

Final Review Report

2021 annual review of national greenhouse gas inventory data

pursuant to Article 19(2) of Regulation (EU) No 525/2013

Malta
30 June 2021

European Environment Agency



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Conclusions from the 2021 annual ESD review

This Draft Review Report presents the findings from the 2021 annual review of the greenhouse gas (GHG) emission inventory of Malta, pursuant to Article 19(2) of Regulation (EU) No 525/2013, with a view to monitoring Malta's achievement of its GHG emission reduction or limitation target pursuant to Article 3 of Decision No 406/2009/EC (the 'Effort Sharing Decision', ESD) in 2019.

The reviewers carried out checks to verify the transparency, accuracy, consistency, comparability and completeness of the national GHG inventory for the year 2019 submitted in 2021 by Malta pursuant to Articles 7(1) and 7(3) of Regulation (EU) No 525/2013.

The review consisted of two steps:

1. The EU inventory team (European Environment Agency (EEA), European Topic Centre on Climate Change Mitigation and Energy (ETC/CME), Joint Research Centre (JRC) and Eurostat) performed the initial checks under Step 1.
2. A Technical Expert Review Team (TERT) performed Step 2 of the 2021 annual ESD review.

More information on the ESD legislation and the procedures for the 2021 annual ESD review is presented in the annexes to this review report.

Step 1 conclusions

The EU inventory team identified 9 significant issues through the checks performed in Step 1. Therefore, Malta was subject to a second step of the 2021 annual ESD review. Only significant issues were subject to the second step review checks.

Step 2 conclusions

1. The reviewers raised 42 issues with Malta during the first and the second step of the 2021 annual ESD review (see Table 1). The TERT provided a recommendation for 7 of these issues. Other issues raised during the annual 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 underestimates or overestimates exceeding the threshold of significance pursuant to Article 31 of Commission Implementing Regulation (EU) No 749/2014.
3. Malta provided 5 revised estimates. The TERT agreed to all revised estimates. Table 2 below summarises the revised estimates and further information is provided at the end of this report.
4. On that basis, the TERT did not deem necessary any technical corrections within the meaning of Article 19(3)(c) of Regulation (EU) No 525/2013 in consultation with Malta.
5. The TERT identified non-binding recommendations in order to improve the national inventory data of Malta (see Table 4).
6. The TERT considers that it received a response from Malta that was sufficient in order to undertake the review appropriately.

Table 1: Overview of issues raised with Malta during the first and the second step

	Issues raised ¹	Recommendations ²	Revised estimates ³	Technical corrections ⁴
Total	42	7	5	-
Energy	16	-	-	-
IPPU	5	-	-	-
Agriculture	16	7	5	-
Waste	5	-	-	-
Cross-cutting	-	-	-	-

¹ Excluding findings related to Land use, land-use change and forestry (LULUCF) and Kyoto Protocol (KP) LULUCF.

² The total number of recommendations includes revised estimates and technical corrections.

³ Revised estimates: changes in inventory estimates triggered by the review and provided by the Member State.

⁴ Technical corrections: changes in inventory estimates triggered by the review and provided by the TERT.

National totals for the purpose of Article 3 of Decision No 406/2009/EC (ESD)

Table 2: National totals for the purpose of Article 3 of Decision No 406/2009/EC

Data / Source category	Reference	Emission estimates (kt CO ₂ equivalent) ¹ 2019
Total greenhouse gas emissions, including indirect CO ₂ , without land use, land-use change and forestry as reported by Malta pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	MLT_2021_2_11032021	2 174.718
Difference between original estimates and revised estimates provided by Malta and accepted by the TERT²		
3A Enteric fermentation, CH ₄	MT-3A-2021-0001	-2.216
3A Enteric fermentation, CH ₄	MT-3A-2021-0006	1.522
3B Manure management, CH ₄	MT-3B-2021-0002	-3.446
3B Manure management, CH ₄	MT-3B-2021-0003	-1.615
3B Manure management, CH ₄	MT-3B-2021-0004	-1.043
Total greenhouse gas emissions including revised estimates		2 167.920
CO ₂ emissions from 1A3a Domestic aviation ³	MLT_2021_2_11032021	1.297
NF ₃ emissions ³	MLT_2021_2_11032021	-

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 (in particular of total GHG emissions and total ESD emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals would be taken into account.

² A positive difference indicates an increase compared to reported emissions. A negative difference indicates a decrease compared to reported emissions.

³ NF₃ emissions and emissions from 1A3a Domestic Aviation will be deducted from the national total as they are not included within the scope of total ESD emissions.

Greenhouse gas emissions covered by Decision 406/2009/EC

Table 3: Greenhouse gas emissions covered by Decision 406/2009/EC

Data	Reference	Emissions (kt CO ₂ equivalent) ¹ 2019
Total greenhouse gas emissions including accepted revised estimates provided by Malta	<i>See Table 2 above</i>	2 167.920
Total verified emissions from stationary installations under Directive 2003/87/EC	Extracted by the European Commission from EUTL on 12 April 2021 ²	739.362
CO ₂ emissions from 1A3a Domestic aviation ³	<i>See Table 2 above</i>	1.297
NF ₃ emissions ³	<i>See Table 2 above</i>	-
Total ESD emissions		1 427.261

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 (in particular of total GHG emissions and total ESD emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals would be taken into account.

² The emissions of ETS stationary installations were independently verified and recorded in the EU Transaction Log (EUTL). These emissions do not derive from the national greenhouse gas emission inventory data and therefore the TERT was not tasked to review them.

³ NF₃ emissions and emissions from 1A3a Domestic Aviation will be deducted from the national total as they are not included within the scope of total ESD emissions.

Statement from Malta on the conclusions presented by the TERT

Malta agrees with the aggregated GHG emission inventory estimates presented in Table 3.

Recommendations from the TERT including revised estimates

Table 4: Recommendations from the TERT (RE = Revised estimate¹; TC = Technical correction²)

EMRT - ID	Key category	Category, gas, year	Recommendation	RE or TC in 2021
MT-3A-2021-0001	Yes	3A Enteric fermentation, 1990-2019, CH ₄	For CRF category 3A Enteric Fermentation and 3B Manure Management, dairy cows, CH ₄ emissions, all years the TERT noted that there was a calculation error regarding the feed digestibility of dairy cows. In response to a question raised during the review, Malta explained that the value of the feed digestibility of low-quality forage (FD%LQF=45%) assumed for the period 1990-2004 was applied for the years 2005 onwards instead of the value of 50% reported in the Table 5-6 of Malta's NIR 2021 for the years 2005-2019. Malta provided a revised estimate for all years and stated that it will be included in the next submission. The TERT agreed with the revised estimate provided by Malta and attached to the annex of the review report. The TERT recommends that Malta include the revised estimate in its next submission.	RE
MT-3A-2021-0006	Yes	3A Enteric fermentation, 2019, CH ₄	For CRF category 3A Enteric Fermentation and 3B Manure Management CH ₄ emissions, Other Cattle, all years the TERT noted that Malta uses an unusual high digestibility rate (DE%=78.5%) for Calves and Growing Cattle. In response to a question raised during the review, Malta explained that the reason for the high digestibility rate (DE%) for Calves is the milk replacer feeding, while Malta provided a revised estimate for Growing Cattle for all years. The TERT accepted the explanation and agreed with the revised estimate provided by Malta and attached to the annex of the review report. The TERT recommends that Malta include the revised estimate for Growing Cattle in its next submission and report in the next submission of the NIR the justification for the high value of DE% for Calves.	RE

EMRT - ID	Key category	Category, gas, year	Recommendation	RE or TC in 2021
MT-3B-2021-0002	Yes	3B Manure management, 1990-2019, CH ₄	<p>For CRF Category 3B Manure Management, CH₄ emissions, Sheep, all years the TERT noted that (1) Malta applied the Tier 1 methodology given in the 2019 IPCC Refinement to the emission estimate for the whole time series, which is acceptable to the reporting of GHG inventories if (a) the methodologies, emission factors (EFs) and/or assumptions taken from the 2019 IPCC Refinement or a country-specific approach based on or consistent with the 2019 IPCC Refinement are well documented, (b) the Party demonstrates that they better represent the national circumstances and justifies their use in its NIR; (2) Malta implemented the Tier 1 methodology provided in the 2019 IPCC Refinement incorrectly, due to unit conversion errors and misinterpretation of the default values provided to the Equation 10.22 of the 2019 IPCC Refinement. Additionally, the livestock numbers of male lambs and ewe lambs were used for other mature sheep while other mature sheep was omitted from the calculation at all. In response to a question raised during the review, Malta provided a revised estimate for all years. The TERT agreed with the revised estimate provided by Malta and attached to the annex of the review report. However, there is a slight difference between the livestock population of other mature sheep provided in the revised estimate and the value reported in CRF Table 3.As1 and 3.B(a)s1 (March 15, 2021 submission). Additionally, the TERT examined the methodological differences between the Tier 1 methodology provided in the 2006 IPCC Guidelines and 2019 IPCC Refinement and noted that the Tier 1 methodology of the 2019 IPCC Refinement better reflects the national circumstances because the emission factors are stratified by manure management system usage and production levels; the VS [kg VS/1000 kg animal mass/day] values allow to take into account the country-specific weights of the animals. In contrast, the default values given in the 2006 IPCC Guidelines do not make it possible to refine the calculation with this country-specific information. Consequently, the TERT accepts that the Tier 1 methodology of the 2019 IPCC Refinement better represents the national circumstances for this source category than the Tier 1 methodology of the 2006 IPCC Guidelines. The TERT recommends that Malta (1) include the revised estimate in its next submission; (2) report in the next submission of the NIR information on the production level and manure management system usage for sheep to support the selection of factors; (3) report manure management system usage data in CRF Table 3.B(a)s2 instead of 'NA'; (4) justify in the next submission of the NIR that the 2019 IPCC Refinement methodology better represents the Maltese national circumstances; (5) enhance the quality control to avoid transcription errors between the CRF Table and calculation sheet.</p>	RE

EMRT - ID	Key category	Category, gas, year	Recommendation	RE or TC in 2021
MT-3B-2021-0004	Yes	3B Manure management, 1990-2019, CH ₄	<p>For CRF Category 3B Manure Management, CH₄ emissions, Horses, all years the TERT noted that (1) Malta applied the Tier 1 methodology given in the 2019 IPCC Refinement to the emission estimate for the whole time series, which can be acceptable to the reporting of the GHG inventories if (a) the methodologies, emission factors (EFs) and/or assumptions taken from the 2019 IPCC Refinement or a country-specific approach based on or consistent with the 2019 IPCC Refinement are well documented, (b) the Party demonstrated that they better represent the national circumstances and justifies their use in its NIR; (2) Malta implemented the Tier 1 methodology provided in the 2019 IPCC Refinement incorrectly, due to unit conversion errors and misinterpretation of the default values provided to the Equation 10.22 of the 2019 IPCC Refinement. In response to a question raised during the review, Malta provided a revised estimate for all years. The TERT agreed with the revised estimate provided by Malta and attached to the annex of the review report. In this sense Malta applied the Tier 1 methodology consistently with the 2019 IPCC Refinement methodology. Additionally, the TERT examined the methodological differences between the Tier 1 methodology provided in the 2006 IPCC Guidelines and 2019 IPCC Refinement and found that the Tier 1 methodology of the 2019 IPCC Refinement better reflects the national circumstances, because the emission factors are stratified by manure management system usage and production levels; the VS [kg VS/1000 kg animal mass/day] values allow to take into account the country-specific weights of the animals. In contrast the default values given in the 2006 IPCC Guidelines do not make it possible to refine the calculations with this country-specific information. Consequently, the TERT accepts that the Tier 1 methodology of the 2019 IPCC Refinement better represents the national circumstances for this source category than the Tier 1 methodology of the 2006 IPCC Guidelines. The TERT recommends that Malta (1) include the revised estimate in its next submission, (2) report in the next submission of the NIR information on the production level and manure management system usage for horse to support the selection of factors; (3) report manure management system usage data in CRF Table 3.B(a)s2 instead of 'NA'; (4) justify in the next submission of the NIR that the 2019 IPCC Refinement represents better the Maltese national circumstances.</p>	RE

EMRT - ID	Key category	Category, gas, year	Recommendation	RE or TC in 2021
MT-3B-2021-0003	Yes	3B Manure management, 1990-2019, CH ₄	For CRF Category 3B Manure Management, CH ₄ emissions, Goats, all years the TERT noted that (1) Malta applied the Tier 1 methodology given in the 2019 IPCC Refinement to the emission estimate for the whole time series, which can be acceptable to the reporting of the GHG inventories if (a) the methodologies, emission factors (EFs) and/or assumptions taken from the 2019 IPCC Refinement or a country-specific approach based on or consistent with the 2019 IPCC Refinement are well documented, (b) the Party demonstrated that they better represent the national circumstances and justifies their use in its NIR; (2) Malta implemented the Tier 1 methodology provided in the 2019 IPCC Refinement incorrectly, due to unit conversion errors and misinterpretation of the default values provided to the Equation 10.22 of the 2019 IPCC Refinement. In response to a question raised during the review, Malta provided a revised estimate for all years. The TERT agreed with the revised estimate provided by Malta and attached to the annex of the review report. In this sense Malta applied the Tier 1 methodology consistently with the 2019 IPCC Refinement methodology. Additionally, the TERT examined the methodological differences between the Tier 1 methodology provided in the 2006 IPCC Guidelines and 2019 IPCC Refinement and found that the Tier 1 methodology of the 2019 IPCC Refinement better reflects the national circumstances, because the emission factors are stratified by manure management system usage and production levels; the VS [kg VS/1000 kg animal mass/day] values allow to take into account the country-specific weights of the animals. In contrast the default values given in the 2006 IPCC Guidelines do not make it possible to refine the calculations with this country-specific information. Consequently, the TERT accepts that the Tier 1 methodology of the 2019 IPCC Refinement better represents the national circumstances for this source category than the Tier 1 methodology of the 2006 IPCC Guidelines. The TERT recommends that Malta (1) include the revised estimate in its next submission (2) report in the next submission of the NIR the information on the production level and manure management system usage for goats to support the selection of VS and the EF; (3) report manure management system usage data for goats in CRF Table 3.B(a)s2 instead of 'NA'.	RE
MT-3-2021-0001	Yes	3 Agriculture, 2019, CH ₄ , CO ₂ , N ₂ O	For 3A Agriculture, CH ₄ , N ₂ O and CO ₂ emissions, all years, the TERT noted that the 2019 IPCC Refinement methodology had been used to update several categories in the 2021 submission. However, Malta did not demonstrate that the 2019 IPCC Refinement methodologies better represents the national circumstances and justify their use in its NIR. The TERT notes that this issue does not relate to an over or under-estimate of emissions. In response to a question raised during the review, Malta explained that the refinements might reflect better the Maltese situation, given that they are based on the most recent research. The TERT recommends that Malta (1) enhance the QA/QC activity in the course of switching to the 2019 IPCC Refinement methodology to avoid unit conversion errors and misinterpretation of factors and (2) include clear explanation by source categories how the 2019 IPCC Refinement better reflects the Maltese circumstances of the agricultural practices than the 2006 IPCC methodology in the next submission of the NIR.	No

EMRT - ID	Key category	Category, gas, year	Recommendation	RE or TC in 2021
MT-3B-2021-0006	Yes	3B Manure management, 2019, N ₂ O	For CRF category 3B2.3 N ₂ O emissions from Manure Management the TERT noted that (1) Malta used the Tier 1 methodology of the 2019 IPCC Refinement to derive the annual N excretion rate (Nex) for swine for the whole time series. (2) Malta did not demonstrate in the NIR that the 2019 IPCC Refinement better represents the national circumstances than the 2006 IPCC methodology. (3) The use of the Tier 1 methodology of the 2019 IPCC Refinement for the derivation of the Nex resulted in such a significant increase in emissions from this sector that this category became a key category in the 2021 submission, which justifies the use of a Tier 2 method. The TERT noted that Malta derived the Nex for swine in line with the Tier 1 methodology of the 2019 IPCC Refinement, therefore this issue does not relate to an over or under-estimate of emissions. However, Malta did not demonstrate in the NIR 2021 why the use of the 2019 IPCC Refinement methodology reflects better the national circumstances than the use of the 2006 IPCC Guidelines. In response to a question raised during the review, Malta explained that the 2019 IPCC Refinement methodology is based on the 2019 FAO GLEAM Database values, which are more accurate and recent and therefore in their opinion are more reliable than the values provided in the 2006 IPCC Guidelines. The TERT recommends that Malta (1) include in the next submission of the NIR the information provided during the ESD Review to justify why the 2019 IPCC Refinement methodology better reflects the national circumstances than the 2006 IPCC methodology; (2) develop a Tier 2 methodology to derive Nex rates for Swine.	No

¹ Revised estimates: changes in inventory estimates triggered by the review and provided by the Member State.

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

Revised estimates provided by Malta and accepted by the TERT

1

ESD Review Tool ID:	MT-3A-2021-0001
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2021/MT-3A-2021-0001
Country:	Malta
Sector:	3A Enteric fermentation
Gases:	CH ₄
Fuel	N/A
Completed by Sector Expert:	Katalin Lovas
Reviewed by Counterpart:	Chris Dore
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	Justin Goodwin

The underlying problem:	There is a calculation error regarding the feed digestibility of Dairy Cattle. In CRF Table 3As2 Malta reports the digestibility of Dairy Cows as 61.09%. In contrast the Table 5-6 of Malta's NIR 2021 states that over the period 2015-2019 the Dairy Cows feed consisted of 10 kg forage and 11 kg concentrate and according to the p. 185 of the NIR the digestibility of concentrate is 78.5%, while the digestibility of forage is 50% for 2005 onwards. Consequently, the equation provided on p. 185 of the NIR results in (10kg*50% + 11kg*78.5%)/21kg = 65%, which is higher than the reported value.
Summarise the methodology used:	Malta corrected the calculation error, using the value of 50% for the feed digestibility of low-quality forage (FD%LQF), which was assumed 2005 onwards, instead of the value of 45% assumed for the period 1990-2004 to calculate the digestible energy (DE%) for dairy cows.

2

	Original estimate (Gg CO ₂ e)							Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		23.602						

	Revised Estimate received from country (Gg CO ₂ e)							Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		21.386						

	Difference between RE and original estimate (Gg CO ₂ e)						
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG
2019		-2.216					

1

ESD Review Tool ID:	MT-3A-2021-0006
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2021/MT-3A-2021-0006
Country:	Malta
Sector:	3A Enteric fermentation
Gases:	CH ₄
Fuel	N/A
Completed by Sector Expert:	Katalin Lovas
Reviewed by Counterpart:	Chris Dore
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	Justin Goodwin

The underlying problem:	Malta used an unusual high (78.5%) digestibility rate (DE%) for Calves and Growing Cattle to calculate the gross energy intake (GE), which is inconsistent with the values applied for the other cattle sub-categories.
Summarise the methodology used:	Malta revised the DE% for Growing Cattle providing data on the diet composition (proportions of concentrate and forage in the diet) and ensuring a consistent approach to estimate the DE% across the different cattle sub-categories.

2

	Original estimate (Gg CO ₂ e)							Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		3.571						

	Revised Estimate received from country (Gg CO ₂ e)							Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		5.093						

	Difference between RE and original estimate (Gg CO ₂ e)						
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG
2019		1.522					

1

ESD Review Tool ID:	MT-3B-2021-0002
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2021/MT-3B-2021-0002
Country:	Malta
Sector:	3B Manure management
Gases:	CH ₄
Fuel	N/A
Completed by Sector Expert:	Katalin Lovas
Reviewed by Counterpart:	Chris Dore
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	Bernd Guegle

The underlying problem:

Malta implemented the Tier 1 methodology for the calculation of CH₄ emissions from Manure Management of Sheep provided in the 2019 IPCC Refinement incorrectly. The CH₄ EF [g CH₄/kg VS] given in Table 10.14 of Vol. 4 Ch. 10 of the 2019 IPCC Refinement was interpreted as CH₄ EF [kg CH₄/animal/yr] and the VS [kg VS/1000 kg animal mass/day] provided in Table 10.13A of Vol. 4 Ch. 10 of the 2019 IPCC Refinement was interpreted as VS [kg VS/animal/yr] in the calculation; the body mass was not considered at all to calculate the value of VS [kg/animal/yr] and there was no information given on the manure management system usage which is also needed for the choice of the EF. Additionally, the livestock numbers of male lambs and ewe lambs were used for other mature sheep while other mature sheep was omitted from the calculation at all.

Summarise the methodology used:

The Tier 1 methodology and the Equations 10.22 and 10.22a of the Vol 4 Ch. 10 of the 2019 IPCC Refinement were applied. The EF=1.3 g CH₄/kg VS was taken from the Table 10.14 of the 2019 IPCC Refinement, assuming low productivity system, temperate climate and dry lot in accordance with the information provided by Malta in the course of the ESD Review and the default value of VS=8.2 kg VS/1000 kg animal mass/day given in the Table 10.13A was applied. Malta revised the livestock population data for other mature sheep reported in CRF Table 3.As1 and 3.B(a)s1.

2

Original estimate (Gg CO ₂ e)								Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		3.507						3B2 Sheep
Revised Estimate received from country (Gg CO ₂ e)								Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		0.061						3B2 Sheep
Difference between RE and original estimate (Gg CO ₂ e)								
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		-3.446						

1

ESD Review Tool ID:	MT-3B-2021-0003
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2021/MT-3B-2021-0003
Country:	Malta
Sector:	3B Manure management
Gases:	CH ₄
Fuel	N/A
Completed by Sector Expert:	Katalin Lovas
Reviewed by Counterpart:	Chris Dore
Reviewed by Lead Reviewer:	Ralph Harthan
Reviewed by Quality Controller:	Justin Goodwin

The underlying problem:	Malta implemented the Tier 1 methodology for the calculation of CH ₄ emissions from Manure Management provided in the 2019 IPCC Refinement incorrectly. The CH ₄ EF [g CH ₄ /kg VS] given in Table 10.14 of Vol. 4 Ch. 10 of the 2019 IPCC Refinement was interpreted as CH ₄ EF [kg CH ₄ /animal/yr] and the VS [kg VS/1000 kg animal mass/day] provided in Table 10.13A of Vol. 4 Ch. 10 of the 2019 IPCC Refinement was interpreted as VS [kg VS/animal/yr] in the calculation. Additionally, the body mass was not considered at all to calculate the value of VS [kg/animal/yr] and there was no information given on the manure management system usage which is also needed for the choice of the EF.
Summarise the methodology used:	Malta corrected all errors and applied the Equations 10.22 and 10.22a of the Vol 4 Ch. 10 of the 2019 IPCC Refinement correctly; provided information on the manure management of goats to justify the choice of the emission factor. Thereby Malta implemented the Tier 1 methodology to calculate the CH ₄ emissions from Manure Management appropriately.

2

	Original estimate (Gg CO ₂ e)							Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		1.636						
	Revised Estimate received from country (Gg CO ₂ e)							Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		0.021						
	Difference between RE and original estimate (Gg CO ₂ e)							
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Mixed GHG	
2019		-1.615						

ESD Review Tool ID:

MT-3B-2021-0004

ESD Review Tool URL:

https://emrt-esd.eionet.europa.eu/2021/MT-3B-2021-0004

Country:

Malta

Sector:

3B Manure management

Gases:

CH₄

Fuel

N/A

Completed by Sector Expert:

Katalin Lovas

Reviewed by Counterpart:

Chris Dore

Reviewed by Lead Reviewer:

Ralph Harthan

Reviewed by Quality Controller:

Justin Goodwin

The underlying problem:

Malta implemented the Tier 1 methodology for the calculation of CH₄ emissions from Manure Management provided in the 2019 IPCC Refinement incorrectly. The CH₄ EF [g CH₄/kg VS] given in Table 10.14 of Vol. 4 Ch. 10 of the 2019 IPCC Refinement was interpreted as CH₄ EF [kg CH₄/animal/yr] and the VS [kg VS/1000 kg animal mass/day] provided in Table 10.13A of Vol. 4 Ch. 10 of the 2019 IPCC Refinement was interpreted as VS [kg VS/animal/yr] in the calculation. Additionally, the body mass was not considered at all to calculate the value of VS [kg/animal/yr] and there was no information given on the manure management system usage which is also needed for the choice of the EF.

Summarise the methodology used:

Malta corrected the errors and applied the Equations 10.22 and 10.22a of the Vol 4 Ch. 10 of the 2019 IPCC Refinement correctly; provided information on the manure management for horses to justify the choice of the emission factor. Thereby Malta implemented the 2019 IPCC Refinement Tier 1 methodology to calculate the CH₄ emissions from Manure Management appropriately.

Original estimate (Gg CO₂e)

Year

CO₂

CH₄

N₂O

HFCs

PFCs

SF₆

Mixed GHG

2019

1.305

Revised Estimate received from country (Gg CO₂e)

Year

CO₂

CH₄

N₂O

HFCs

PFCs

SF₆

Mixed GHG

2019

0.262

Difference between RE and original estimate (Gg CO₂e)

Year

CO₂

CH₄

N₂O

HFCs

PFCs

SF₆

Mixed GHG

2019

-1.043

Annex I: Legal background and procedures of the 2021 annual ESD review

The Effort Sharing Decision No 406/2009/EC (ESD) sets national emission limits for greenhouse gas (GHG) emissions in the sectors outside the EU's Emission Trading System (ETS) for the period 2013-2020. The ESD and the Monitoring Mechanism Regulation (EU) 525/2013 (MMR) lay down annual reporting obligations, compliance checks and a Union 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 Union review of the national inventory data submitted by Member States are set out in Article 19 of the MMR.

The details concerning the review process, such as the timing and steps of conducting the annual and comprehensive reviews are set out in Chapter III and Annex XVI of the Commission Implementing regulations (EU) No 749/2014.

The objectives of the 2021 annual ESD review of Member States' GHG emission inventories are:

- a) to support the European Commission by ensuring it has accurate, reliable and verified information on annual GHG emissions for determining compliance with ESD targets for the year 2019 in a credible, consistent, transparent and timely manner, according to Article 19 (2) of the MMR;
- b) to assist Member States in improving the quality of their GHG inventories.

The 2021 annual ESD review of national GHG inventory data was carried out for the compliance year 2019 pursuant to Article 19 of the MMR. The EEA review secretariat (consisting of Melanie Sporer, Claire Qoul and Justine Raoult) coordinated the 2021 annual ESD review as foreseen in Article 28 of the Commission Implementing Regulation (EU) No 749/2014.

The scope of the 2021 annual ESD review is presented in Table A.1.1. The checks carried out during the 2021 annual ESD review are presented in Annex II.

The review consisted of 2 steps. Step 1 was combined with the 'EU QA/QC procedures' (i.e. initial checks) and was carried out by the EU inventory team (EEA, ETC/CME, JRC, Eurostat). The EU inventory team consisted of the following experts:

- ETC/CME task manager: Nicole Mandl, Marion Pinterits (ETC/CME)
- Energy: Julien Vincent, Coralie Jeannot, Eva Krtkova, Marion Pinterits, Matina Kastori, Bernd Gugele, Markéta Müllerová (ETC/CME), Michael Goll (Eurostat)
- IPPU: Barbara Gschrey, Kristina Kaar, Lorenz Moosmann, Lukas Emele, Julien Vincent, Coralie Jeannot (ETC/CME)
- Agriculture: Adrian Leip, Simona Bosco, Janka Szemesova, Efisio Solazzo (JRC)
- Waste: Céline Gueguen (ETC/CME)
- LULUCF: Raul Abdas-Vinas (JRC)
- Quality coordinators: Adrian Leip, Giacomo Grassi (JRC), Bernd Gugele, Nicole Mandl, Marion Pinterits, Eva Krtkova, Markéta Müllerová, Risto Saarikivi, Maria Purzner, Julien Vincent, Giorgos Mellios, Ils Moorkens, Kaat Jespers (ETC/CME)
- Cross-cutting: Nicole Mandl (ETC/CME)

All findings from the initial checks that were relevant for the ESD and that were not resolved within the initial check phase were followed up in the second step of the annual review.

Step 2 of the 2021 annual ESD review was performed by a Technical Expert Review Team (TERT) under service contract 340201/2020/838280/SER/CLIMA.C.2 of the Directorate General for Climate Action of the European Commission. The TERT consisted of the following experts:

- Lead Reviewers: Ioannis Sempas, Ralph Harthan
- Energy: Stephan Poupa, Julien Vincent

- IPPU: Emma Salisbury, Maria Purzner
- Agriculture: Chris Dore, Katalin Lovas
- Waste: Richard Claxton, Céline Gueguen
- Quality controller: Justin Goodwin
- Co-ordinator: Bernd Gugele

The TERT did not review emission inventories of Member States 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. Reviewers who are nationals of the Member State whose inventory is concerned, did not take part in the review of that inventory.

Step 2 of the review was performed on the basis of GHG emission data and the national inventory report (NIR) officially reported by Member States by 15 March 2021 under the MMR. Where relevant, the TERT calculated technical corrections for over- or underestimates identified in a mandatory category in the Member States' GHG inventories that exceed the threshold of significance. Technical corrections were calculated for the year 2019.

Table A.1.1: Scope of the 2021 annual ESD review

Element	Scope	Further information
Countries	EU geographical coverage of the 27 Member States and the United Kingdom	
Years	2019	
Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆	NF ₃ is not covered by the ESD
Sectors	All emission source sectors excluding LULUCF	National totals exclude emissions from LULUCF and emissions reported under memo items
Indirect CO ₂ emissions	Included in national total	
Inventory Submission	Submissions received by 15 March 2021	

Annex II: Checks carried out during the 2021 annual ESD review in line with Article 29 and 32 of the Commission Implementing Regulation (EU) No 749/2014

As part of the EU's effort to assist Member States in improving the quality of the GHG inventories, the checks to verify the transparency, consistency, comparability and completeness of the greenhouse gas inventory included:

First step review checks:

1. Assessment whether all emission source categories and gases required under Regulation (EU) No 525/2013 are reported;
2. Assessment whether emissions data time series are consistent;
3. Assessment whether implied emission factors across Member States 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 paragraph 37 of the UNFCCC reporting guidelines on annual greenhouse gas inventories as included in Annex I to Decision 24/CP.19;
5. Analysis of recalculations performed for the inventory submission, in particular if the recalculations are based on methodological changes;
6. Comparison of the verified emissions reported under the Union's Emissions Trading System with the greenhouse gas emissions reported pursuant to Article 7 of Regulation (EU) No 525/2013 with a view of identifying areas where the emission data and trends as submitted by the Member State under review deviate considerably from those of other Member States;
7. Comparison of the results of Eurostat's reference approach with the Member States' reference approach;
8. Comparison of the results of Eurostat's sectoral approach with the Member States' sectoral approach;
9. Assessment whether recommendations from earlier Union or UNFCCC reviews, not implemented by the Member State could lead to a technical correction;
10. Assessment whether there are potential overestimations or underestimations relating to a key category in a Member State's inventory.

Second step 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 or in the final review report pursuant to Article 35(2) of this Regulation; where recommendations have not been implemented a detailed analysis of the justification provided by the Member State for not implementing them;
3. Detailed assessment of the time series consistency of the greenhouse gas emissions estimates;
4. 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 2006 IPCC Guidelines for National Greenhouse Gas Inventories;
5. Follow-up on the results of the checks referred to in Article 29 of the Commission Implementing Regulation (EU) No 749/2014 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.