Final Review Report

2025 Comprehensive Review of National Greenhouse Gas Inventory Data

pursuant to Article 38(1a) of Regulation (EU) No 2018/1999 and Article 4(4) of Regulation (EU) No 2018/841

Spain

28 August 2025

European Environment Agency

Reference: No 3502/B2025/EEA.60384

Contents

List of tables

Introduction and conclusions from the 2025 comprehensive review

This Final Review Report presents the findings from the 2025 review of the greenhouse gas (GHG) emission inventory of Spain.

The comprehensive review was carried in accordance with Article 38(1a) of Regulation (EU) 2018/1999 ('Governance Regulation'). The purpose of the comprehensive review is to enable the Commission to set out the annual limit values of Spain for the years from 2026 to 2030, in terms of tonnes of CO_2 equivalent, as required by Article 4(4) of Regulation (EU) No 2018/841 (the 'LULUCF Regulation').

The reviewers carried out checks to verify the transparency, accuracy, consistency, comparability and completeness of the national GHG inventory for the years 2016, 2017 and 2018 as well as 2021, 2022 and 2023 submitted in 2025 by Spain pursuant to Articles 26 (4) of the Governance Regulation.

The initial checks were carried out on the draft inventory submissions submitted pursuant to Article 26(3) of the Governance Regulation. The review builds on the initial checks performed by the EU inventory team (European Environment Agency (EEA) and the European Topic Centre on Climate Change Mitigation (ETC/CM)). The comprehensive review was performed by a Technical Expert Review Team (TERT).

More information on the procedures for the 2025 comprehensive review is presented in the annexes of this review report.

Initial check and comprehensive review conclusions

1. The reviewers raised 10 issues with Spain during the initial check and comprehensive review (see Table 1). The TERT provided recommendations for 3 of these issues. Other issues raised during the comprehensive review were clarified and are considered resolved.
2. The TERT identified cases where inventory data were prepared in a manner which is inconsistent with UNFCCC guidance documentation or Union rules. In particular, the TERT identified a number of under-estimates or over-estimates exceeding the threshold of significance pursuant to Article 31 of Commission Implementing Regulation (EU) No 2020/1208.
3. Spain provided 2 revised estimates to which the TERT agreed. Table 2 below summarises the revised estimates and further information is provided in the respective chapter of this report. The TERT agreed to all revised estimates.
4. The TERT did not deem necessary any technical corrections in the meaning of Article 38(2)(d) of Regulation (EU) No 2018/1999.
5. The TERT identified recommendations in order to improve the national inventory data of Spain (see Table 3).
6. The TERT considers that it received a response from Spain that was sufficient in order to undertake the comprehensive review appropriately.

Table 1: Overview of issues raised with Spain

	Issues raised during the initial check	Issues raised during the comprehensive review	Recommendations	Revised estimates[1]	Technical corrections[2]
LULUCF	**5**	**5**	**3**	**2**	**-**

[1] Revised estimates: changes in inventory estimates triggered by the review and provided by the country.

[2] Technical corrections: changes in inventory estimates triggered by the review and provided by the TERT.

National totals for the purpose of Article 4(4) of Regulation (EU) 2018/841 (LULUCF)

Table 2: Totals net LULUCF emissions for the purpose of Article 4(4) of Regulation (EU) No 2018/841

Emission source category	**Reference**	**Emission estimates (kt CO_2 equivalent)[1]**					
		2016	**2017**	**2018**	**2021**	**2022**	**2023**
Total net greenhouse gas emissions for the LULUCF sector, pursuant to Article 26(4) of Regulation (EU) No 2018/1999	ESP-CRT-2025-V0-2-DataEntry-20250312-125754	-52 093.815	-52 517.526	-53 475.524	-51 775.546	-50 620.844	-51 032.763
Difference between revised estimates and original estimates provided by Spain and accepted by the TERT[2]							
4A1 Forest land remaining Forest Land, Dead Organic Matter, CO_2	ES-4A1-2025-0001	-1 089.480	-1 096.731	-1 103.982	-1 125.366	-1 132.364	-1 139.361
4A2 Land converted to Forest Land, Living Biomass, CO_2	ES-4A1-2025-0002	-2 526.159	-2 453.510	-2 380.860	-2 095.208	-2 003.661	-1 912.115
Total net greenhouse gas emissions for the LULUCF sector including revised estimates		-55 709.455	-56 067.767	-56 960.366	-54 996.120	-53 756.869	-54 084.239

[1] The tables presented in this report show numbers rounded to three decimal places, although most numbers are available with greater precision. For all calculations all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals are taken into account.

[2] A positive difference indicates an increase compared to reported emissions or decrease in reported removals. A negative difference indicates a decrease compared to reported emissions or increase in reported removals. For more information on revised estimates, see Annex 1.

Statement from Spain on the conclusions presented by the TERT

Spain agrees with the aggregated GHG emission inventory estimates presented in Table 2.

Recommendations from the TERT, considering revised estimates deemed necessary by the TERT

Table 3: Recommendations from TERT (RE = Revised estimate; TC = Technical correction)

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2025 (RE/TC/no)
ES-4A1-2025-0002	Yes	4A1 Forest land remaining Forest Land, Living Biomass, CO_2, 1990-2023	For 4A1 Forest Land remaining Forest Land, the TERT recommends including a detailed information on the NFIs survey in the NID to enhance transparency, explaining how these data sources have been used in the estimation process. For Land converted to Forest Land, living biomass pool, the Party has provided a revised estimate, to have an increment consistent with the 20 years transition period. The TERT, noting that further refinement of the provided estimates may be implemented in future submissions, agreed with the revised estimate provided by Spain. The TERT recommends that Spain include the revised estimate in its next submission.	RE
ES-4A1-2025-0001	Yes	4A1 Forest Land remaining Forest Land, Dead wood, CO_2, 2010-2023	For 4A1 Forest Land remaining Forest Land, deadwood, for all years the TERT noted a significant difference in emissions trends of living biomass and deadwood, even though the deadwood estimates were supposed to be directly derived from biomass trends with a ratio according to the NID. In response to a question raised during the review, Spain explained that it could be linked to an issue in the calculation of deadwood ratio compared to living biomass conducted by forest types and by province. Spain provided revised estimates for all years based on revised provincial ratio, applied to the provincial carbon stocks. Spain stated that in the next submission the Spanish inventory team will explore the possibility of including revised disaggregated ratio by forest type at the provincial level. The TERT agreed with the revised estimate provided by Spain. The TERT recommends that Spain include the revised estimate in its next submission.	RE
ES-4-2025-0004	No	4 Land use, Land-use change and Forestry, CO_2, 1990-2023	For 4E2 Land converted to Settlements; 4B2 Land converted to Cropland; and 4C2 Land converted to Grassland, for living biomass, the TERT noted that in CRT table 7 and in the NID p429, that Spain is reporting pools with Tier 1 methods in significant pools of a key category which is not in line with Annex V Part 3 of the Governance Regulation. Spain informed the TERT that the inventory team is currently working to develop a higher Tier method in these subcategories. The TERT recommends pursuing these efforts in order to be compliant with the requirements in the next submissions.	No

Revised estimates provided by Spain and accepted by the TERT[1]

1	EMRT ID:	ES-4A1-2025-0001
	EMRT URL:	https://emrt-esd.eionet.europa.eu/2025/ES-4A1-2025-0001
	Country:	Spain
	Land use category:	4A1 Forest land remaining Forest Land (this is linked to ES-4A1-2025-0002)
	Gases:	CO_2
	Pool:	DOM (Dead wood)
	Completed by LULUCF Expert:	Mélanie Juillard
	Reviewed by Thematic Counterpart Expert:	
	Reviewed by Lead Reviewer:	Marina Vitullo
	Reviewed by Quality Controller:	Justin Goodwin
	The underlying problem:	Spain estimates and reports removals and emissions from deadwood pool in Forest Land remaining Forest Land based on a ratio of deadwood / living biomass, at provincial level, carried out in the NFI3 cycle (1997-2008). Nevertheless, the TERT notes that a significant difference occurs in emissions trends of living biomass and deadwood. Spain, during the review, explained that the deadwood ratios were applied by forest type, per province and year when each NFI was conducted, but calculated at national level by forest type. In response to a question raised during the review about the misfit of trends, Spain explained that it could be linked to an issue in the calculation of deadwood ratio compared to living biomass conducted by forest types and by province. The TERT first proposed a PTC based on a national ratio and national living biomass stocks. Then, Spain provided revised estimates for all years based on revised provincial ratio, applied to the provincial carbon stocks. Spain stated that in the next submission the Spanish inventory team will explore the possibility of including revised disaggregated ratio by forest type at the provincial level.
	Summarise the methodology used:	The TERT proposed a national ratio, obtained by dividing the total national deadwood stock by the total national living biomass stock, to recalculate the emissions and removals of deadwood. The deadwood carbon stock per hectare, equal to 0.88 tC/ha, for forest land remaining forest land (included in the annex document Cambio en las existencias de carbono de la madera muerta en las tierras forestales que permanecen como tales the NID) was used to derive a deadwood ratio dividing the total national deadwood stock by the total national living biomass stock. This ratio is applied to the living biomass carbon stocks per hectare, as derived from the NFI data, linearly interpolating and extrapolating data for the reporting years where NFIs data were not present. The deadwood carbon stock changes have been further calculated based on the abovementioned annual deadwood carbon stocks, for Forest Land remaining Forest Land category. The Spanish inventory team has developed new provincial ratios of deadwood/living biomass. These new ratios have been applied to the provincial living biomass carbon stock changes for Forest Land remaining Forest Land, to develop revised deadwood carbon stock changes estimates (please refer to the "Calculations_Party" and "Ratio DW_LB_Party" sheets). The TERT agreed with the Revised Estimate provided by Spain.

2

	Original estimate (kt CO_2e)				Notes
Year	CO_2	CH_4	N_2O	Total GHG	
2016	311.382			311.382	
2017	311.382			311.382	
2018	311.382			311.382	
2021	311.382			311.382	
2022	311.382			311.382	
2023	311.382			311.382	

	Revised Estimate received from country (kt CO_2e)				Notes
Year	CO_2	CH_4	N_2O	Total GHG	
2016	-778.098			-778.098	
2017	-785.349			-785.349	
2018	-792.600			-792.600	
2021	-813.984			-813.984	
2022	-820.981			-820.981	
2023	-827.979			-827.979	

	Difference between RE and OE (kt CO_2e)			
Year	CO_2	CH_4	N_2O	Total GHG
2016	-1 089.480			-1 089.480
2017	-1 096.731			-1 096.731
2018	-1 103.982			-1 103.982
2021	-1 125.366			-1 125.366

2022	-1 132.364			-1 132.364	
2023	-1 139.361			-1 139.361	

EMRT ID:	ES-4A1-2025-0002
EMRT URL:	https://emrt-esd.eionet.europa.eu/2025/ES-4A1-2025-0002
Country:	Spain
Land use category:	4A2 Land Converted to Forest Land
Gases:	CO_2
Pool:	Living Biomass
Completed by LULUCF Expert:	Mélanie Juillard
Reviewed by Thematic Counterpart Expert:	
Reviewed by Lead Reviewer:	Marina Vitullo
Reviewed by Quality Controller:	Justin Goodwin

1	The underlying problem:	The TERT has raised a first question to understand the methodology used for estimating net removals of living biomass in Forest Land remaining Forest Land, asking to clarify the difference of areas between NFI data and the Land representation data. The Party has provided a file with new elements on forest areas from the NFI and has justified that the areas from the Land representation system are more suited to follow the forest dynamics. Spain will consider adding more elements on the NID about NFI campaigns to improve transparency. No corrected estimate is proposed for this issue. Spain explained, during the review the approach used to obtain the increment in Forest Land as following: - For forest Land remaining Forest Land, the increment is derived from NFI data, by using the difference of the stocks per hectare of the NFI 2,3 and 4 by province when they are available. The NFI measurement only covers forests where the diameter at breast height is above 20 cm. This increment is applied to the area of Forest Land remaining Forest Land. - For Land converted to Forest Land, the increment is estimated assuming linear growth until reaching a DBH (Diameter at Breast Height) of 20 cm. The Party has specified that in 86% of the cases, it takes more than 20 years to reach this diameter. However, Spain uses this increment (lower than the excepted increment that would reflect the 20 years transition period) and apply it to the areas of Land converted to Forest Land. The TERT considers that this method under-estimates the removals of the forests with trees older than 20 years, but with a diameter smaller than 20 cm. Thus, the TERT initially carried out a technical correction for carbon stock changes, living biomass, in Land converted to Forest Land. Following this, Spain provided its own revised estimate which was accepted by the TERT.
	Summarise the methodology used:	The technical correction applied a living biomass increment value for Land converted to Forest Land, which is suitable for application during the 20-year transition period (please refer to the "Calculations" sheet). The TERT has used the IPCC default factors to derive the living biomass increment value, as the TERT was not in possession of the elements to derive more specific values. The living biomass increment per hectare for Land converted to Forest Land has been multiplied by areas (as reported in CRT tables 4A2) of Land converted to Forest Land to calculate the living biomass carbon stock changes for the Land converted to Forest Land subcategory. Spain, in its revised estimated, assessed living biomass increment values, by province, for Land converted to Forest Land, assuming linear growth until reaching the age of 20 years (please refer to the "Calculations_Party" and "Net biomass growth_Party" sheets).

2

	Original estimate (kt CO_2e)				Notes
Year	CO_2	CH_4	N_2O	Total GHG	
2016	-11 399.297			-11 399.297	
2017	-11 090.940			-11 090.940	
2018	-10 782.582			-10 782.582	
2021	-9 272.316			-9 272.316	
2022	-8 740.254			-8 740.254	
2023	-8 208.191			-8 208.191	

	Revised Estimate received from country (kt CO_2e)				Notes
Year	CO_2	CH_4	N_2O	Total GHG	
2016	-13 925.457			-13 925.457	
2017	-13 544.450			-13 544.450	
2018	-13 163.442			-13 163.442	
2021	-11 367.524			-11 367.524	
2022	-10 743.915			-10 743.915	
2023	-10 120.306			-10 120.306	

	Difference between RE and OE (kt CO_2e)			
Year	CO_2	CH_4	N_2O	Total GHG
2016	-2 526.159			-2 526.159
2017	-2 453.510			-2 453.510

2018	-2 380.860			-2 380.860	
2021	-2 095.208			-2 095.208	
2022	-2 003.661			-2 003.661	
2023	-1 912.115			-1 912.115	

[1] Carbon stock changes (in kt C) from the CRT tables have been converted into kt CO_2 by multiplying by -44/12.

Annex I: Legal background and procedures of the 2025 comprehensive review

The LULUCF Regulation (EU) 2018/841 sets net emission removal targets for 2030 and net emission budgets in the period 2026 to 2029. In Article 4(5) of the LULUCF Regulation, the Commission is required to adopt decision setting out the annual limit values for net greenhouse gas removals for each year in the period from 2026 to 2029, for which it shall carry out a comprehensive review.

The Governance Regulation (EU) 2018/1999 lays down annual reporting obligations, compliance checks and a review process to ensure that the compliance with annual GHG emission limits is assessed in a credible, consistent, transparent and timely manner.

The requirements for the review of the national inventory data submitted by countries are set out in Article 38 of Regulation (EU) 2018/1999. The details concerning the review process, such as the timing and steps of conducting of the annual and comprehensive reviews are set out in Chapter V and Annex XXII of the Commission Implementing Regulation (EU) No 2020/1208.

The 2025 reviews were thus held as a comprehensive review in line with Article 38(1a) of Regulation (EU) 2018/1999in concert with the reviews required by the LULUCF Regulation.

Objectives

The objectives of the comprehensive review of countries' GHG emission inventories in 2025 are:

a) to support the European Commission by ensuring it has accurate, reliable and verified information on annual GHG emissions for
    - determining the budget for the period 2026-2029 according to Article 4(4) of Regulation (EU) 2018/841.

b) to assist countries in improving the quality of their GHG inventories.

Procedures

The scope of the 2025 comprehensive review is presented in Table A-1. The checks carried out during the 2025 comprehensive review are presented in Annex II.

The initial checks were carried out by the EEA with support from the ETC/CM. All findings from the initial checks that were partly resolved or not resolved within the initial check phase were followed up in the comprehensive review.

The EEA LULUCF experts consisted of the following experts:

- Sector experts: Raul Abad-Viñas and Peter Iversen (EEA)
- Quality coordinator: Lucia Perugini (EEA)

The comprehensive review 2025 was performed by a Technical Expert Review Team (TERT) under service contract **No 3502/B2025/EEA.60384** implementing Framework service contract No EEA/CET/24/002 of the European Environment Agency. The lead reviewers and sector review experts did not review emission inventories of countries where these individuals have themselves contributed to the compilation of that inventory, or presently are or have been any part of the decision-making process related to the compilation of that inventory.

The TERT consisted of the following experts:

- Iordanis Tzamtzis, Lora Stoeva, Rosie Brook, Carmen Schmid, Boštjan Mali, Andis Lazdiņš, Sven van Baren, Bradley Matthews, Valentin Bellassen, Aldis Butlers, Mattias Lundblad, Juan José Rincón Cristóbal, Etienne Mathias, Erwin Moldaschl and Mélanie Juillard;
- Lead reviewers: Peter Weiss, Kevin Black, Sandro Federici and Marina Vitullo.

The comprehensive review was coordinated by Bernd Gugele and Justin Goodwin.

The EEA review secretariat consisting of Claire Qoul, Lærke Callisen, Peter Iversen and Roxy Cottey prepared and coordinated the comprehensive review as foreseen in Article 30 of Commission Implementing regulation (EU) No 2020/1208 and Article 42 of the Governance Regulation (EU) 2018/1999.

The comprehensive review was performed on the basis 15 April submissions of GHG emission data and the national inventory document (NID) under the Governance Regulation.

Where relevant, the TERT calculated technical corrections for over- or under-estimates identified in a mandatory category in the countries' GHG inventories that exceed the threshold of significance. Technical corrections have been calculated only for the years 2016-2018 and 2021-2023 If the technical correction exceeds the threshold of significance for at least one year of the inventory under review (2021-2023) but not for all the years, the technical correction was calculated only for those years where the technical correction exceeds the threshold of significance.

Table A-1: Scope of the comprehensive review 2025

Element	Scope	Further information
Countries	EU geographical coverage of the Member States, Norway and Iceland	
Years	2016, 2017, 2018, 2021, 2022 and 2023	According to GovReg Article 38(1a) According to LULUCF Article 4(4)
Gases	CO_2, CH_4 and N_2O	
Sectors	LULUCF	

Annex II: Checks carried out during the 2025 initial checks and review

The checks carried out during the 2025 initial checks are pursuant to Article 37(4) of Regulation (EU) 2018/1999 and Article 6 of Commission Delegated Regulation (EU) 2020/1044 and the comprehensive review following Article 38(1a) of Regulation (EU) 2018/1999 and Article 30 of the Commission Implementing Regulation (EU) No 2020/1208.

Initial checks may include:

1. Assessment whether all emission source categories and gases required under Regulation (EU) No 2018/841 are reported;
2. Assessment whether emissions data time series are consistent;
3. Assessment whether implied emission factors across Member States/countries are comparable taking the IPCC default emission factors for different national circumstances into account;
4. Assessment of the use of 'Not Estimated' notation keys where IPCC Tier 1 methodologies exist and where the use of the notation key is not justified in accordance with point 32 of the Annex to Decision 18/CMA.1;
5. Analysis of recalculations performed for the inventory submission, including whether the recalculations are based on methodological changes;
6. Assessment whether issues from earlier Union initial checks and reviews as well as recommendations from UNFCCC reviews have been implemented by the Member State;
7. Assessment of the accuracy of Member States' emissions by sources and removals by sinks estimates in relation to Union key categories;
8. Assessment of the transparency and completeness of the methodological descriptions reported by Member States for the Union key categories;
9. Assessment of monitoring and reporting of emissions by sources and removals by sinks in the land use, land use change and forestry (LULUCF) sector pursuant to Part 3 of Annex V to Regulation (EU) 2018/1999, including the assignment of key categories, Tier methodology applied, and a comparison of reported land use and land use change activity data with information derived from the Union and Member State programmes and surveys.

Comprehensive review checks:

1. Detailed examination of the inventory estimates including methodologies used by the Member State in the preparation of inventories;
2. Detailed analysis of the Member State's implementation of recommendations related to improving inventory estimates as listed in its most recent UNFCCC annual review report made available to that Member State before the submission under review where recommendations have not been implemented;
3. Detailed analysis of the justification provided by the Member State for not implementing them;
4. Detailed assessment of the time series consistency of the greenhouse gas emissions estimates;
5. Detailed assessment whether the recalculations made by a Member State in the given inventory submission as compared to the previous one are transparently reported and made in accordance with the greenhouse gas inventory guidelines;
6. Follow-up on the results of the initial checks and on any additional information submitted by the Member State under review in response to questions from the technical experts review team and other relevant checks; -
7. Other relevant checks complementing the initial checks;
8. Check that all gases and pools are reported under LULUCF.