United Nations FCCC/ETF/TERR.1/2024/PRT/Add.1

Framework Convention on Climate Change

Distr.: General
6 July 2026

English only

Report on the technical expert review of the first biennial transparency report of Portugal*

Addendum

Summary

This addendum to the report on the technical expert review of the first biennial transparency report of Portugal, conducted by a technical expert review team in accordance with the modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement, contains the results of the review of the consistency of the information submitted by the Party with those modalities, procedures and guidelines. The review took place from 23 to 27 March 2026 in Lisbon.

* In the symbol for this document, 2024 refers to the year in which the biennial transparency report was submitted, not to the year of publication.

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
2019 Refinement to the 2006 IPCC Guidelines	*2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AD	activity data
BTR	biennial transparency report
CH_4	methane
CL	cropland
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
COS	land-use and land-cover map
CRT	common reporting table
CTF	common tabular format
EEA	European Environment Agency
EF	emission factor
EMEP	Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
ETF	enhanced transparency framework under the Paris Agreement
EU	European Union
Eurostat	statistical office of the European Union
GEM-E3_PT	General Equilibrium Model for Energy, Economy and Environment for Portugal
GHG	greenhouse gas
GL	grassland
HFC	hydrofluorocarbon
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MCF	methane correction factor
MMS	manure management system(s)
MPGs	modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement
MSW	municipal solid waste
N_2O	nitrous oxide
NA	not applicable
NDC	nationally determined contribution
NE	not estimated
NFI	national forest inventory
NID	national inventory document
NMVOC	non-methane volatile organic compound
NO	not occurring
OECD DAC	Development Assistance Committee of the Organisation for Economic Co-operation and Development
PaMs	policies and measures
QA/QC	quality assurance/quality control
SWDS	solid waste disposal site(s)
TERT	technical expert review team

TIMES_PT	The Integrated Market Allocation–Energy Flow Optimization Model System customized for Portugal
Wetlands Supplement	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*

Areas of improvement[1] identified during the technical expert review of the Party's first biennial transparency report

Tables 1–20 present the results of the review of the consistency with the MPGs[2] of the information submitted by Portugal in its BTR1. All recommendations and encouragements contained in the tables are for the next BTR or national inventory report, unless otherwise specified.

A. General reporting provisions

Table 1
Areas of improvement relating to general reporting provisions

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

B. Greenhouse gas emissions and removals

Table 2
Areas of improvement relating to general findings on greenhouse gas emissions and removals

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
2.G.1	Specified in paragraph 18 of the MPGs Institutional arrangements	The Party described the institutional arrangements for preparing the inventory in chapter 1.2 of its NID (pp.1-10–1-15). However, the TERT noted that the national inventory arrangements currently in place seem insufficient in terms of ensuring continuity and sustainability with regard to the continued compilation of the national GHG inventory in the event of staffing changes, particularly for the energy and transport sectors. During the review, the Party explained that in the past year the national system has undergone institutional changes, and following the departure of long-serving experts, it has not yet been possible to recruit additional staff. The Party explained the measures in place for retaining institutional knowledge within the inventory team, noting that departing experts prepare detailed manuals describing data sources, calculations and methodological issues. The TERT encourages the Party to implement and maintain national inventory arrangements in a way that ensures sufficient expert capacity, institutional memory and sustainability of reporting.
2.G.2	Specified in paragraphs 29 and 44 of the MPGs Uncertainty analysis	In annex F to its NID, Portugal provided information on the uncertainty assessment, noting that approach 1 was applied to estimate total inventory uncertainty for a single year (2022) as well as the uncertainty in the trend. However, NID table F-1 (pp.F-2–F-8) reports the uncertainty associated with a number of categories as zero (e.g. categories 1.A.4, 2.C.1, 4.A.2, 4.B.2 4.C.2, 4.D.2, 4.E.2, 4.F.2 and 4.G), with no justification provided. In addition, Portugal did not report the underlying assumptions used when estimating the uncertainty of parameters for key categories, particularly in the LULUCF sector. During the review, the Party explained that it lacks the capacity to undertake an uncertainty assessment for all sectors but intends to carry out such an assessment and report information thereon once resources are available. The TERT recommends that the Party quantitatively estimate and qualitatively discuss the uncertainty of the emission and removal estimates for all source and sink categories, including updated information on the uncertainties of the inventory totals. The TERT also recommends that the Party provide information on the underlying assumptions used for the uncertainty assessment, as applicable, for all sectors.

[1] As referred to in paras. 7, 8, 146(d) and 162(d) of the MPGs, contained in the annex to decision 18/CMA.1.

[2] Decision 18/CMA.1, annex.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
2.G.3	Specified in paragraphs 31, 35 and 38 of the MPGs Notation keys	The TERT noted gaps in the reporting in Portugal's CRTs, such as (1) empty cells, (2) notation keys not being used in accordance with IPCC good practice; and (3) cases of "IE" being used without an accompanying justification in CRT 9: (a) Blank cells were reported in CRTs 2(II).B-Hs2 (for emission recovery for subcategory 2.F.1 refrigeration and air conditioning); 1.B.1 (AD for subcategory 1.B.1.a.i.3 abandoned underground mines, and AD and emissions for subcategory 1.B.1.a.i.4 flaring of drained CH_4 or conversion of CH_4 to CO_2); and 1.A(d) (AD for biomass); (b) "NO" was incorrectly reported instead of "NE" in a number of CRTs, including 1.A(a)s1 (category 1.A.1.a public electricity and heat production from solid fuels), or instead of "IE" in CRT 5.C (category 5.C.1 open waste incineration of MSW), which the Party reported in the NID (p.7-7) to be occurring and had included under the energy sector (subcategories 1.B.2.b.iv natural gas transmission and storage and 1.B.2.c.i.2 natural gas venting), for which emission estimates for CO_2 and CH_4 should have been provided in CRT 1.B.2; (c) Explanations for the use of "IE" were missing from CRT 9, including for the energy sector (e.g. CO_2 from manufacturing industries and construction and transport), the IPPU sector (e.g. CO_2 from other process uses of carbonates), the agriculture sector (e.g. N_2O from mineralization/immobilization associated with loss/gain of soil organic matter) and the LULUCF sector (e.g. N_2O from organic nitrogen fertilizers). During the review, Portugal explained that information was not reported in CRT 9 owing to a malfunction in the ETF GHG inventory reporting tool. The Party noted that the inclusion of empty cells and the incorrect use of notation keys were due to reporting errors and acknowledged that enhancing QA/QC procedures could enhance the consistency of its reporting process. The TERT recommends that Portugal ensure that the CRTs are complete, in accordance with annex I to decision 5/CMA.3, using the appropriate notation keys and providing explanations, including for the notation keys used in CRT 9; enhance QA/QC activities with a view to increasing consistency and completeness of the inventory; and follow IPCC good practice on correct use of notation keys.
2.G.4	Specified in paragraphs 35 and 46 of the MPGs QA/QC and verification	Portugal has implemented general inventory QC procedures and provided information thereon in its NID (chap. 1.6, pp.1-22–1-24) in accordance with its QA/QC plan and the 2006 IPCC Guidelines (vol. 1, chap. 6). However, the TERT identified some inconsistencies between the CRTs and the NID (e.g. "NO" was reported in CRT 2(I).A_H for CO_2 and CH_4 emissions under subcategories 1.B.2.b.v and 1.B.2.c.i.2, whereas the NID (pp.3-141–3-142 and 3-144–3-146) reports that corresponding emissions occur in the country), indicating that the inventory QC procedures currently in place may not be fully effective. In addition, Portugal did not report information on QA procedures already implemented or to be implemented or provide information on any peer reviews considered in inventory preparation. During the review, the Party acknowledged that its existing QC procedures could be strengthened. Portugal explained that a lack of capacity hinders QA procedures from being implemented and confirmed that no basic expert peer review of the inventory was conducted. The TERT recommends that the Party enhance the general QC procedures to ensure that consistent information is reported in the NID and CRT. In addition, the TERT encourages the Party to implement QA procedures by conducting a basic expert peer review of its inventory and include information on QA procedures already implemented or to be implemented in the future.

Table 3
Areas of improvement of the reporting on greenhouse gas emissions and removals – energy sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
3.E.1	Specified in paragraphs 40 and 47 of the MPGs	In 2003–2011 the IEF for CO_2 from liquid fuels in subcategory 1.A.1.a public electricity and heat production decreased by 1 per cent, while the IEFs for CH_4 and N_2O from liquid fuels in subcategory 1.A.1.a increased by 84 and 203 per cent

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
	1.A.1.a Public electricity and heat production – liquid fuels – CH_4 and N_2O	respectively. The NID explains that there was a shift in the fuels used, from fuel oils to coal and gas, in this period. The TERT noted that the NID does not specify any shifts in types of liquid fuels used, or in the technologies used for public electricity and heat production using liquid fuels. The TERT noted that the Party did not report complete information on the underlying trends to explain the shift in IEFs for CH_4 and N_2O from liquid fuels in source subcategory 1.A.1.a. During the review, the Party clarified that the change in the IEFs for liquid fuels in subcategory 1.A.1.a reflects structural changes in the power generation fleet using fuel oil. In 2003–2011, several fuel-oil-fired plants on the mainland were progressively phased out as electricity generation shifted towards natural gas. In the island systems, however, liquid fuels continued to be used because of the limited availability of alternative fuels and the smaller scale of the power systems. As a result, the relative share of electricity generation from smaller island plants increased within the remaining liquid fuel consumption, which led to higher weighted average IEFs for CH_4 and N_2O. The TERT recommends that the Party improve the transparency of its reporting by including information on the underlying trends in the fuel mix for liquid fuels and the technology used for public electricity and heat production from liquid fuels, which resulted in changes to the IEFs for CH_4 and N_2O.
3.E.2	Specified in paragraphs 40 and 47 of the MPGs 1.A.1.a Public electricity and heat production – gaseous fuels – N_2O	The Party reported in NID table 3-5 that the EF for natural gas in energy production (1.0–3.0 g/GJ) was sourced from the 2006 IPCC Guidelines. For 1997, which is the first year for which emissions from gaseous fuels are reported, the IEF for N_2O is 1.00 kg/TJ, as reported in CRT table 1.A(a). The IEF increases to 2.56 kg/TJ in 2000 and remains between 2.63 and 2.96 kg/TJ thereafter. The TERT noted that the Party did not report on how the range of EFs (1.0–3.0 g/GJ) was applied, and that the NID does not explain the changes in the N_2O IEF early in the time series. Therefore, the Party did not report complete information on the EFs used for subcategory 1.A.1.a public electricity and heat production or explain underlying emission trends. During the review, the Party explained that the variation in the IEF over time reflects the progressive introduction of combined cycle gas turbine plants in Portugal, starting in 1999. These technologies are associated with higher default N_2O EFs compared with conventional boilers, resulting in a higher IEF for gaseous fuels. The TERT recommends that the Party increase the transparency of its reporting by including in the NID information on technological changes in power generation based on natural gas across the time series, explaining the change in the IEF for N_2O in source subcategory 1.A.1.a, and by including information about the different EFs used.
3.E.3	Specified in paragraphs 26 and 28 of the MPGs 1.A.1.a Public electricity and heat production – other fossil fuels – CH_4	The Party reported in NID figure 7-18 a relatively high level of MSW incineration, with respect to energy content, for 2021. When incinerated with energy recovery, MSW should be included under source subcategory 1.A.1.a public electricity and heat production (other fossil fuels), as described in the 2006 IPCC Guidelines (vol. 2, chap. 1, table 1.1). The consumption of other fossil fuels under subcategory 1.A.1.a was more than 50 per cent higher in 2021 compared with the previous and following years, according to the CRTs. This affected the CH_4 emission estimates, which rely on AD in energy terms. Therefore, the corresponding CH_4 emission estimates reported in CRT 1.A(a) increased in 2021. The TERT noted that the Party did not provide an explanation for the fluctuation in the AD for other fossil fuels in the NID, and the high value for a single year may represent an issue with the accuracy of the emission estimate and with the Party's QA/QC procedures. During the review, the Party explained that net calorific values were reported by the MSW incineration plants and that the high level of energy for 2021 resulted from one of the plants reporting a higher net calorific value for that year. The TERT recommends that the Party verify the AD and net calorific value used for MSW for 2021, which resulted in a sharp increase in the consumption of other fossil fuels reported under subcategory 1.A.1.a, and perform recalculations for 2021 in accordance with the 2006 IPCC Guidelines if a lack of time-series consistency is identified, ensuring that changes in emission trends are not introduced as a result of changes in methods or assumptions across the time series.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
3.E.4	Specified in paragraphs 21 and 40 of the MPGs 1.A.4.a Commercial/institutional – liquid fuels – CO_2, CH_4 and N_2O	The Party reported in NID section 3.6.3.2 a drop in diesel/gas oil consumption under commercial/institutional (source subcategory 1.A.4.a) in 2005–2006. The Party reported that this was due to a reallocation in the energy balance, namely of gas/diesel oil from services not specified to agriculture. According to the 2006 IPCC Guidelines (vol. 2, chap. 2, table 2.1), emissions from fuel combustion in agriculture should be included in source subcategory 1.A.4.c agriculture, forestry and fishing. According to CRT 1.A(a)s4, energy consumption for liquid fuels in source subcategory 1.A.4.a decreased by 13,202 TJ in 2005–2006 and CO_2 emissions for the subcategory decreased by 973 kt. The TERT noted that the NID does not provide clear information on which CRT source categories gas/diesel oil consumption and associated emissions were reallocated to. A reclassification in the energy balance to agriculture would indicate a reallocation to source subcategory 1.A.4.c in the GHG inventory, but no increase in liquid fuel consumption is evident in 2005–2006 in that subcategory. Moreover, it is unclear from the NID how time-series consistency was ensured for source subcategory 1.A.4.a and for the source category to which the consumption was allocated. The TERT also noted that the time series of fuel consumption and emissions for commercial/institutional is not consistent because gas/diesel oil was reallocated to another source category for 2006 onward but recalculations were not carried out for the time series prior to 2006. During the review, the Party clarified that the consumption of gas/diesel oil in the GHG inventory was reallocated to source subcategory 1.A.3.b road transportation. Regarding time-series consistency, the Party noted that the inventory follows the national energy balance as the primary source of AD. The Party explained that the change observed after 2005 likely reflects an improvement in the underlying energy statistics, rather than a methodological change in the inventory. The TERT recommends that the Party ensure that the allocation of fuel consumption between subcategories is in line with the 2006 IPCC Guidelines (vol. 2, chap. 2, p.2.9) and consistent across the time series. The TERT also recommends that the Party clearly document and justify in the NID the allocation of gas/diesel oil between the commercial/institutional and road transportation subcategories across the entire time series.
3.E.5	Specified in paragraph 40 of the MPGs 1.B.2.a Oil – CH_4	According to the NID, revised values for crude oil density were used for the estimates for subcategory 1.B.2.a.iii transport. For subcategory 1.B.2.a.iv refining/storage, no crude oil density value was provided, nor was any revision of this value reported. The TERT noted that the Party did not report transparently on the conversion of crude oil density data, which was necessary for estimating emissions for subcategory 1.B.2.a.iv. In addition, the most recent country-specific value for crude oil density was not used to estimate emissions for the subcategory. During the review, the Party explained that different crude oil densities were used for subcategories 1.B.2.a.iv and 1.B.2.a.iii, and a constant value for crude oil density of 850.77 kg/m^3 was used across the time series. The Party also confirmed that it will update the crude oil density time series for subcategory 1.B.2.a.iv using the recently revised values applied for subcategory 1.B.2.a.iii. The TERT recommends that the Party increase the transparency of its reporting by including information on the conversion of AD under subcategory 1.B.2.a.iv from Mt to m^3. In addition, the TERT encourages the Party to update the crude oil density used for the conversion of AD to the most recent country-specific value available.
3.E.6	Specified in paragraph 21 of the MPGs 1.B.2.a Oil – CH_4	In NID section 3.8.3.5.7, the Party reported that fugitive CH_4 emissions from oil refining/storage were estimated using crude throughput in refineries in m^3 and using an average EF derived from two values provided in the 2006 IPCC Guidelines (vol. 2, chap. 4, table 4.2.4) (2.18×10^{-5} Gg $CH_4/10^3$ m^3 crude). The Party reported in CRT 1.B.2 0.0000002628095 kt CH_4 emissions and AD of 18,549 Mt crude oil for 2022 under subcategory 1.B.2.a.iv. However, applying an EF of $2,18\times10^{-5}$ Gg/10^3 m^3 to 18,549 Mt crude oil and using a crude oil density of 850.77 kg/m^3 (see ID# 3.E.5) results in a higher CH_4 emission estimate than the one reported by the Party. The TERT therefore concludes that there is an accuracy issue in the AD and/or a calculation error in the emission estimates reported. In addition, the IEF reported in CRT 1.B.2 is not comparable with the default EF in

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		terms of orders of magnitude. The TERT identified similar problems across the time series. During the review, the Party clarified that crude throughput in the refineries is in the range of 11 million–17 million m^3/year, and that a density of 850.77 kg/m^3 was used for crude oil for this subcategory. The TERT recommends that the Party ensure that the estimates are in line with the 2006 IPCC Guidelines, as explained in the NID, making the necessary corrections to the AD and EF used for the estimates across the times series.
3.E.7	Specified in paragraphs 22, 31 and 40 of the MPGs 1.B.2.b Natural gas – CH_4	The Party reported in NID section 3.8.4.2 that the methodology used to estimate emissions from the transport of natural gas is based on the use of adjustment factors, which represent all losses of natural gas throughout the system. The Party reported that the adjustment factors include gas released in safety valves in distribution networks and leakage during maintenance in transmission systems, and only a small proportion of total losses in the high-pressure gas transmission system are due to leaks, with most losses due to self-consumption and covered by category 1.A fuel combustion activities. The TERT noted that the NID does not specify in which subcategories self-consumption is included. Furthermore, in CRT 1.B.2, venting and flaring of gas was reported as "NO". The TERT noted that gas released through safety valves in the transmission system is not described as part of the adjustment factor, and that it is unlikely that venting (i.e. the intentional release of gas into the atmosphere) does not occur in connection with natural gas transport in the country. The TERT noted that the country-specific methodologies used were not clearly presented in the NID. During the review, the Party explained that emissions from venting and flaring are included in the adjustment factors applied to estimate fugitive emissions from the natural gas transmission and distribution systems and were therefore reported as "NO" in CRT 1.B.2. The Party also provided additional information from the Portuguese Directorate-General for Energy and Geology, which clarifies that self-consumption of natural gas in the grid is mainly associated with the operation of compressors or turbines used to maintain pressure in the underground storage in natural gas facilities. The TERT recommends that the Party include in its NID more comprehensive information and documentation on the methodology used to estimate fugitive emissions from the transmission and distribution of natural gas, including by clearly indicating which sources and source categories are covered by the adjustment factors for gas transmission and distribution and by including information on the types of self-consumption that occur and the source categories in which self-consumption is included, thereby clarifying the reporting on self-consumption in the gas transmission system. The TERT recommends that the Party report "IE" rather than "NO" for subcategory 1.B.2.c.i.2 and any other source category covered by the adjustment factor for gas transmission and distribution as the emissions are reported under subcategory 1.B.2.b.iv.

Table 4
Areas of improvement of the reporting on greenhouse gas emissions and removals – industrial processes and product use sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
4.I.1	Specified in paragraph 21 of the MPGs 2.A.4 Other process uses of carbonates – CO_2	The Party reported in its NID (chap. 4.2.12.2) AD for carbonate uses of fertilizer (subcategory 2.A.4.d). Portugal explained the reasons for the significant decrease in consumption in 2010 and 2011 but did not explain the reason for the sharp increase in consumption from 2020 (145.45 kt CO_2) to 2021 (174.97 kt CO_2) and 2022 (194.23 kt CO_2) seen in NID figure 4-23 and CRT 2(I).A-H. During the review, the Party explained that it did not initially seek to clarify the significant increase in consumption of limestone and dolomite fertilizer in 2021–2022 with the data provider. During the preparation of the 2025 submission, a sharp decrease in production in 2023 triggered a verification process with the National Statistics Office, which confirmed that the 2023 value was correct, but a compilation error was identified in the units used for fertilizer amounts throughout the time series (1990–2022). The Party received corrected AD, revised the entire

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		time series and found that CO_2 emissions had previously been significantly overestimated. The revised data show a slight decrease in the AD in 2019–2020 owing to market restrictions related to the coronavirus disease 2019 pandemic, with the trend subsequently recovering and showing gradual growth in 2021–2024. The Party stated that the corrected estimates are included in the upcoming 2026 submission. The TERT recommends that the Party correct the AD for carbonate uses of fertilizer across the time series.
4.I.2	Specified in paragraphs 21 and 35 of the MPGs 2.D.1 Lubricant use – CO_2	The values reported for CO_2 emissions from lubricant use in row 78 of CRT 2(I).A-H (category 2.D.1) do not match the corresponding values deducted in CRT 1.A(d) (row 23) for most of the time series, even though identical values should be reported. The NID explains that emissions from lubricants combusted as energy in two-stroke engines are reported under subcategory 1.A.3.b fuel combustion in road transportation, while emissions from lubricants used as feedstock and from lubricants unintentionally entering four-stroke engine combustion chambers are reported under category 2.D.1. During the review, the Party confirmed that it followed the above-mentioned reporting methodology and clarified that the discrepancies between the values reported in the energy and IPPU sectors were caused by a compilation error, where the amounts deducted from CRT 1.A(d) (row 23) were not correctly assigned to CRT 2(I).A-H (row 78), affecting the entire time series. The TERT recommends that the Party correct the CO_2 emission estimates for lubricant use reported in CRT 2(I).A-H (row 78) and the corresponding deducted values in CRT 1.A(d) (row 23) and strengthen its QA/QC procedures to ensure full consistency between the values reported for lubricant-related CO_2 emissions in the energy and IPPU sectors and prevent future compilation errors.
4.I.3	Specified in paragraph 52 of the MPGs 2.D.3 Other (non-energy products from fuels and solvent use)	The Party reported in its NID (chaps. 4.5.4 and 4.5.5, pp.4-90–4-91 and 10-11–10-12) that it continued to report indirect CO_2 emissions for subcategories 2.D.3.a solvent use and 2.D.3.b road paving with asphalt as direct emissions in CRT 2(I). During the review, the Party indicated that NMVOC emissions from solvent use were reported as indirect CO_2 emissions to maintain continuity with previous submissions and ensure consistency with EU guidance issued in 2016. The Party explained that it intends to consult with colleagues from working group I – annual GHG inventories – of the expert group on transparency under the UNFCCC to clarify whether there have been any updates to the guidance and to ensure that its reporting aligns with it going forward, as appropriate. The TERT recommends that the Party report indirect CO_2 emissions from NMVOCs for subcategories 2.D.3.a and 2.D.3.b as indirect without including them in the national totals of direct emissions.
4.I.4	Specified in paragraphs 21 and 39 of the MPGs 2.F.3 Fire protection – HFCs	The Party reported in its NID (chap. 4.7.9.4) that in 1999–2010 data on amounts of gases used in fire extinguishing equipment were provided by sellers and enterprises responsible for filling equipment, whereas for 2011 onward, the values were forecast on the basis of the average for 2005–2010. NID figure 4-60 and CRT 2(II).B-Hs2 show double the amount of HFCs in new equipment in 2010 compared with the previous year (31.68 t compared with 15.84 t in 2009). This results in emissions remaining consistently high from 2011 onward, driven by the inflated 2010 value used in the averaging method, contrary to the expected declining trend for category 2.F.3 fire protection. During the review, the Party explained that earlier estimates for this category were based on a conservative approach following the 2006 IPCC Guidelines (vol. 3, chap. 7.6.2.2) and incomplete and outdated AD, which required revision. In the light of a question raised during the 2025 comprehensive review of the GHG emissions inventory of Portugal, the Party reassessed the methodology and collected new information from the Portuguese Association for Security, obtaining a complete time series of HFC amounts for 1998–2018 and updated information on extinguishing agents and shares used in operation. The Party also revised assumptions for the disposal phase. These updates led to substantial recalculations and a significant reduction in the emission estimates for 2018 onward. The revised estimates and methodological clarifications are included in the 2026 submission.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		The TERT recommends that the Party replace the forecast AD used for 2011 onward with the AD collected from the Portuguese Association for Security and transparently document the revised AD and assumptions applied in the NID.

Table 5
Areas of improvement of the reporting on greenhouse gas emissions and removals – agriculture sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
5.A.1	Specified in paragraph 39 of the MPGs 3. General (agriculture) – CH_4 and N_2O	The Party's emission estimations include changes implemented over time for different submissions in the data sources, AD, methodology or EFs used, sometimes with insufficient rationale provided for its choice of methods and/or no descriptions, assumptions and references provided, particularly for categories 3.A.1 dairy cattle (updates made to the dairy and non-dairy cattle population data for 2021) and 3.D.1 animal manure applied to soils (updates made to amounts for 2000 onward). During the review, Portugal explained that a thorough QA/QC process was performed and new data continue to become available, but only for part of the time series. The Party confirmed that time-series consistency is ensured by applying consistent procedures for all inventory years; specifically, the same AD source (the National Statistics Office) was used for the entire time series, the same methodology was applied for all years and AD were systematically compared with previous submissions. In addition, cross-checks with data from the Food and Agriculture Organization of the United Nations were carried out to ensure coherence and reliability. The Party also confirmed that coherence is maintained with AD used for other source categories, as the same data underpin emission estimates for N_2O, CH_4, ammonia and nitrogen dioxide, thereby ensuring internal consistency for the inventory. The TERT recommends that Portugal provide background information, including a description, assumptions, references and sources used, for the EFs and AD used for livestock population for dairy cattle under category 3.A.1; animal waste management systems under category 3.B.1 (fraction of manure handled); and manure applied to soil under category 3.D.1 in compiling the GHG inventory.
5.A.2	Specified in paragraph 39 of the MPGs 3.B Manure management – N_2O	The Party followed the 2006 IPCC Guidelines (vol. 4, chap. 10) by providing information in NID table 5-25 on the national MMS classification. However, the Party did not provide additional information or a description to show how the lagoon system or tanks/earthen ponds correspond to the categories liquid/slurry with and without natural crust cover described in the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.21). During the review, the Party shared its plans for the continuing improvement of the characterization of MMS framed by decree-law 81/2013 related to livestock farming and described planned efforts to explore new sources of information, particularly for the lagoon system and tanks/earthen ponds. Portugal noted that the parameters for both these MMS are based on time of storage (less than one year). The TERT recommends that the Party revise NID table 5-25 and explain in the NID that the country-specific MMS lagoon system and tanks/earthen ponds correspond with the categories liquid/slurry with natural crust cover and liquid/slurry without natural crust cover respectively from the 2006 IPCC Guidelines.
5.A.3	Specified in paragraphs 21 and 23 of the MPGs 3.D.1 Direct N_2O emissions from managed soils – N_2O	The Party reported in CRT summary 3 the use of tier 1 methods for the agriculture sector, which includes key categories according to CRT 7 (categories 3.D.1 and 3.D.2). The TERT noted that, according to paragraph 23 of the MPGs, a Party may be unable to adopt a higher-tier method for a particular key category owing to a lack of resources. During the review, the Party explained that it was unable to implement a higher-tier method for key categories owing to a lack of data, financial resources and knowledge. The TERT recommends that the Party clearly document in the NID why the methodological choice was not in line with the corresponding decision tree (figure 4.1) from the 2006 IPCC Guidelines (vol. 1, chap. 4). The TERT encourages the

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		Party to make every effort to use a higher-tier method, in line with IPCC good practice, and to report information on how it is addressing or intends to address this issue.
5.A.4	Specified in paragraph 40 of the MPGs 3.F Field burning of agricultural residues – CO_2, CH_4 and N_2O	In CRT 3.F the Party reported the burning of perennial woody crops as "NO", but the NID (chap. 5.7.1, p.7-42) indicates that such burning occurs in the country. Some agricultural waste is incinerated and reported under the agriculture sector (category 3.F.1 cereals), and some incinerated waste is reported under the waste sector (category 5.C open burning of waste). The TERT noted that this reporting and allocation is not consistent with the 2006 IPCC Guidelines (vol. 5, chap. 5, p.5.5), which state that emissions from the burning of agricultural residues are considered under the agriculture, forestry and other land use sector (see ID# 7.W.5). During the review, the Party explained that, as described in the NID, a reallocation was made following a recommendation from the 2022 review of the EU directive on the reduction of national emissions of certain atmospheric pollutants (directive 2016/2284), which defines emission ceilings for nitrogen oxides, NMVOCs, sulfur oxides, ammonia and fine particular matter ($PM_{2.5}$) for each member State, for Portugal to reallocate emissions from residue burning of vineyards, olive trees or orchard, previously reported under the agriculture sector, to category 5.C.2, as stipulated in the EMEP/EEA air pollutant emission inventory guidebook 2023. In order to ensure as much consistency as possible between the GHG inventory and other non-GHG inventories, Portugal applies the same allocation in both inventories. The TERT evaluated the Party's explanation as not fully transparent and identified a potential source of double counting, noting that the Party did not explain in the NID how the implementation of the above-mentioned directive is consistent with the 2006 IPCC Guidelines. The TERT recommends that the Party report emission estimates for the on-site burning of perennial woody crops under burning of agricultural residues in accordance with the 2006 IPCC Guidelines in CRT 3.F, along with the incineration of other agricultural residues. If some of the waste is burned off-site as waste or for energy purposes, the TERT recommends that the Party justify the allocation of the emissions, report appropriate notation keys and provide an explanation in the CRT and NID.

Table 6
Areas of improvement of the reporting on greenhouse gas emissions and removals – land use, land-use change and forestry sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
6.L.1	Specified in paragraphs 21 and 23 of the MPGs 4. General (LULUCF) – all gases	The Party reported in CRT summary 3 the use of tier 1 methods for the LULUCF sector, which includes key categories according to CRT 7 (CO_2 for categories 4.A.1, 4.A.2, 4.B.1, 4.C.1, 4.C.2, 4.D.2 and 4.G, and CO_2 and CH_4 for category 4(IV)). However, the NID does not describe the key categories and/or carbon pools for which tier 1 methods were applied the TERT was unable to find a description in the NID of the key categories and/or carbon pools for which tier 1 methods were applied. The TERT noted that, according to paragraph 23 of the MPGs, if a Party is unable to adopt a higher-tier method for a particular key category owing to a lack of resources, it may use a tier 1 approach and shall clearly document why the methodological choice was not in line with the corresponding decision tree of the 2006 IPCC Guidelines; however, this information was not provided in the NID. During the review, the Party explained that it applied tier 1 methods for the following key categories: categories 4.A.1, 4.A.2, 4.B.1, 4.B.2, 4.C.1, 4.C.2, 4.D.2, 4.E.2 and 4.G. Portugal provided a detailed table indicating the sources and sinks for which tier 1 methods were applied and confirmed that this information is reported in its 2026 national GHG inventory submission. The Party also noted that applying higher-tier methods for the above-mentioned key categories would require disaggregated national data sets to be developed, including through extensive field-based data collection for litter and soil organic carbon, which would involve national soil sampling campaigns and subsequent laboratory and statistical analysis. In order to make these improvements, the Party would need to

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		establish new data-collection systems, carry out extensive, systematic field campaigns across multiple land-use categories, and implement periodic data collection over time. In addition, statistical analysis would need to be carried out on large data sets in order to derive robust country-specific parameters, and close collaboration with research institutions would be required, along with additional technical capacity. Significant additional financial and human resources would be required in the long term, and such resources are not currently available. The TERT recommends that the Party clearly document in the NID why the methodological choice for key categories was not in line with the corresponding decision trees (figures 1.2–1.3) from the 2006 IPCC Guidelines (vol. 4, chap. 1). The TERT encourages the Party to make every effort to use a higher-tier method for key categories, in line with IPCC good practice, and to report information on how it is addressing or intends to address this issue.
6.L.2	Specified in paragraph 39 of the MPGs Land representation – all gases	The Party described its use of COS maps for representing lands in continental Portugal; however, the NID does not describe how the maps were produced, including data-collection methods, sources of information (aerial photography or remote sensing data) and how the methods remain consistent over time. During the review, the Party explained that, according to the Directorate-General for Territory, COS1995, COS2007, COS2010, COS2015 and COS2018 are spatially and temporally consistent across the time series. The Party also clarified that COS maps are polygon-based land-use and land-cover maps produced for continental Portugal. The maps are primarily based on visual interpretation of orthorectified aerial imagery with high spatial resolution, supported by auxiliary data sets from different sources. The maps follow common technical specifications across the series, including a minimum mapping unit of 1 ha, a minimum distance between lines of 20 m, and a hierarchical classification system. To support consistency over time, the same general methodological framework was applied to the aerial imagery coverage for 1995, 2007, 2010, 2015 and 2018. Portugal noted that, while updates and improvements were introduced over time, the COS series 1 was specifically designed to support comparable land representation in 1995–2018. The TERT recommends that the Party describe in the NID the COS maps used for representing land in continental Portugal, including information on methods, assumptions and information sources (aerial photography or remote sensing data), and describe how the maps are produced using consistent methodologies over time.
6.L.3	Specified in paragraphs 21 and 39 of the MPGs 4.A.1 Forest land remaining forest land – CO_2	The Party applied the gain–loss method from the 2006 IPCC Guidelines (vol. 4, chap. 4, p.4.11) for estimating biomass carbon stock changes in category 4.A.1 forest land remaining forest land, resulting in cumulative emissions and removals of –96.3 Gg CO_2 eq for 1990–2022. However, this value differs significantly from the NFI data reported in NID table 6-3 (p.6-18) in relation to total biomass forest carbon stocks and the implied net emissions and removals. During the review, the Party explained that annual changes in biomass were estimated as the balance between gains (from growth) and losses (including harvest, disturbances and land-use change). To ensure consistency with observed NFI stock changes, an additional loss component (“other harvest”) was calculated for each forest type and NFI period. This component, which represents biomass losses not captured by reported industrial removals or resulting from natural mortality, was derived so that the cumulative net annual changes are consistent with the biomass carbon stocks reported in successive NFIs. Portugal explained that it carried out a recalculation for the category for its 2025 submission by reconciling the annual gains and losses with the forest carbon stocks measured through the NFIs and by adjusting forest growth rates and the volume of “other harvest”. The TERT recommends that Portugal reconcile the biomass gains and losses in category 4.A.1 forest land remaining forest land with its periodic NFI measurements of forest carbon stocks in line with the gain–loss method from the 2006 IPCC Guidelines (vol. 4, chap. 4, p.4.11) and describe in the NID how the reconciliation was performed, including in tabular format.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
6.L.4	Specified in paragraph 39 of the MPGs 4.A.1 Forest land remaining forest land – CO_2	The Party reported in its NID that expert judgment was used for estimating forest growth rates (table 6-3, p.6-18) and post-fire tree mortality rates (table 6-18, p.6-51). For the former, the Party reported that a range of experts from forest authorities, forest owner organizations and forest management companies were involved. However, the TERT was unable to find examples of the documentation referred to in the 2006 IPCC Guidelines (vol. 1, chap. 2, annex 2A.1) for this expert judgment. During the review, the Party explained that formal documentation of expert judgment and associated processes, as described in the 2006 IPCC Guidelines, is not available. Portugal also explained that the selected values for forest growth rates and post-fire tree mortality rates reflect a technical consensus reached among experts with practical and scientific knowledge of Portuguese forest ecosystems. The consultation process was conducted internally through technical exchanges and meetings. Portugal also noted that the effect of these parameters on the overall estimates is limited because forest biomass carbon stocks in the inventory are periodically aligned with data from successive NFIs. Between NFI benchmark years, stocks are updated using a gain–loss approach, and additional adjustments are applied to ensure consistency between modelled stocks and observed total stocks. As a result, potential uncertainties in growth or mortality parameters do not lead to significant deviations in long-term carbon stock estimates. The TERT recommends that the Party document the expert judgment used for the selection of forest growth rates and post-fire tree mortality rates in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 2, annex 2A.1).
6.L.5	Specified in paragraph 39 of the MPGs 4.A.1 Forest land remaining forest land – CO_2	The Party reported carbon stock data obtained from NFI3, NFI4, NFI4 and NFI5 in NID table 6-3 (p.6-18). However, the NID does not include background data, methodological information or a description for these NFIs, including information on how data were collected and the comparability of methods over time. During the review, Portugal explained that its NFIs are based on a systematic sampling approach, which is designed to be representative of all forests at the national level. This approach relies on a common sampling framework applied across the national territory and provides statistically robust estimates of forest area, standing volume, biomass and carbon stocks. To support the development of a consistent monitoring system, the sampling framework was applied to four land-cover maps based on national aerial imagery from 1995, 2005, 2010 and 2015. The TERT recommends that Portugal describe in its NID the NFIs used for estimating forest carbon stocks and forest carbon stock changes associated with category 4.A forest land and with conversion from forest land to other land uses (categories 4.B.2, 4.C.2, 4.D.2, 4.E.2 and 4.F.2), including information on the methods used and how they are comparable over time.
6.L.6	Specified in paragraph 39 of the MPGs 4.B.1 Cropland remaining cropland – CO_2	The Party reported in its NID (p.6-33) an assumption of no net changes in living biomass in category 4.B.1 cropland remaining cropland, except in cases of conversion among cropland subcategories and post-fire recovery of burned perennial crops. However, the TERT notes that the 2006 IPCC Guidelines (vol. 4, chap. 5.2.1.1) state that this tier 1 assumption is for annual crops only and require biomass carbon stock changes to be estimated for perennial crops. During the review, the Party explained that the assumption described in the NID only applies to annual crops in accordance with the 2006 IPCC Guidelines and that it estimated biomass carbon stock changes using country-specific data for perennial crops (CL4–CL6) remaining in the same subcategory. Portugal also noted that age-dependent biomass functions were developed using national data sets compiled under the LIFE MediNet project and describe above- and below-ground biomass accumulation following plantation. Annual carbon gains were derived from successive age-specific stock differences during the establishment phase, while a constant net annual increment was applied under mature stand conditions. The TERT considers this to be in line with the 2006 IPCC Guidelines. The TERT recommends that the Party clarify in the NID that the assumption of no net changes in living biomass relating to category 4.B.1 only applies to annual crops.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
6.L.7	Specified in paragraphs 21 and 47 of the MPGs 4.B Cropland – CO_2 and 4.C Grassland – CO_2	The Party reported in the NID emissions and removals for categories 4.B cropland (figure 6-20, p.6-32) and 4.C grassland (figure 6-22, p.6-35), with both categories showing a decreasing trend (i.e. net removals increase over the time series). However, the Pary did not provide a clear description of these trends. During the review, the Party explained that the decreasing trend in net removals reported for cropland and grassland was influenced by methodological inconsistencies in the estimation of biomass carbon stock changes, which have been corrected for the 2025 submission. According to the Party, the following corrections have been made: (a) For perennial cropland (CL5, CL6) and shrubland (GL2), below-ground biomass growth was previously calculated using above-ground biomass factors instead of below-ground biomass factors. EFs have been revised accordingly; (b) Data for perennial crops (CL4, CL5, CL6) from the MediNet project were inadvertently introduced as biomass instead of carbon. These values have been corrected by applying the appropriate carbon fraction; (c) The MediNet data tables for perennial crops (CL4, CL5, CL6), structured by age class (1 to 20 years), were incorrectly used in the estimation of biomass gains through the SUMPRODUCT function. Owing to a misalignment, age-dependent growth factors were applied in reverse order (e.g. areas aged 20 years were multiplied by factors for one year of age). Since growth rates are typically higher in younger stands, this resulted in an overestimation of carbon gains, particularly in older age classes. The data have now been correctly aligned (from 20 years of age to one year of age). The same issue and correction applies to shrubland (GL2). Portugal explained that these inconsistencies led to an overestimation of CO_2 removals in perennial cropland and shrubland categories. Following the corrections introduced for the 2025 submission, the estimation of biomass gains is consistent with the age structure and carbon content of the vegetation. As a result, the artificial trend previously observed is no longer present in the updated time series. The Party also shared the updated time series in tabular and graphical format following the corrections, and the time series appears to be consistent. The TERT considers the changes to be in line with IPCC guidance. The TERT recommends that Portugal describe in its NID corrections to categories 4.B.1 cropland remaining cropland and 4.C.1 grassland remaining grassland by (1) using the correct growth rate for below-ground biomass, (2) using correct units relating to the data obtained from the MediNet project and (3) correctly estimating biomass carbon gains by age class; ensure consistent reporting of the time series; and explain the recalculations in the NID.
6.L.8	Specified in paragraph 20 of the MPGs 4.D.2 Land converted to wetlands – CH_4 and N_2O	The Party reported in CRT 7 that category 4.D.2 land converted to wetlands is a key category. Portugal provided in its NID (section 6.5.2, p.6-39) a methodological description for the category with respect to carbon pools (CO_2) only. However, the Party did not describe the methods for estimating non-CO_2 emissions for this key category, although the TERT notes that the 2006 IPCC Guidelines (vol. 4, appendix 3) provide limited guidance on this respect. During the review, the Party confirmed that the methodologies for estimating GHG emissions from wetlands are under consideration for improvement, drawing on the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*, as well as elements of the 2019 Refinement to the 2006 IPCC Guidelines. The planned improvements include the identification and disaggregation of wetland types into subcategories (e.g. coastal lagoons, salt marshes, salt pans and reservoirs) and the characterization of associated management practices, as well as the potential development of country-specific parameters and the application of methodologies for estimating CH_4 and N_2O emissions from managed wetland systems. The TERT encourages the Party to improve the completeness of its inventory by estimating non-CO_2 emissions for category 4.D.2, for example by using methodologies from the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, chap. 7.3.2) and the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
6.L.9	Specified in paragraph 56 of the MPGs 4.G Harvested wood products – CO_2	The Party reported emissions and removals for category 4.G harvested wood products using data on production, imports and exports, and the Party used approach B (production approach) in table 4.G. However, the Party did not provide a sufficiently detailed methodological description to enable the TERT to confirm whether the selected approach adheres to the production approach required under paragraph 56 of the MPGs, including with regard to the system's boundary and how equations from the 2006 IPCC Guidelines (vol. 4, chap. 12, annex 12.A.1) were used; only a reference to equation 12.4 from the IPCC Guidelines was provided. During the review, the Party confirmed that it applied the production approach in accordance with the 2006 IPCC Guidelines. According to the Party, carbon stocks are tracked for products originating from domestically harvested wood, accounting for production, imports and exports. Carbon stocks were estimated using first-order decay functions with product-specific half-lives. The product categories considered include wood pulp (half-life of two years), wood-based panels (half-life of 25 years) and sawnwood (half-life of 35 years). The TERT considers this to be in line with IPCC guidance. The TERT recommends that the Party describe its approach for estimating harvested wood products and confirm that the production approach was applied following the 2006 IPCC Guidelines (vol. 4, chap. 12), and describe the system's boundaries and how IPCC equations and parameters were applied.

Table 7
Areas of improvement of the reporting on greenhouse gas emissions and removals – waste sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
7.W.1	Specified in paragraphs 39–40 of the MPGs 5. General (waste) – CH_4, N_2O and CO_2	The Party reported in its NID (pp.7-12) that 5,323 kt MSW was generated in 2022. In the NID (figure 7-5), the Party also reported the quantities of MSW that were landfilled, composted, incinerated and treated through anaerobic digestion. The TERT noted that, for 2022, the sum of MSW disposed of or treated through landfilling, composting, anaerobic digestion and incineration is lower than the total amount of MSW generated, indicating a potential inconsistency and incomplete reporting of waste flows. The NID does not provide an explanation for this discrepancy. Furthermore, the TERT noted that data published by EEA and Eurostat indicate that, for 2020–2022, the quantity of MSW treated in the country exceeds the quantity generated as reported by EEA. For example, Eurostat data indicate that 5,614 kt MSW was treated in 2022, which is higher than the amount of MSW generated reported by the Party. During the review, the Party provided additional information indicating that the sum of MSW treated (landfilled, composted, anaerobically digested and incinerated) amounted to 4,890 kt in 2022, which is 433 kt lower than the reported amount of MSW generated. The Party clarified that this difference is attributable to recycled waste streams and indicated that it will include a corresponding explanation in its next submission. Regarding the differences between the NID data and external data sources, the Party indicated that it is currently unable to explain these discrepancies and will further investigate the issue with the Portuguese Environment Agency. The TERT recommends that the Party improve its reporting of MSW data by including a balanced waste account. If a fully balanced waste account cannot be achieved, the Party should provide in the NID the reasons for any discrepancies between waste generation and treatment data.
7.W.2	Specified in paragraph 39 of the MPGs 5.A.2 Unmanaged waste disposal sites – CH_4	The Party reported in its NID (p.7-26) that an MCF of 0.6 was applied for unmanaged SWDS but did not explain how this value was derived. The TERT noted that, according to the 2006 IPCC Guidelines (vol. 5, chap. 3, table 3.1), the default MCF values are 0.8 for unmanaged deep SWDS (>5 m waste), 0.4 for unmanaged shallow SWDS (<5 m waste) and 0.6 for uncategorized SWDS. The TERT also noted that applying an inappropriate MCF may lead to inaccuracies in the emission estimates.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		During the review, the Party clarified that the MCF of 0.6 was applied to unmanaged SWDS on the basis of the assumption that around 50 per cent of such sites are deep (>5 m waste) and 50 per cent are shallow (<5 m waste). The TERT recommends that the Party improve its reporting by including in the NID information on the underlying assumptions and data sources used and references for the selected MCF.
7.W.3	Specified in paragraphs 30, 32 and 45 of the MPGs 5.B.1 Composting – CH_4 and N_2O	The Party reported in its NID (p.7-41) that emissions from home composting were not included in the submission. The TERT noted that this omission may affect the completeness of the emission estimates During the review, the Party clarified that the registration of domestic and/or community composting activities for the recycling of biowaste began in 2024. The Party also provided additional documentation, including emission estimates, which indicates that emissions for this source category are below the threshold of significance. However, the TERT notes that since home composting is not a separate source category, the insignificance criteria do not apply. The TERT recommends that the Party include home composting emissions under the composting category or, if it is unable to do so, provide a justification for the exclusion of this source.
7.W.4	Specified in paragraphs 39–40 of the MPGs 5.B Biological treatment of solid waste – CH_4 and N_2O	The Party reported in its NID (p.7-32) default EFs for CH_4 and N_2O emissions from biological treatment of waste on a wet weight basis, whereas the AD reported in CRT 5.B use a dry weight basis. The TERT noted that, in the NID (figure 7.14), the Party presented quantities of waste composted and anaerobically digested without specifying whether these data are expressed on a wet or dry weight basis. The TERT highlighted the inconsistency between the basis of the EFs reported in the NID and the AD reported in CRT 5.B and noted that such inconsistencies may affect the transparency and accuracy of the emission estimates. During the review, the Party clarified that the quantities of waste composted and anaerobically digested presented in NID figure 7.14 are expressed on a wet weight basis. The Party explained that the EFs reported in the NID are also based on wet weight because the underlying calculations use wet weight data. The Party acknowledged that the omission of the unit from figure 7.14 and the difference in reporting between the NID and CRT 5.B may cause confusion and indicated that it will revise the NID accordingly for future submissions. The TERT recommends that the Party ensure consistency between AD and EFs by using the same basis (wet or dry weight) across the NID and CRTs, noting that if different bases are used, the Party should clearly document the conversion methods and provide transparent explanations.
7.W.5	Specified in paragraphs 20, 21 and 39 of the MPGs 5.C.2 Open burning of waste – CO_2, CH_4 and N_2O	The Party reported in its NID (p.7-42) that emissions from the burning of residues from vineyards, olive trees and orchards, previously reported under the agriculture sector, were reallocated to category 5.C.2 open burning of waste in line with the EU directive on the reduction of national emissions of certain atmospheric pollutants. The TERT noted that this reallocation is not consistent with the 2006 IPCC Guidelines (vol. 5, chap. 5, p.5.5), which state that emissions from the burning of agricultural residues are considered under the agriculture, forestry and other land use sector. Moreover, the Party did not explain in the NID how the implementation of the above-mentioned directive is consistent with the 2006 IPCC Guidelines. In addition, the TERT identified a potential inconsistency in the Party's reporting; CRT 3.F reports the burning of perennial woody crops as "NO", whereas the NID (p.7-42) indicates that this activity occurs in the country (see ID# 5.A.4). During the review, the Party clarified that burning of perennial woody crops occurs in Portugal and that the subcategory was reported under category 5.C.2 to follow the same approach recommended under a review of the EU directive on the reduction of national emissions of certain atmospheric pollutants. The Party indicated they it will consider changing its reporting to ensure consistency with the 2006 IPCC Guidelines. Portugal also stated that the notation key used in CRT 3.F will be changed to "IE".

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		The TERT recommends that the Party report emissions from the burning of agricultural residues under the agriculture sector (CRT category 3.F) in accordance with the 2006 IPCC Guidelines. Alternatively, the Party should justify how reporting these emissions under the waste sector (category 5.C.2) is consistent with the 2006 IPCC Guidelines and ensure consistency in the reporting between the NID and the CRTs.
7.W.6	Specified in paragraph 39 of the MPGs 5.D Wastewater treatment and discharge – CH_4 and N_2O	The Party reported in its NID (p.7-40) that population statistics used to estimate the total organic load from domestic wastewater include foreign tourists. The TERT noted that the NID does not provide or include a reference for the AD related to foreign tourists used in these calculations. During the review, the Party provided additional documentation containing the statistics on the foreign tourist population applied in estimating the total organic load from domestic wastewater. The Party clarified that the share of foreign tourists increased from 0.5 per cent of the total population in 1990 to 1.2 per cent in 2022. The TERT recommends that the Party provide all AD used in the estimation of emissions from domestic wastewater, including data on the foreign tourists, along with information on data sources and assumptions.

C. Information necessary to track progress in implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

Table 8
Areas of improvement of the reporting on national circumstances and institutional arrangements

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

Table 9
Areas of improvement of the description of the nationally determined contribution under Article 4 of the Paris Agreement, including updates

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

Table 10
Areas of improvement of the reporting of the information necessary to track progress in implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

Table 11
Areas of improvement of the reporting on mitigation policies and measures, actions and plans, including those with mitigation co-benefits resulting from adaptation actions and economic diversification plans, related to implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
11.1	Specified in paragraphs 85–86 of the MPGs	Portugal reported “NE” for all GHG emission reduction estimates (both expected and achieved) in CTF table 5, without providing justification for the lack of quantified impacts at the individual policy level, which may be due to challenges related to data availability or methodologies, for example. During the review, Portugal clarified that mitigation impacts are assessed through integrated scenario modelling (TIMES_PT linked with GEM-E3_PT), which reflects the combined effect of policy packages rather than individual measures, and acknowledged that it currently faces methodological and data availability

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		constraints which prevent systematic estimation of GHG emission reductions at the policy level. The Party clarified that all PaMs were modelled together as a package, making it impossible to attribute emission reductions to individual policies without double counting, which is why all estimates in CTF table 5 were reported as "NE". Portugal explained that the combined effect is captured in national projections and it is working to improve estimation at the policy level for future reports. The TERT recommends that Portugal develop and report, to the extent possible, estimates of expected and achieved GHG emission reductions for individual PaMs or clusters of PaMs, clearly documenting the methodological approach and assumptions used.
11.2	Specified in paragraph 90 of the MPGs	Although Portugal's BTR1 describes the National System of Policies and Measures and Projections framework, refers to just transition objectives under the Climate Framework Law and highlights the linkage between the TIMES_PT and GEM-E3_PT models, it does not clearly indicate whether or how economic and social impacts of response measures are systematically assessed. During the review, the Party clarified that such assessments are primarily conducted at the level of integrated policy scenarios in the context of preparing and revising the National Energy and Climate Plan 2030 and the Roadmap for Carbon Neutrality 2050, using the coupled TIMES_PT–GEM-E3_PT modelling framework. The Party also indicated that macroeconomic indicators, such as gross domestic product, private energy consumption and employment, are considered in these assessments, which are currently being further refined as part of the ongoing revision of the Roadmap, incorporating updated modelling assumptions and recent policy developments. The TERT encourages Portugal to further enhance the transparency of its reporting on the economic and social impacts of response measures, to the extent possible, for example by providing additional information on methodologies, analytical approaches and indicators and/or illustrative results.

Table 12
Areas of improvement of the summary of greenhouse gas emissions and removals

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

Table 13
Areas of improvement of the projections of greenhouse gas emissions and removals

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
13.1	Specified in paragraph 96(d) of the MPGs	Portugal did not provide in its BTR1 either a sensitivity analysis for its projections or a brief explanation of the methodologies and parameters used. In its BTR1, the Party reported that a sensitivity analysis is being performed for each sector in the context of the ongoing revision of the Roadmap for Carbon Neutrality 2050, and the results will be available after this process is concluded in 2025. During the review, Portugal explained that the sensitivity analysis is being developed in parallel with the revision of the Roadmap and the update of the National Energy and Climate Plan 2030, and that the ongoing work includes exploring the use of alternative assumptions in several sectors, including energy, IPPU, agriculture, LULUCF and waste. The Party provided additional information on sensitivity analyses already carried out for the LULUCF, agriculture and waste sectors under the revision of the Roadmap, including analyses of methodological assumptions related to other wood losses and fire severity in the LULUCF sector, demographic changes in the waste sector, and alternative assumptions on the scope and mitigation potential of decarbonization measures in the agriculture sector. The Party indicated that sensitivity analyses for the other sectors are still under development.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		The TERT encourages the Party to provide a sensitivity analysis for the projections, together with a brief explanation of the methodologies and parameters used.
13.2	Specified in paragraph 100 of the MPGs	Portugal reported projection totals with and without LULUCF in CTF tables 7 and 8. However, the table rows reporting CH_4 emissions including CH_4 from LULUCF and N_2O emissions including N_2O from LULUCF were reported as "NO" and therefore not reflected in the total emissions with LULUCF. At the same time, these emissions were reported in the summary of GHG emissions and removals in CTF table 6. During the review, Portugal explained that, when the BTR1 was compiled, projections of CH_4 and N_2O including LULUCF were not yet available and, to ensure consistency with the projection values, "NO" was also used for 2022 in CTF tables 7 and 8, even though values for 2022 were reported in CTF table 6. The Party provided information from its National Energy and Climate Plan progress report submitted to the European Commission in 2025, which includes projections of CH_4 and N_2O emissions including LULUCF, and indicated that these values will be reported in its next BTR. The TERT recommends that the Party provide emission projections with and without LULUCF, including CH_4 emissions from LULUCF and N_2O emissions including N_2O from LULUCF.

Table 14
Areas of improvement of other information relevant to tracking progress in implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

D. Financial, technology development and transfer, and capacity-building support provided under Articles 9–11 of the Paris Agreement

Table 15
Areas of improvement of the reporting on national circumstances and institutional arrangements

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
15.1	Specified in paragraph 120 of the MPGs	Portugal did not provide information on national circumstances and institutional arrangements for the provision of technology development and transfer and capacity-building support in the BTR1 and did not explain why the information was not reported. During the review, the Party clarified that all information collected on national circumstances and institutional arrangements for the provision of support is processed in accordance with the directives from OECD DAC, which does not collect information on technology development and transfer and capacity-building support. The Party also noted that the data collection system for gathering relevant data has been established, which will enable this information to be included in future reporting. The TERT recommends that the Party provide information, if available, on national circumstances and institutional arrangements for the provision of technology development and transfer and capacity-building support in its BTR, or explain why such information was not reported.

Table 16
Areas of improvement of the reporting on underlying assumptions, definitions and methodologies relating to financial, technology development and transfer, and capacity-building support provided under Articles 9–11 of the Paris Agreement

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
16.1	Specified in paragraph 121(a), (b), (c), (f), (i), (j), (k), (p) and (s) of the MPGs	Portugal did not explain in its BTR1 the methodologies and definitions used to identify and/or report, for support provided, (1) the chosen reporting year (calendar year, fiscal year), (2) the conversion between domestic currency and United States dollars, (3) the status (committed, disbursed), (4) the financial instrument, (5) the sector, (6) the subsector and (7) whether the support supported capacity-building and/or technology development and transfer objectives. In addition, although the Party clearly explained that all projects financed by Portuguese cooperation are proposed by partner countries, which are also entirely responsible for their design, it did not link this aspect to how it seeks to ensure that support provided effectively addresses the needs and priorities of developing country Parties for the implementation of the Paris Agreement. Finally, Portugal did not explain how the information provided reflects a progression from previous levels in the provision of finance under the Paris Agreement. During the review, the Party explained that the calendar year is used; the reporting of disbursed amounts; the methodologies used in classifying the financial instrument, sector and subsector are defined in the OECD DAC directives for reporting in the Creditor Reporting System; and determining whether projects support capacity-building and/or technology development and transfer objectives involves a detailed analysis of project objectives and characteristics, assessing whether they fall within the definitions of the variables. No clarification was provided on the exchange rate used between the domestic currency, indicated as euros, and United States dollars. The Party also explained that implementation of the strategic cooperation programmes and the mandates set out in the Portuguese Development Strategy ensure that the needs and priorities of developing countries are addressed, which is also achieved as a result of the fact that all activities financed under the agreements are proposed by partner countries themselves, as stated in BTR1 section 5.2, and because this strategic alignment between the Party's Development Strategy and partner-country priorities is implemented through activities financed by the Party's Environmental Fund. Portugal also explained that progression from previous levels in the provision of finance is demonstrated by the targets set out in the Strategy for Portuguese Cooperation 2030. The TERT recommends that the Party provide a description of the underlying assumptions, methodologies and definitions used to identify and/or report the parameters relating to financial support provided under Article 9 of the Paris Agreement, as applicable, in order to enhance the transparency of reporting.
16.2	Specified in paragraph 122 of the MPGs	Portugal did not report in its BTR1 the underlying assumptions, definitions and methodologies used to provide information on technology development and transfer and capacity-building support. During the review, the Party explained that the data presented in the BTR1 are based on the information reported by the Camões Institute for Cooperation and Language to OECD DAC through the Creditor Reporting System on financial efforts to support development. Given that technology development and transfer and capacity-building support are not variables under Creditor Reporting System reporting, this information was not available for the reference period 2021–2022. The Party noted that the data collection system for gathering relevant data has been established, which will enable this information to be included in future reporting. The TERT recommends that the Party provide information in its BTR on underlying assumptions, definitions and methodologies relating to reporting on technology development and transfer and capacity-building support.

Table 17
Areas of improvement of the information on financial support provided under Article 9 of the Paris Agreement – bilateral, regional and other channels

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
17.1	Specified in paragraph 123(b) of the MPGs	Portugal reported complete information in tabular format, both in the BTR1 and in CTF table III.1. However, the TERT noted discrepancies between the amounts reported in the summary information in BTR1 table 5.4 (p.225) on total amount disbursed by country in 2021 and 2022 and in BTR1 tables 5.5, 5.6 and 5.7 (p.226) on bilateral support provided by type of support, on the one hand, and the total amounts reported in CTF table III.1, on the other. The TERT also identified an error in the amount reported as grant equivalent in one of the projects in CTF table III.1. During the review, the Party clarified that these discrepancies were due to internal calculation errors within the above-mentioned summary tables and no information is missing from CTF table III.1 for the reporting years 2021 and 2022. The TERT recommends that the Party ensure that transparent information is reported on the amounts of support provided through bilateral, regional and other channels by implementing QC procedures to ensure consistency in the numerical data reported between the CTF tables and the BTR.

Table 18
Areas of improvement of the information on financial support provided under Article 9 of the Paris Agreement – multilateral channels

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
18.1	Specified in paragraph 124(d–e) of the MPGs	Portugal did not report accurate information on inflows and/or outflows related to amounts provided through multilateral channels. In the BTR1, the Party stated that the multilateral finance reported is exclusively based on the Party's share in the outflows of the multilateral institutions, and in CTF table III.2 the amounts are reported under the outflows columns. However, the TERT noted that the Party did not provide information on the approach used to calculate the Party's share in the outflows of the multilateral institutions or explain how multilateral finance is attributed to the reporting Party. Furthermore, Portugal did not transparently report whether the amounts provided through multilateral channels are core-general or climate-specific, considering that BTR table 5.3.2 refers to "provided core", while CTF table III.2 reports support as climate-specific. During the review, the Party clarified that the support provided through multilateral channels was reported in the BTR and in the CTF tables on the basis of the Party's inflow contributions; that is, contributions made by Portugal to the multilateral institutions. The Party also explained that the reported contributions are primarily core-general. The TERT recommends that Portugal improve the transparency of the information reported by correctly reporting the amount of support provided through multilateral channels as inflows in its BTR and by correctly and consistently reporting whether the amounts of support provided through multilateral channels are core-general or climate-specific in the text of the BTR and in CTF table III.2.

Table 19
Areas of improvement of the information on technology development and transfer support provided under Article 10 of the Paris Agreement

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
19.1	Specified in paragraph 126 of the MPGs	Portugal did not provide any information in textual format on support for technology development and transfer provided under Article 10 of the Paris Agreement, as requested by the MPGs. The reporting on this matter in the BTR1 (section 5.4) is limited to a statement explaining that Portugal has not developed a systematic approach for reporting this type of information.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		During the review, the Party clarified that the information presented in the BTR is based on the information reported by the Camões Institute for Cooperation and Language to OECD DAC through the Creditor Reporting System on financial efforts to support development, and information on technology development and transfer is not part of OECD DAC Creditor Reporting System reporting. The Party also clarified that the Camões Institute for Cooperation and Language has adjusted its information technology system to obtain additional data on this matter for inclusion in future submissions. The TERT recommends that Portugal provide information in the BTR on support for technology development and transfer provided under Article 10 of the Paris Agreement, including, to the extent possible, qualitative and/or quantitative information on (1) strategies employed to support technology development and transfer; (2) support provided at different stages of the technology cycle; (3) support for the development and enhancement of endogenous capacities and technologies of developing country Parties; (4) efforts to encourage private sector activities related to technology development and transfer, and how such efforts support developing country Parties; (5) efforts to accelerate, encourage and enable innovation; and (6) knowledge generated.
19.2	Specified in paragraph 127(b) of the MPGs	Portugal did not report transparent information in tabular format on the recipient entity in CTF table III.4, as the name of the recipient entity does not refer to the recipient entity in the developing country Party, but rather to the extending entity or the channel of delivery used in the Portuguese cooperation activity. During the review, the Party clarified that the entities mentioned in column c of CTF table III.4 represent the donor's funding entities; that is, the channel of delivery used under the Portuguese cooperation policy. The TERT recommends that Portugal transparently report, to the extent possible and as relevant, information on the recipient entity, as requested in CTF table III.4, including, in particular, the name of the recipient entity in the relevant developing country Party.

Table 20
Areas of improvement of the information on capacity-building support provided under Article 11 of the Paris Agreement

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
20.1	Specified in paragraph 128(b–e) of the MPGs	Portugal did not provide information in textual format on capacity-building support provided under Article 11 of the Paris Agreement with regard to (1) how the support provided responds to the existing and emerging capacity-building needs, priorities and gaps identified by developing country Parties; (2) policies that promote capacity-building support; (3) involvement of stakeholders; and (4) how support provided for capacity-building actions in developing country Parties promotes the sharing of lessons learned and best practices. During the review, the Party clarified that the current tracking system, based on information collected and communicated to OECD DAC through the Creditor Reporting System, does not allow for an automated and granular isolation of capacity-building support. Despite these technical limitations, capacity-building support remains fundamentally country-driven and features in most climate-related development projects. It is identified through strategic cooperation programme bilateral agreements, which are drafted with partner countries to ensure that support responds directly to national climate priorities, national adaptation plans and NDCs. This approach is further reinforced by the Portuguese Cooperation Strategy 2030, which identifies capacity-building and technical assistance as core pillars of Portugal's development policy and is aimed at strengthening institutional frameworks; human development is at the core of the Portuguese Cooperation Strategy 2030. The TERT recommends that Portugal provide information in its BTR in textual format on capacity-building support provided, including, to the extent possible, on how the support provided responds to the existing and emerging capacity-building needs, priorities and gaps identified by developing country Parties;

	policies that promote capacity-building support; involvement of stakeholders; and how support provided for capacity-building actions in developing country Parties promotes the sharing of lessons learned and best practices.

Annex

Documents and information used during the review

A. Reference documents

BTR1 of Portugal. Available at https://unfccc.int/first-biennial-transparency-reports.

BTR1 CTF tables of Portugal. Available at https://unfccc.int/first-biennial-transparency-reports.

BTR1 of the EU. Available at https://unfccc.int/first-biennial-transparency-reports.

BTR1 CTF tables of the EU. Available at https://unfccc.int/first-biennial-transparency-reports.

CRTs of Portugal. Available at https://unfccc.int/first-biennial-transparency-reports.

CRTs of the EU. Available at https://unfccc.int/first-biennial-transparency-reports.

"Guidance for operationalizing the modalities, procedures and guidelines for the enhanced transparency framework referred to in Article 13 of the Paris Agreement". Decision 5/CMA.3. FCCC/PA/CMA/2021/10/Add.2. Available at https://unfccc.int/documents/460951.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl.

IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at https://www.ipcc.ch/publication/2013-supplement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-wetlands/.

IPCC. 2019. *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. E Buendia, K Tanabe, et al. (eds.). Geneva: IPCC. Available at https://www.ipcc-nggip.iges.or.jp/public/2019rf/.

"Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement". Annex to decision 18/CMA.1. FCCC/PA/CMA/2018/3/Add.2. Available at https://unfccc.int/documents/193408.

NDC of the EU. Available at https://unfccc.int/NDCREG.

NID of Portugal. Available at https://unfccc.int/first-biennial-transparency-reports.

NID of the EU. Available at https://unfccc.int/first-biennial-transparency-reports.

Report on the technical expert review of the BTR1 of the EU. FCCC/ETF/TERR.1/2024/EU and Add.1. Available at https://unfccc.int/first-biennial-transparency-reports.

B. Additional information provided by the Party

Responses to questions during the review were received from Pedro Baptista, Ana Rita Branco and Paulo Lourenço (Climate Agency of Portugal), including additional material. The following references were provided by Portugal and may not conform to UNFCCC editorial style as some have been reproduced as received:

EMEP/EEA Air Pollutant Emission Inventory Guidebook 2023; Technical guidance to prepare national emission inventories; European Environmental Agency, ISBN 978-92-9480-598-0.

European Environment Agency. 2025. Waste management country profile with a focus on municipal and packaging waste. European Environment Agency. Portugal. Available at https://www.eea.europa.eu/en/topics/in-depth/waste-and-recycling/municipal-and-packaging-waste-management-country-profiles-2025/pt-municipal-waste-factsheet.pdf.

Eurostat. 2025. Municipal waste by waste management operations (ENV_WASMUN). Eurostat database. Available at https://ec.europa.eu/eurostat/databrowser/view/ENV_WASMUN/default/table (accessed 21 March 2026).

Soares, P. M. M., Dias, L. F., Lemos, G., et al. 2024. National Roadmap for Adaptation 2100: Portuguese Territorial Climate Change Vulnerability Assessment for XXI Century – Report WP7: Regional Adaptation Storylines. Lisbon: Instituto Dom Luiz & Project RNA2100. Available at https://zenodo.org/records/13920096.