

Final report of the 2012 technical
review of the greenhouse gas emission
inventory of The United Kingdom
to support the determination of annual emission
allocations under Decision 406/2009/EC

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Introduction

Pursuant to Article 3.2 of Decision 406/2009/EC⁽¹⁾ (the 'Effort Sharing Decision' – ESD), the European Commission shall determine the annual emission allocations (maximum allowed greenhouse gas emissions) of Member States for the period from 2013 to 2020 in tonnes of carbon dioxide equivalent (CO₂ eq.), using reviewed and verified emission data.

Complete sets of greenhouse gas (GHG) emission estimates for the reference years (2005, 2008, 2009 and 2010) were submitted by each Member State by the 15th of May, 2012 as part of the 2012 national inventory submission under Decision 280/2004/EC (the 'Monitoring Mechanism Decision' – MMD). These estimates must have been reviewed to allow the determination in 2012 of the annual emission allocations for the period from 2013 to 2020.

The 'Guidelines for the 2012 technical review of greenhouse gas emission inventories to support the determination of Member States' annual emission allocations under Decision 406/2009/EC' were endorsed by the Climate Change Committee on 19 May 2011 and published as a European Commission Staff Working Document on 26 April 2012⁽²⁾. The 2012 greenhouse gas emission inventory of The United Kingdom was reviewed in accordance with these guidelines.

This report presents the findings of the 2012 technical review of the greenhouse gas emission inventory of The United Kingdom to support the determination of annual emission allocations under Decision 406/2009/EC.

Review Objectives

The purpose of the technical review of Member States' GHG inventories is to support the determination of the annual emission allocations by:

- a) ensuring that the European Commission has accurate, reliable and verified information on annual GHG emissions for the years 2005, 2008, 2009 and 2010 to determine the annual emission allocations under Decision 280/2004/EC;
- b) providing the European Commission and its Member States with a consistent, transparent, thorough and comprehensive technical assessment of GHG emissions, with a focus on data for the years 2005, 2008, 2009 and 2010 reported in 2012;
- c) examining, in a facilitative and open manner, the reported inventory information for consistency with the 'Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories', with the 2000 'Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories', and with the requirements of Decision 280/2004/EC (the 'Greenhouse Gas Monitoring Mechanism' Decision)⁽³⁾;

⁽¹⁾ Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020. OJ L 140, 5.06.2009, p. 136.

⁽²⁾ Commission Staff Working Document of 26 April 2012: Guidelines for the 2012 technical review of greenhouse gas emission inventories to support the determination of Member States' annual emission allocations under Decision 406/2009/EC. SWD(2012) 107 final.

⁽³⁾ Decision No 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto protocol. OJ L 140, 5.06.2009, p. 136.

- d) assisting Member States in improving the quality of their GHG inventories.

Review approach and scope

The technical review of the 2012 GHG inventory estimates of The United Kingdom for the years 2005, 2008, 2009 and 2010 was performed by a Technical Expert Review Team (TERT) under service contract 2011/S 234-378130 to the Directorate General for Climate Action of the European Commission. The review was conducted by the following experts: Kristien Aernouts & Tomas Gustafson for Stationary combustion (CRF categories 1.A.1, 1.A.2, 1.A.4, 1.A.5) + Reference approach; Maria Liden & Tinus Pulles for CRF categories 1.A.3 Transport + 1.C International bunkers; Ralph Harthan & John Watterson for CRF category 1.B Fugitive; Anke Herold & Ils Moorkens for CRF categories 2.A Mineral products + 2.B Chemical industry + CRF sector 3 Solvents; Kristina Saarinen & Dusan Vacha for CRF categories 2.C Metal production + 2.D Other production + 2.G Other; Maria Jose Lopez & Karin Kindbom for CRF categories 2.E Production of Halocarbons and SF₆ + 2.F Consumption of Halocarbons and SF₆; Michael Anderl & Steen Gyldenkaerne for CRF categories 4.A Enteric fermentation + 4.B Manure management; Sorin Deaconu & Etienne Mathias for CRF categories 4.C Rice cultivation + 4.D Agricultural soils, 4.E Prescribed burning of savannas, 4.F Field burning of agricultural residues; Juraj Farkas & Celine Gueguen for CRF sector 6 Waste. Ole-Kenneth Nielsen, Suvi Monni, Klaus Radunsky and Tatiana Tugui acted as lead reviewers. The review was coordinated by Bernd Gugele and Justin Goodwin. The TERT acknowledges the support of the EEA review secretariat Martin Adams, Francois Dejean and Melanie Sporer.

This technical review was performed on the basis of GHG emission data and the national inventory report (NIR) officially reported by Member States by the 15th of April, 2012 under the MMD. Resubmissions reported by Member States were taken into account until the 15th of May, consistent with the reporting practice for resubmissions under Decision 280/2004/EC. Emissions from international transport and land use, land-use change and forestry (LULUCF) were not reviewed. The review was performed with a focus on data for the years 2005, 2008, 2009 and 2010, reported in 2012.

The technical review process for GHG inventories comprised three stages, each of which considered different aspects of the inventories in such a way that the purposes described above were achieved by the end of the process. The three stages were:

- Stage 1, completed by 15 April 2012 – initial completeness checks of each Member State GHG inventory (submitted by 15 January and by 15 March);
- Stage 2, completed by 15 April 2012 – initial consistency and comparability checks of each Member State GHG inventory (submitted by 15 January and by 15 March);
- Stage 3, to be completed by the end of August 2012 – detailed *technical review* of each Member State GHG inventory (submitted by 15 May).

The detailed timeline of the review, including a summary of the correspondence with The United Kingdom, is presented in Annex 3.

ESD 2012 technical review conclusions

Table 1. Main conclusions from the TERT

Findings
1. The TERT considers that the GHG emission inventory estimates of The United Kingdom for the years 2005, 2008, 2009 and 2010 submitted in 2012 under the MMD included emission overestimates .
2. The TERT identified inconsistency issues between the reported GHG emission inventory estimates and verified emission data under the EU ETS. However, those inconsistencies do not result in overestimates.
3. During the course of the technical review, the TERT received revised GHG emission inventory estimates from The United Kingdom in response to its initial findings and the draft review report (see Table 2).
4. The TERT considers that the aggregated revised GHG emission inventory estimates from The United Kingdom for the years 2005, 2008, 2009 and 2010 do not include emission overestimates .
5. The TERT therefore suggests that it is not necessary to implement technical corrections to the GHG emission inventory estimates and to amend the reported GHG total (see Table 2).
6. As stated beneath Table 1, The United Kingdom accepts the aggregated GHG emission inventory estimates presented in Table 2 including any revised estimate received from The United Kingdom and accepted by the TERT.
7. The TERT identified non-binding recommendations for improvements of The United Kingdom's GHG inventory (see Table 3 in Annex 1).
8. The TERT considers that it received a response from The United Kingdom that was sufficient in order to undertake the review appropriately.

Statement from The United Kingdom on the conclusions of the TERT

The United Kingdom agrees with the TERT's conclusions and accepts the aggregated GHG emission inventory estimates presented in Table 2 including any revised estimates received from the United Kingdom and accepted by the TERT.

Table 2. Summary of national totals, including any revised estimates or technical corrections identified during the review

Data / Category	Reference	Status of GHG emission revision or correction	2005 Gg CO ₂ eq.	2008 Gg CO ₂ eq.	2009 Gg CO ₂ eq.	2010 Gg CO ₂ eq.
Total GHG emissions as reported in the 2012 submission under the MMD	13 Jan 2012, GBE-2012-v1.1		654 093.876	626 072.213	572 338.401	590 246.553
Revised estimates provided by The United Kingdom (⁴)						
2.A.2. Lime production	30/07/2012 UK-ESD-2012-Report-Response-Final.xlsx	Accepted by the TERT	708.889	760.360	739.546	865.224
Energy: Country-specific issues, 1.A.2.f, Biomass, CH ₄ , N ₂ O	14/08/2012 'ESD-2012-Report-Response-Final-v2(biomass-corrected).xlsx'	Accepted by the TERT	26.687	17.392	35.630	37.952
4.A.1 Dairy Cattle	04/07/2012 UK_Technical correction to dairy cattle – UK response – 03 07 2012	Accepted by the TERT	-163.380			
Total GHG emissions including any accepted revised estimate received from The United Kingdom and/or technical correction as proposed by the TERT			654 666.071	626 849.965	573 113.578	591 149.729
CO₂ emissions from 1.A.3.a Civil aviation	13 Jan 2012, GBE-2012-v1.1		2 346.902	2 024.112	1 793.051	1 631.431

Note: National totals exclude emissions from LULUCF and emissions reported under memo items (e.g. international aviation and maritime transport).

⁴ Difference: revised estimates – original estimates. A positive difference indicates an increase compared to reported emissions. A negative difference indicates a decrease compared to reported emissions. For more information on revised estimates, see Annex 1.

Annex 1 – Recommendations, revised estimates and technical corrections

Table 3. Recommendations of the TERT

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
Yes	1.A.2.a. Iron and steel CO ₂ 2005, 2008, 2010	In 2010, CO ₂ emissions reported in the EU ETS for iron and steel (14 286 Gg) are higher than those reported in CRF 1.A.2.a. (13 750 Gg). In the NIR, the United Kingdom provides extensive information on analyses of the use of EU ETS data in the GHG inventory. No information is, however, provided on the differences. During the review, the United Kingdom explained that the use of EU ETS data in the GHG inventory is limited, but that further investigations to extend the use are ongoing. The United Kingdom replied that this issue has been investigated and there is no systematic difference between the current estimates and estimates that can be derived from the EU ETS data. Therefore the UK did not submit a revised estimate for this source, but the UK will continue to investigate discrepancies between the inventory and EU ETS.	The TERT recommends that the United Kingdom continues to analyse the use of EU ETS data in the GHG inventory, in particular the use of EU ETS data to verify EFs and AD. In addition, the TERT recommends that the United Kingdom analyses any differences in reporting of CO ₂ emissions between the EU ETS and the GHG inventory and reports on this issue in the next NIR.	No	No

⁵ The GHG emission estimate for this category was revised by The United Kingdom during the technical review.

⁶ The GHG emission estimate for this category is subject to a technical correction proposal by the TERT.

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
Yes	1.A.2.c. Chemicals CO ₂ 2009, 2010	In 2009 and 2010, CO ₂ emissions reported in the EU ETS for chemicals (8 194 Gg in 2010) are higher than those reported in CRF 1.A.2.c. (7 768 Gg in 2010). In the NIR, the United Kingdom provides extensive information on analyses of the use of EU ETS data in the GHG inventory. No information is, however, provided on the differences. During the review, the United Kingdom explained that the use of EU ETS data in the GHG inventory are limited, but that further investigations to extend the use are ongoing. The United Kingdom also expressed the view that the discrepancy between emissions is due to an allocation issue rather than a potential under- or overestimate.	The TERT recommends that the United Kingdom continues to analyse the use of EU ETS data in the GHG inventory, in particular, the use of EU ETS data to verify EFs and AD. In addition, the TERT recommends that the United Kingdom analyses any differences in reporting of CO ₂ emissions between the EU ETS and the GHG inventory and reports on this issue in the next NIR.	No	No
No	Energy: Country-specific issues Biomass 2005–2010	There are significant differences between biomass combustion reported to EUROSTAT and in the CRF (around 20 % more in EUROSTAT data). The differences mainly occur in 1.A.2.f. In response to a question raised by the TERT during the review, the United Kingdom acknowledged these differences and explained that efforts are made to reconcile the reporting of biomass in the CRF and to EUROSTAT. The United Kingdom submitted a time series of emissions for biomass use in autogenerators for the period 2005-2010 partly explaining the differences in biomass combustion. The investigation of the UK has indicated that biomass use (energy data and emissions) from autogenerators was missing from the inventory. The revised estimates	The TERT recommends that the UK includes these revised estimates in future inventories and continues its efforts to reconcile differences between the biomass combustion reported to EUROSTAT and in the CRF and reports on any results.	Yes	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		from the UK cover methane and N ₂ O emissions from autogenerator use of biomass and the estimates are based on DUKES data and IPCC default emission factors.			
Yes	2.A.1. Cement production CO ₂ All years	The TERT was provided with the confidential EFs and could confirm that the EFs are within the expected range and consistent with EU ETS data. However, British cement industry reports include a strongly declining EF for cement production between 1998 and 2008 (MPA: performance 2008 — a sector plan report for the United Kingdom cement industry) while the CRF IEF slightly increases in the same period. The United Kingdom also expressed the view that it would not be appropriate to include an incomplete dataset in the NIR since this would be inconsistent with the CRF. The UK also noted that the TERT's comparison with the MPA document is not a like for like comparison, since the inventory figures are based on clinker produced rather than cement produced. The UK further explained that the downward trend could imply that cement now contains more additives which do not require calcining.	The TERT recommends that the United Kingdom checks the data used by the cement association in their reporting compared to the inventory data. Furthermore, the TERT recommends that the United Kingdom develops an approach to present data in the NIR that allows an assessment of the EF, e.g. taking out one or two small cement plants from the calculation and presenting the AD, IEFs and emissions for the remaining plants in the NIR.	No	No
No	2.A.2. Lime production CO ₂ 2005–2010	For process emissions from lime production, the CRF data in 2.A.2. and the additional data provided for the EU ETS do not match well while all other emission categories for cement and lime compare well. This	The TERT recommends including these revised estimates in future inventory estimates.	Yes	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		<p>difference for process emissions from lime production also explains the difference in total emissions between CRF and EU ETS data for cement and lime production (CRF emissions are lower). The emissions from lime production are also much lower for 2009 in the 2012 submission than the emissions reported in the 2011 submission. Therefore, CO₂ emissions from lime production seem to be underestimated. In response to a question raised by the TERT during the review, the United Kingdom explained that it is further investigating this issue. A revised time series was submitted by the United Kingdom for the period 2005-2010 using data from the EU ETS. The process emissions from the decarbonisation of limestone and dolomite in the industry were originally based on data from the British Geological Survey (BGS). As noted by the TERT, the ETS data set indicates higher use of limestone and dolomite compared to BGS estimates. The revised estimates were accepted by the TERT. The UK also informed that work will be undertaken to revise the time series prior to 2005 for the next submission.</p>			
No	2.A.7. Other (mineral products) CO ₂ 2008–2010	<p>For 2.A.7. Other mineral products the NIR (page 132) states that 'Carbon dioxide emissions may also occur from the use of other materials in the glass and brick industries, for example other carbonates such as barium carbonate. Emissions are likely to be very small</p>	<p>The TERT recommends that the United Kingdom incorporates these additional carbonate sources in the inventory estimation.</p>	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		<p>although some emissions data are available through EU ETS sources which may allow a time series of emission estimates to be generated in future. If emissions from other carbonate materials are available through EU ETS data and part of ETS verified emissions, these emissions should also be reported in the inventory.' In response to a question raised by the TERT during the review, the United Kingdom indicated that further discussions with the industries involved are needed in order to generate a time series of data for these small emission sources, because the United Kingdom only has data for a few years and does not yet understand the factors that determine the consumption of these materials. Nevertheless, the TERT considers that with the EU ETS data it should be straightforward to correct this underestimation of emissions. The United Kingdom informed that currently there is no reliable data set available to estimate emissions for 2005 or earlier in the time series since the ETS coverage is not complete prior to 2008 and that no changes are therefore proposed at this time.</p>			
No	2.A.7.a. Glass production CO ₂ All years	<p>The CO₂ IEF for glass production is 1.74 t CO₂/tonne glass fibre/glass wool and significantly higher than for other MS. It is also much higher than the default values provided in the 2006 IPCC Guidelines (about 0.2 t CO₂/tonne glass). In response to questions raised by the TERT during the review, the United Kingdom</p>	<p>The TERT recommends that the United Kingdom corrects the error in the activity data in the next submission.</p>	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		<p>explained that the activity data given in the CRF in Table 2(l).A-Gs1 contain errors. They only include production estimates for continuous filament glass fibre and glass/mineral wool. The most significant outputs (in mass terms) of the United Kingdom's glass industry are container glass and flat glass. If these had been included in the activity data the production data for 2010, for example, would have been 3 670 kt, yielding an IEF of 0.12 t CO₂/tonne glass. This error was introduced during the process of moving all glass emissions to this category and away from the limestone and soda ash use categories. The emission estimates were compared with the previous year's submission and the error does not affect the CO₂ emission estimate. The United Kingdom informed that this error will be corrected in the next submission and that emissions are not affected.</p>			
No	<p>2.B.1. Ammonia production CO₂ All years</p>	<p>The IEF used for ammonia production (36.9 kt CO₂/PJ natural gas consumption) results in a carbon content of natural gas feedstock of 10.1 kt/PJ. This is much too low for natural gas. The IPCC default is 15.3 kt/PJ (or kg/GJ) and the C content used in the energy sector is much higher. This seems to indicate a significant underestimation of CO₂ emissions from ammonia production. In the answer to the TERT, the United Kingdom explained that the activity data reported in the CRF is total natural gas used as a feedstock for</p>	<p>The TERT recommends correcting the AD for ammonia production and reporting in the CRF only the natural gas consumption that is used for ammonia production.</p>	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		ammonia, acetic acid and methanol production, which are obtained directly from plant operators. CO ₂ emissions occur only from ammonia production. Consequently, the reported AD is wrong and this is not only the AD for ammonia production, but also for other activities. The United Kingdom informed that this reporting issue will be resolved in the next submission and that emissions are not affected.			
No	2.C.1.a. Steel CO ₂ 2005–2010	There is limited methodology description in the United Kingdom's NIR related to possible double-counting of emissions from iron and steel production. In response to a question raised by the TERT during the review, the United Kingdom provided additional information. However, no satisfactory explanation was provided on how the United Kingdom avoids double-counting of emissions from this sector. The United Kingdom informed that reporting on this sector will be improved in the NIR to enhance transparency in the next submission.	The TERT recommends that the United Kingdom discusses in the NIR all important issues related to possible double-counting and/or omission of emissions from iron and steel production.	No	No
Yes	4.A.1.OptA.a. Dairy cattle CH ₄ 2005	The CH ₄ IEF of dairy cattle increased 2004 to 2005 by 15.3% (from 97.7kg CH ₄ /head to 112.7kg CH ₄ /head). The GE intake increased from 248 MJ in 2004 to 286 MJ in 2005 (or by 15,3%). The milk yield increased only by 3.3% 2004-2005. The sharp increase of GE intake is mainly due to the increased live weights of dairy cattle which increased by 44.1% from 2004 to 2005. The approach used by the United Kingdom resulted in a	The TERT recommends including these revised estimates in future inventory estimates.	Yes	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		strange trend with a peak in 2005 and declining emissions in the following year. This indicated an overestimation in the year 2005. The United Kingdom provided a revised estimate for the time series including 2005. This was accepted by the TERT.			
Yes	4.D. Agricultural soils N ₂ O, parameter All years	The parameter Fra _{C_{FUEL}} (manure burnt for fuel) is reported as 0.36 which is rather uncommon and was not clear to the TERT. In response to a question raised by the TERT during the review, the United Kingdom explained that in the United Kingdom 36 % of poultry litter (2010) is incinerated in power stations for energy production. The parameter Fra _{C_{FUEL}} (0.36) as filled in in Table 4.Ds2 is specifically for poultry N-excretion. The United Kingdom indicated that the parameter should be more correctly filled in as 0.015, referring to the proportion of total livestock N-excretion which is burnt for fuel. The TERT considers that the explanation provided by the United Kingdom is satisfying. The United Kingdom informed that the explanation will be included in the next NIR and that the Fra _{C_{FUEL}} error will be corrected in the next CRF submission.	The TERT recommends that the United Kingdom provides the same explanation in the NIR and reports 0.015 for the parameter Fra _{C_{FUEL}} as proposed by the United Kingdom.	No	No
Yes	4.D.1.1. Synthetic fertilisers N ₂ O 1995–1996	The TERT identified that the N ₂ O IEF for synthetic fertilisers is changing between 1995 and 1996. In response to a question raised by the TERT during the review, the United Kingdom explained that an error was discovered whereby there was double-counting of	The TERT recommends that the United Kingdom corrects this data in the next submission.	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		<p>some of the cereal fertiliser use from 1990–1995 for Scotland and Northern Ireland. This did not affect emissions calculations, which are correct, but did affect the entry for 4.D.1.1., giving an erroneously larger value and hence affected the IEF from 1990–1995. This will be corrected for the next submission. The United Kingdom informed that the data will be corrected in the next annual submission.</p>			
Yes	<p>4.D.1.1. Synthetic fertilisers N₂O, parameter All years</p>	<p>The TERT identified that AD of mineral fertiliser as reported in the CRF was not adjusted by volatilisation. In response to a question raised by the TERT during the review, the United Kingdom acknowledged that total mineral N fertiliser in 4.D.1.1. was entered without excluding losses to volatilisation. The United Kingdom indicated it would correct this error for the next submission. This issue does not affect emission estimates. The United Kingdom informed that the data will be corrected in the next annual submission.</p>	<p>The TERT recommends that the United Kingdom corrects this data in the next submission.</p>	No	No
Yes	<p>4.D.1.2. Animal manure applied to soils N₂O All years</p>	<p>The TERT identified that AD of manure applied to soils as reported in the CRF was not adjusted by volatilisation. In response to a question raised by the TERT during the review, the United Kingdom acknowledged that total animal manure N applied to soils in 4.D.1.2. was entered without excluding losses to volatilisation. The United Kingdom indicated it would correct this error for the next submission. This issue does not affect emission estimates. The United</p>	<p>The TERT recommends that the United Kingdom corrects this data in the next submission.</p>	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		Kingdom informed that the data will be corrected in the next annual submission.			
Yes	4.D.3.1. Atmospheric deposition N ₂ O All years	The TERT identified that the IEF (0.016 kg N ₂ O -N/kg N) is higher than the IPCC default EF (0.010 kg N ₂ O -N/kg N). In response to a question raised by the TERT during the review, the United Kingdom explained that the reported atmospheric deposition total in 4.D.3.1. was too low because volatilisation from pasture range and paddock had erroneously been omitted. This will be corrected for the next submission. This issue does not affect emission estimates. The United Kingdom informed that the data will be corrected in the next annual submission.	The TERT recommends that the United Kingdom corrects this data in the next submission.	No	No
Yes	4.D.3.2. Nitrogen leaching and run-off N ₂ O All years	The TERT identified that the IEF (0.046 kg N ₂ O -N/kg N) is higher than the IPCC default EF (0.025 kg N ₂ O -N/kg N). In response to a question raised by the TERT during the review, the United Kingdom explained that an error was discovered in the calculation for total N leached (4.D.3.2.), which was therefore erroneously reported at too low a value. This will be corrected for the next submission. This issue does not affect emission estimates. The United Kingdom informed that the data will be corrected in the next annual submission.	The TERT recommends that the United Kingdom corrects this data in the next submission.	No	No
Yes	4.D.4. Other N ₂ O All years	The TERT identified that the IEF (0.01 kg N ₂ O -N/kg N) is lower than the IPCC default EF (0.0125 kg N ₂ O -N/kg N). In response to a question raised by the TERT during	The TERT recommends that the United Kingdom corrects this data in the next submission.	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		the review, the United Kingdom explained that erroneously total sewage sludge nitrogen going to soils was entered in 4.D.4., without excluding losses to volatilisation. This will be corrected for the next submission. This issue does not affect emission estimates. The United Kingdom informed that the data will be corrected in the next annual submission.			
Yes	4.D.4. Other N ₂ O All years	The United Kingdom reports an additional emission category named 'Improved Grassland'. Only a short explanation is provided in the NIR. In response to questions raised by the TERT during the review, the United Kingdom explained that this category accounts for emissions from biological fixation by clovers which are an important part of much of the improved grassland in the United Kingdom. Emissions are calculated assuming a nitrogen fixation rate of 4 kg N/ha./year (Lord, 1997) by the clover, using the areas for grass under 5 years and permanent grassland. The fixation rate is based on expert opinion, taking into account the estimated proportion of clover in leys and permanent grassland. The United Kingdom informed that the description of this source category will be extended in the next NIR.	The TERT recommends that the United Kingdom extends the description of this source category in its next NIR.	No	No
Yes	6.A. Solid waste disposal on land CH ₄ recovery All years	The United Kingdom uses data for 'export' of electricity to calculate the amount of methane used for power generation, corrected for efficiency of installations and on-site electricity use. This final 'efficiency' is	The TERT recommends that the United Kingdom further justifies the value of final efficiency of 30 %, for example by providing in the NIR the efficiency of electricity-producing installations and the fraction of	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
		considered to be 30 %. During the review the UK explained that using the current method for assessing methane capture does not affect the total amount of methane captured, only the estimated split between what is flared and what is utilised and that this will be clarified in the next submission. The UK also stated that emissions are not affected.	generated electricity used on the sites.		
Yes	6.A.1. Managed waste disposal on land CH ₄ recovery All years	The amount of CH ₄ recovered (R in equation 1 of the NIR) is not estimated as the sum of the amount of CH ₄ used for energy production and the amount of CH ₄ flared, but on the basis of an expert judgement concerning gas collection efficiency for modern landfills. The amount of CH ₄ used for power generation is calculated in the inventory on the basis of official data concerning electricity generation in solid waste disposal sites. The amount of CH ₄ flared is estimated as the difference between CH ₄ recovered and CH ₄ used for electricity generation. The 2000 IPCC Good Practice Guidance (GPG) recommends that methane recovered should be based on metering of all gas recovered for energy utilisation or flaring. The United Kingdom is currently working with the Environment Agency to obtain a verified dataset on flare stack methane usage. The United Kingdom informed that it is currently investigating available data and that no changes are therefore proposed at this time.	The TERT recommends that the United Kingdom uses monitored verified data on biogas combusted in flares in order to estimate the amount of total CH ₄ recovered in solid waste disposal sites.	No	No
No	6.B. Wastewater	The NIR does not include information concerning	The TERT encourages the United Kingdom to improve	No	No

Key category	Gas, fuel, activity	Observation	Recommendation	Revised estimate ⁽⁵⁾	Technical correction ⁽⁶⁾
	handling CH ₄ recovery All years	recovery of CH ₄ in anaerobic digesters. During the review process the TERT asked for clarification concerning CH ₄ recovery in wastewater treatment plants. The United Kingdom indicated that it uses the industry-wide data on CH ₄ emissions to derive the United Kingdom's estimates and that, for the purposes of reporting data in the CRF, the United Kingdom back-calculates an estimate of CH ₄ recovered in sewage sludge digestion from national statistics on electricity generated through sewage sludge digestion. The United Kingdom informed that the reporting in the NIR will be improved to enhance transparency.	the transparency of the NIR by including the clarifications provided during the review.		

Annex 2 – Detailed technical corrections

There are no technical corrections applied to the United Kingdom’s estimates of emissions.

Annex 2 – Checks and tests completed

The initial checks (stage 1 and 2 checks), which cover the national inventory submissions, informed the stage 3 technical review with a view to:

- a) assess whether all emission source categories and gases are reported as required under Decision 280/2004/EC;
- b) assess whether sub-category sums are consistent with sectoral and national totals;
- c) assess whether emission data time series are consistent;
- d) assess whether implied emission factors across Member States are comparable;
- e) assess the use of 'Not Estimated' notation keys where IPCC Tier 1 methodologies exist;
- f) compare with the previous year's inventory submission of the Member State;
- g) limited sector-specific checks performed by ETC/ACM sector experts.

The EU initial checks were extended in 2012 to address additional elements needed for the 2012 technical review. The extended checks included:

- a) a detailed analysis of recalculations performed for the 2012 inventory submissions, in particular if recalculations are based on methodological changes.
- b) a comparison of the verified emissions reported under the EU ETS with the greenhouse gas emissions reported in GHG inventories. The verified emissions under the EU ETS are not fully comparable with the emissions reported in the GHG inventories. This comparison may only highlight areas where some Member States' data and trends deviate considerably from those of other Member States.
- c) a comparison of the results from Eurostat's reference and sectoral approach, based on energy data reported under Regulation (EC) No 1099/2008, with the Member States' reference and sectoral approach.

The specific activities of the 2012 technical review included:

- a) an analysis of the Member States' implementation of recommendations related to improving inventory estimates in accordance with the Revised 1996 IPCC Guidelines and the 2000 IPCC good practice guidance (GPG) as listed in the UNFCCC Annual Review Reports from the 2010 and 2011 UNFCCC review processes. Where UNFCCC recommendations have not been implemented, the analysis included an assessment as to whether the Member State provided adequate justification for this;
- b) an assessment of the time series consistency of the greenhouse gas emissions estimates, with a particular focus on the 2005 and 2008-2010 estimates;
- c) checking whether problems identified for one Member State in UNFCCC reviews might also have been a problem for other Member States (whether identified by the UNFCCC expert review team or not);
- d) an assessment of any recalculations made by a Member State in its inventory since the previous submission, and an assessment as to whether these were transparently reported and were in accordance with IPCC good practice guidance;
- e) a follow-up on any outstanding findings from existing and extended stage 1 and 2 checks;
- f) the inclusion of revised estimates as provided by Member States in response to the review, and as accepted by the TERT during the review;
- g) the provision of an estimate for any 'technical correction' to emission estimates reported by a Member State where it is believed that emissions reported by the Member State are

overestimated, and a statement of the significance of these 'technical corrections' in comparison to the overall reported inventory estimates;

- h) the provision of recommendations where problems have been identified that do not require technical corrections.

Material from previous UNFCCC inventory reviews was used to inform the technical review, including the previous years' Annual Review Reports, which provide an indication of the overall quality of the inventory.

The TERT used additional technical information in the review process, such as EU ETS data, information from Eurostat, and F-gas data from the 'Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases (⁷), as well as data from other international organisations.

⁷ Service contract 070307/2009/548866/SER/C4 to the European Commission

Annex 4 – Correspondence references

Date	Reference
13 January 2012	Final CRF submission under the MMD, version GBE-2012-v1.1
15 March 2012	Final NIR submission under the MMD
21, 23 May, 4 June 2012	Initial questions raised by the TERT during the desk review
7, 14 June 2012	Additional questions raised by the TERT during the centralised review
31 May, 8, 15 June 2012	Responses from the United Kingdom to TERT questions
21 June 2012	Draft technical corrections from TERT to the United Kingdom
3 July 2012	Response from the United Kingdom to TERT draft technical corrections
13 July 2012	Draft review report from TERT to the United Kingdom
30 July 2012	Response from the United Kingdom to draft review report
13 August 2012	Draft final review report from TERT to United Kingdom
15 August 2012	Response and additional information from United Kingdom to final review report
17 August 2012	Final review report to European Commission