Treaty on the Functioning of the EU?' (German Environment Agency 2023) 3–4.

[136] EEA, 'The Handbook on the Updated LULUCF Regulation EU 2018/841. Guidance and Orientation for the Implementation of the Updated Regulation' (2024).

[137] 2023 LULUCF Regulation, art 17(3).

change mitigation through bioenergy depends on factors like deployment, scale, initial land use, land type, feedstock, and carbon stocks.[138] Bioenergy presently provides nearly 60% of the EU's renewable energy.[139] It is derived from organic materials like trees, plants, and waste and is primarily utilised in the heating and cooling sector.[140] Forest biomass from forest residues (e.g. branches, stumps, treetops) or industrial wood-processing by-products (e.g. bark, sawdust, wood chips) is primarily sourced from forest management—i.e. the 'managed forest' accounting category under the 2023 LULUCF Regulation.[141] The availability of forest residues, which would otherwise decompose naturally, is however limited.[142] The EU Commission estimates that the use forest biomass in the EU has intensified in recent years and is expected to grow.[143] Increased use of forest biomass to meet the EU's renewable energy targets can therefore lead to an increased use of primary woody biomass (i.e. roundwood).[144]

The Renewable Energy Directive and other EU law instruments have introduced the so-called 'cascading use of biomass' principle, which prioritises the material use of biomass over energy use.[145] This principle recommends using woody biomass in order to achieve the highest economic and environmental value.

The EU sustainability and GHG emissions saving criteria for biofuels, bioliquids, and biomass fuels have been under constant development, with progressive expansion both of their substantive scope and normative role.[146] The 2018 Renewable Energy Directive defined as 'sustainable' the bioenergy derived from feedstocks that meet certain sustainability and GHG emissions reduction criteria.[147] The Directive controversially assumed zero emissions at the point of biomass combustion.[148] As a result, bioenergy emissions are not accounted for in the energy sector because these emissions are in principle already counted under the LULUCF sector as a change in carbon stocks, assuming that the biomass used is harvested in the EU.

The revised 2023 Renewable Energy Directive strengthened the sustainability criteria for biofuels, bioliquids, and biomass fuels.[149] Biomass fuels must fulfil the sustainability and GHG saving criteria only in certain listed kinds of installations, but Member States may extend the application of these criteria to other installations.[150] Under the revised Directive, bioenergy must fulfil these criteria to count towards the achievement of national climate and renewables targets and to qualify for financial incentives.[151]

The Directive identifies 'no-go areas' where bioenergy production is prohibited and lays out the conditions governing these areas. Biofuels, bioliquids, and biomass fuels may not be produced from agricultural biomass obtained from land with a high biodiversity value. No go areas include, for example, primary forests of native species, where there is no clearly visible human activity,[152] land with high-carbon stock (e.g. continuously forested areas),[153] or peatland.[154] In addition, fuels derived from forest biomass must meet stringent sustainability criteria to ensure responsible production. These criteria include, among other things, legal compliance with forestry regulations, effective monitoring and enforcement practices in the harvest area, and adherence to sustainable forest management principles. These measures are designed to ensure that the extraction of biomass does not lead to negative environmental impacts, such as deforestation or biodiversity loss, while promoting sustainable use of forest resources.[155] Additionally, biomass harvesting is prohibited in primary forests, highly biodiverse areas, and protected lands.[156]

The revised 2023 Renewable Energy Directive establishes stringent sustainability requirements for forest biomass. Energy derived from biofuels, bioliquids, and biomass fuels will count towards the EU's renewable energy target, fulfil renewable energy obligations, and qualify for financial support only if it meets the sustainability and GHG emissions savings criteria outlined in the directive. One key condition is that the country must be a party to the Paris Agreement and must have submitted a nationally determined contribution (NDC) that covers emissions and removals from the LULUCF sector. Furthermore, the country is required to maintain laws that conserve and enhance carbon stocks and sinks, ensuring that forest biomass production does not compromise the capacity of forests to sequester carbon.

These provisions seek to align forest biomass production with broader climate and environmental objectives, promoting sustainable practices that contribute to reducing greenhouse gas emissions while maintaining the health and integrity of forest ecosystems.[157] The 2023 Renewable Energy Directive requires countries (both EU Member States and third countries) to provide evidence that their forest biomass production meets established sustainability criteria. In the absence of such evidence, the Directive allows for the use of

[138] A Camia et al, 'JRC Science for Policy Report: The Use of Woody Biomass for Energy Production in the EU' (Publications Office of the European Union 2021) 80; J Bäck et al, 'Multi-Functionality and Sustainability in the European Union's Forests' (European Academies' Science Advisory Council 2017) 21–22; G Berndes et al, 'Forest Biomass, Carbon Neutrality and Climate Change Mitigation. From Science to Policy 3 (European Forest Institute 2016) 4.

[139] Eurostat, 'Shedding Light on Energy – 2023 Edition' (2023) <https://ec.europa.eu/eurostat/web/interactive-publications/energy-2023#renewable-energy>.

[140] Camia et al (n 138).

[141] 2018 Renewable Energy Directive, arts 2(24) and (26).

[142] G Zanchi, N Pena and N Bird, 'Is Woody Bioenergy Carbon Neutral? A Comparative Assessment of Emissions from Consumption of Woody Bioenergy and Fossil Fuel' (2012) 4 Global Change Biology Bioenergy 761, 766.

[143] Commission, 'REPowerEU Plan' (Communication) COM(2022) 230 final, 18 May 2022.

[144] T Searchinger et al, 'Europe's Renewable Energy Directive Poised to Harm Global Forests' (2018) 9 Nature Communications 3741.

[145] The 2023 Renewable Energy Directive, art 3 and recital 10; Directive (EU) 2015/1513 of the European Parliament and of the Council of 9 September 2015 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources [2015] OJ L239/1 is the first document where cascading is explicitly incorporated into a legal document.

[146] Camia et al (n 138) 85–91.

[147] 2018 Renewable Energy Directive, recital 94.

[148] ibid Annex V, C; Directive (EU) 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC [2018] OJ L87/1, Annex IV Part A.

[149] 2023 Renewable Energy Directive, art 29.

[150] ibid art 29(1).

[151] ibid art 29; Camia et al (n 138) 78.

[152] ibid art 29(3).

[153] ibid art 29(4).

[154] ibid art 29(5).

[155] ibid art 29.

[156] ibid art 29(3).

[157] ibid art 29(7).

management systems within the forest sourcing area that ensure the long-term maintenance or enhancement of carbon stocks and sinks. Furthermore, the production of biofuels, bioliquids, and biomass fuels from domestic forest biomass must align with Member States' obligations and targets under the 2023 LULUCF Regulation. This requirement aims to ensure that biomass production supports national and EU-wide goals for reducing emissions and enhancing carbon removals in the LULUCF sector, a cornerstone of the EU's climate neutrality objectives for 2050.[158]

Despite the sustainability criteria introduced with the Fit for 55 Package, bioenergy from forest biomass remains a controversial renewable energy source. Critics argue that while forest biomass is classified as a renewable energy source, it can still result in significant carbon emissions when trees are harvested for fuel, potentially releasing stored carbon back into the atmosphere.[159] Furthermore, the time lag between harvesting trees and the regrowth of forests raises concerns about whether bioenergy can effectively contribute to immediate climate mitigation goals, especially as forest regeneration can take decades to recapture the carbon released. This, in turn, underscores the importance of the rules governing how emissions and removals from the use of forest biomass are accounted for.

5.1 | Interplay with the LULUCF Regulation

The revised Renewable Energy Directive does not directly regulate LULUCF activities but influences them by setting sustainability criteria on bioenergy production. The Directive seeks to ensure that the use of biomass complies with certain standards, indirectly supporting the goal of balancing emissions and removals in the land-use sector. The EU growing reliance on forest biomass as a renewable energy source is a critical test for the effectiveness of the LULUCF Regulation's accounting rules, which must accurately reflect the fluctuations in carbon stocks and emissions within the forest sector.[160] Beginning in 2030, additional monitoring requirements will attempt to strengthen oversight over this crucial interplay. As noted above, the LULUCF Regulation mandates the adoption of tier 3 methodologies, which utilise high-resolution data and advanced modelling to deliver more accurate assessments of carbon fluxes in soils and high-carbon stock lands. These methodologies are expected to enhance compliance with sustainability criteria, while improving the precision of carbon accounting.

6 | OTHER RELEVANT EU LAW INSTRUMENTS

The forest jigsaw emerging from the Fit for 55 Package includes instruments that, while not directly addressing climate change, focus on agriculture, forestry, energy, and environmental protection. Generally, as overarching policy instruments, the EU Forest, Soil, and Biodiversity Strategies prioritise the sustainable management, restoration, and protection of forests to achieve climate, biodiversity, and environmental integrity goals.[161]

The 2023–2027 Common Agriculture Policy (CAP)[162] provides farmers with payments for initiatives that enhance carbon sinks in the land sector. Farmers receiving CAP support must comply with Good Agricultural and Environmental Conditions (GAEC) standards, which include maintaining soil health, protecting permanent grasslands, and preserving wetlands and peatlands.[163] These standards are expected not only to boosts carbon sequestration but also to support biodiversity.[164] However, scholars have cautioned that the CAP and the CRCF Regulation are not aligned.[165] As noted above, the CRCF aims to reward practices that remove carbon from the atmosphere, like afforestation and agroforestry.[166] Some of these practices are already mandatory for receiving income support under the CAP, raising concerns about double-counting and whether such activities should qualify for additional payments.[167] To ensure that only additional actions receive support, the CRCF should allow certification only for activities that go beyond existing legal requirements.

The Nature Restoration Law represents a shift from simply awarding protected status to specific areas to actively restoring degraded ecosystems.[168] The CRCF Regulation should in principle work in synergy with this law, by promoting activities that enhance both carbon sequestration and ecosystem restoration.[169] However, the CRCF Regulation does not impose binding obligations, thus leaving the achievement of biodiversity and soil health co-benefits uncertain. The Regulation merely states that activities must avoid causing significant harm and aim to provide benefits for biodiversity, soil health, and ecosystems.[170] Positive outcomes are only explicitly required for carbon farming.[171]

The proposed Forest Monitoring Law[172] and Soil Monitoring Law[173] aim to standardise data collection and reporting on forests and soils, helping to achieve the EU's climate goals. As mentioned earlier, current data on Europe's forests is often inadequate and outdated.[174] Accurate and timely information is however essential to

[158]ibid art 29(7a).
[159]Searchinger et al (n 144); SP Andersen, B Allen and GC Domingo, 'Biomass in the EU Green Deal: Towards Consensus on the Use of Biomass for EU Bioenergy' (IEEP 2021).
[160]Camia et al (n 138) 86; S Romppanen, 'The Bioenergy "Blind Spots" in EU Climate and Energy Law' (2020) 29 European Energy and Environmental Law Review 150.
[161]New EU Forest Strategy for 2030 (n 27); Commission, 'EU Soil Strategy for 2030. Reaping the benefits of healthy soils for people, food, nature and climate' (Communication) COM(2021) 699 final, 17 November 2021; EU Biodiversity Strategy for 2030 (n 26).
[162]Consolidated text of Regulation 2021/2115 (n 31).
[163]ibid.
[164]EEA 2024 (n 136).
[165]McDonald et al (n 125) 12; Günther et al (n 121) 17–18; Scherger and Sharma (n 126) 8.
[166]Commission proposal for a CRCF Regulation (n 14), art 5(1).
[167]Günther et al (n 121) 17–18.
[168]Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 on nature restoration and amending Regulation (EU) 2022/869 [2024] OJ L2024/1991.
[169]Commission proposal for a CRCF Regulation (n 14), Explanatory Memorandum.
[170]ibid recital 15, 16, art 7(1)(f) and 7.
[171]ibid art 7(1)(fa).
[172]Commission proposal for a Regulation on a monitoring framework for resilient European forests (n 28).
[173]Commission, 'Proposal for a directive of the European Parliament and of the Council on Soil Monitoring and Resilience (Soil Monitoring Law)' COM(2023) 416 final, 5 July 2023, 2023/0232 (COD).
[174]ibid 1.

track progress towards the targets set by the LULUCF Regulation. Greater use of remote sensing technologies across the EU could provide objective, real-time insights, helping policymakers enhance carbon storage capacity and monitor changes in forests. However, it is still too early to assess whether these proposals for improved forest and soil monitoring will result into concrete legislative measures.

Finally, the internal dimension of the forest governance framework is complemented by an external instrument. Regulation (EU) 2023/1115[175] focuses on ensuring that products traded in the EU are deforestation-free, with the aim to reduce global deforestation and forest degradation linked to agricultural expansion. While the regulation builds on previous initiatives like the FLEGT Action Plan,[176] its implementation has faced significant challenges. Currently, there is a temporary pause in its application.[177]

7 | CONCLUSION

The forest sector is poised to play a critical role in achieving the EU's 2030 emission reduction target and the 2050 carbon neutrality goal. Through the jigsaw outlined in this article, the EU has sought to create the legal framework necessary to enable the forest sector to contribute to these milestone climate objectives.

The 2023 LULUCF Regulation sets ambitious targets to enhance carbon sinks, yet projections indicate the EU will miss its 2030 target. While the Regulation improves reporting accuracy, high data uncertainty and natural disturbances hinder effective monitoring. The 2018 LULUCF Regulation fell short of promoting forest management practices that could bolster the EU's declining carbon sink. Reforms introduced under the Fit for 55 Package aim to more effectively harness forest carbon sequestration. Whether these efforts will succeed remains uncertain. This article has highlighted clear shortcomings within the regulatory framework introduced with the 2023 LULUCF Regulation. These are particularly evident in the methods for accounting emissions and removals. The use of flexibilities and potential methodological adjustments in Member States' inventories raise concerns about whether the targets set by the LULUCF Regulation are truly achievable. In this connection, uncertainties surrounding the proposed Forest and Soil Monitoring laws have left the construction of a more comprehensive accounting framework in limbo.

Other instruments introduced with the Fit for 55 Package aim to more effectively leverage forest carbon sequestration, though it remains uncertain whether these efforts will succeed. As highlighted in this article, notable shortcomings persist, particularly regarding the crediting of offsets and the sustainability criteria for forest biomass. The CRCF Regulation seeks to promote both permanent and temporary carbon removals but fails to adequately distinguish between credits from these activities. This lack of differentiation creates a risk of double counting, undermining the credibility of the EU carbon market and hindering the achievement of the EU's mitigation targets. Additionally, the absence of clear accountability mechanisms for carbon removals and challenges in accurately quantifying temporary storage threaten the framework's overall effectiveness. Similarly, bioenergy derived from forest biomass remains contentious, both within the EU and globally. While the 2023 Renewable Energy Directive strengthens sustainability criteria for biofuels and biomass fuels, concerns persist over emissions from biomass combustion and the long regrowth periods required for carbon sequestration, which cast doubt on its climate benefits.

The implementation of the instruments comprising the forest jigsaw presents significant challenges, particularly in politically sensitive areas such as payments to farmers and forest owners. The EU's ability to achieve its climate objectives ultimately hinges on Member States' effective application of the legal instruments analysed in this article. These instruments are designed to enhance oversight of forest management at the national level. However, as forest policy falls within the competence of Member States, implementation has already generated controversy in key forestry nations such as Finland and Sweden.

This leaves us with a newly assembled jigsaw, that already reveals areas requiring significant improvement. While the overall picture may seem underwhelming, reaching this stage represents a considerable achievement. The EU has taken meaningful steps to regulate a sector that was previously largely unregulated, marking an important milestone. Whether these efforts will suffice to meet the EU's climate change mitigation objectives remains uncertain. Ultimately, law is only one of many factors shaping the forest sector. Cultural, economic, social, political, and scientific dynamics all play pivotal roles in determining outcomes, both within the EU and beyond.

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