



COMPLIANCE COMMITTEE

CC/ERT/ARR/2017/26
19 April 2017

**Report on the individual review of the annual submission of Ukraine
submitted in 2016**

Note by the secretariat

The report on the individual review of the annual submission of Ukraine submitted in 2016 was published on 19 April 2017. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2016/UKR, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.



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Framework Convention on
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Report on the individual review of the annual submission of Ukraine submitted in 2016*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual greenhouse gas (GHG) inventory covering emissions and removals of GHG emissions for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol, with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2016 annual submission of Ukraine, conducted by an expert review team in accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol”. The review took place from 5 to 10 September 2016 in Bonn, Germany.

* In the symbol for this document, 2016 refers to the year in which the inventory was submitted, not to the year of publication.

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I. Introduction¹

1. This report covers the review of the 2016 annual submission of Ukraine organized by the UNFCCC secretariat, in accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1, as revised by decision 4/CMP.11) (hereinafter referred to as the Article 8 review guidelines). As indicated in the Article 8 review guidelines, this review process also encompasses the review under the Convention, as described in the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention” (hereinafter referred to as the UNFCCC review guidelines) and particularly Part III, “UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”. The review took place from 5 to 10 September 2016 in Bonn, Germany, and was coordinated by Ms. Sevdalina Todorova (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT) that conducted the review of Ukraine.

Table 1

Composition of the expert review team that conducted the review of Ukraine

| <i>Area of expertise</i> | <i>Name</i> | <i>Party</i> |
|--------------------------|--|---|
| Generalist | Mr. Nagmeldin Elhassan | Sudan |
| | Mr. Marcelo Rocha | Brazil |
| Energy | Ms. Elena Gavrilova | The former Yugoslav Republic of Macedonia |
| | Mr. Michael Smith | New Zealand |
| | Mr. Daniel Tutu Benefoh | Ghana |
| IPPU | Mr. Mauro Meirelles de Oliveira Santos | Brazil |
| | Mr. Erhan Unal | Turkey |
| Agriculture | Mr. Steen Gyldenkærne | Denmark |
| | Ms. Alice Ryan | New Zealand |
| LULUCF | Mr. Craig Elvidge | New Zealand |
| | Ms. Sanaa Enkhtaivan | Mongolia |
| | Mr. Sandro Federici | San Marino |
| | Mr. Sabin Guendehou | Benin |
| Waste | Mr. Martiros Tsarukyan | Armenia |

¹ At the time of publication of this report, Ukraine had not yet submitted its instrument of ratification of the Doha Amendment, and the Amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the Amendment.

| | | |
|----------------|---------------------|---------------------|
| | Ms. Tatiana Tugui | Republic of Moldova |
| Lead reviewers | Ms. Elena Gavrilova | |
| | Mr. Marcelo Rocha | |

Abbreviations: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry.

2. This report contains findings based on the assessment by the ERT of the 2016 annual submission against the Article 8 review guidelines. The ERT has made recommendations to resolve those findings related to issues,² including issues related to problems.³ Other findings, and, if applicable, the ERT’s encouragements to resolve them, are also included.

3. A draft version of this report was communicated to the Government of Ukraine, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

4. Annex I shows annual greenhouse gas emissions for Ukraine, including totals excluding and including the land use, land-use change and forestry sector, indirect carbon dioxide emissions, and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and additional activities under Article 3, paragraph 4, of the Kyoto Protocol, if elected, by gas, sector and activity for Ukraine.

5. Information to be included in the compilation and accounting database can be found in annex II.

II. Summary and general assessment of the 2016 annual submission

6. Table 2 provides the ERT assessment of the annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5 below.

Table 2
Summary of review results and general assessment of the inventory of Ukraine

| <i>Assessment</i> | | <i>Issue or problem ID#(s) in tables 3 and/or 5^a</i> |
|---------------------|---|---|
| Dates of submission | Original submission: 24 May 2016 (NIR), 24 May 2016, version 1 (CRF tables), NA (SEF tables) Revised submissions: 18 July 2016 (NIR), 24 October 2016, version 2 (CRF tables) The values from the latest submission are used in this report | |
| Review format | Centralized | |

² “Issues” are defined in decision 13/CP.20, annex, paragraph 81.

³ “Problems” are defined in decision 22/CMP.1, annex, paragraphs 68 and 69, as revised by decision 4/CMP.11.

| <i>Assessment</i> | | | <i>Issue or problem ID#(s) in tables 3 and/or 5^a</i> |
|--|--|--|--|
| Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable) | Have any issues been identified in the following areas: | | |
| | 1. Identification of key categories | No | |
| | 2. Selection and use of methodologies and assumptions | Yes | E.9, E.15, A.12, A.22, L.35, KP.7, KL.8, KL.10, KL.13 |
| | 3. Development and selection of emission factors | Yes | E.8, E.12, E.29, E.35, I.39, A.14, A.21, A.25, L.3, L.4, L.5, L.14, L.15, L.17, L.19, L.21, W.10 |
| | 4. Collection and selection of activity data | Yes | E.16, A.20, L.16, L.18, L.29, L.33, W.7 |
| | 5. Reporting of recalculations | Yes | E.27, E.31, E.34, A.6 |
| | 6. Reporting of a consistent time series | Yes | A.9 |
| | 7. Reporting of uncertainties, including methodologies | No | |
| | 8. QA/QC | QA/QC procedures were assessed in the context of the national system (see below) | |
| | 9. Missing categories/completeness ^b | Yes | E.17, L.20, L.21, L.36, L.37, L.38, L.40, L.41, W.13, KL.14 |
| | 10. Application of corrections to the inventory | No | |
| Significance threshold | For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines? | No | I.42, W.11 |
| Description of trends | Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable? | No | E.19, I.38, A.20, A.21 |
| Supplementary information under the Kyoto Protocol | Have any issues been identified in the following areas: | | |
| | 1. National system: | | |
| | (a) The overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements | No | |

| Assessment | | | <i>Issue or problem ID#(s) in tables 3 and/or 5^a</i> |
|-------------|--|-----|---|
| | (b) Performance of the national system functions | No | |
| 2. | National registry: | | |
| | (a) Overall functioning of the national registry | Yes | G.3 |
| | (b) Performance of the functions of the national registry and the technical standards for data exchange | Yes | G.4, G.6 |
| 3. | ERUs, CERs, AAUs and RMUs and on information on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, taking into consideration any findings or recommendations contained in the SIAR | Yes | G.5 |
| 4. | Matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, including any changes since the previous annual submission | No | |
| 5. | LULUCF activities under Article 3, paragraphs 3 and 4 of the Kyoto Protocol: | | |
| | (a) Reporting in accordance with the requirements of decision 2/CMP.8, annex II, paragraphs 1–5 | Yes | KL.2, KL.3, KL.5, KL.10, KL.13, KL.14 |
| | (b) The Party has demonstrated methodological consistency between the reference level and reporting on forest management in accordance with decision 2/CMP.7, annex, paragraph 14 | Yes | KL.6, KL.7, KL.8 |
| | (c) The Party has reported information in accordance with decision 6/CMP.9 | Yes | KL.12 |
| | (d) Country-specific information has been reported to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34 | NA | |
| | (e) Other issues | Yes | KL.4, KL.9 |
| CPR | Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18? | No | G.2 |
| Adjustments | Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol? | No | |

| Assessment | <i>Issue or problem ID#(s) in tables 3 and/or 5^a</i> | | |
|---|--|-----|------------------------------|
| | The ERT accepts that the revised estimates submitted by Ukraine in its 2016 submission can replace a previously applied adjustment in the compilation and accounting database | NA | |
| Response from the Party during the review | Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties? | Yes | |
| Recommendation for an exceptional in-country review | On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review? | Yes | See annex III to this report |
| Questions of implementation | Did the ERT list questions of implementation? | No | |

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, CPR = commitment period reserve, CRF = common reporting format, ERT = expert review team, ERU = emission reduction unit, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, NIR = national inventory report, QA/QC = quality assurance/quality control, RMU = removal unit, SEF = standard electronic format, SIAR = standard independent assessment report, UNFCCC Annex I inventory reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”, Wetlands Supplement = *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*.

^a The ERT identified additional issues in the energy, industrial processes and product use, agriculture, LULUCF/KP-LULUCF and waste sectors that are not specifically listed in table 2 but are included in table 3 and/or 5.

^b Missing categories, for which methods are provided in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, may affect completeness and are listed in annex III to this document.

III. Status of implementation of issues and/or problems raised in the previous review report

7. Table 3 compiles all the recommendations made in the previous review report, published on 6 April 2016. For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2016 annual submission and provided the rationale for its determination, taking into consideration the publication date of the previous review report and national circumstances.

Table 3
Status of implementation of issues and/or problems raised in the previous review report of Ukraine

| ID# | <i>Issue and/or problem classification^{a, b}</i> | <i>Recommendation made in previous review report^c</i> | <i>ERT assessment and rationale</i> |
|---------|--|--|--|
| General | | | |
| G.1 | QA/QC and verification (table 5, G.3, 2015). Adherence to the UNFCCC Annex I inventory reporting | Review the QA/QC plan and, as appropriate, update it to minimize errors, and report on the efforts made in the NIR | Resolved. The QA/QC plan was revised and adopted to minimize the likelihood of errors in the calculation of estimates and to enhance the consistency of data between the NIR and the CRF |

| ID# | Issue and/or problem classification ^{a, b} | Recommendation made in previous review report ^c | ERT assessment and rationale |
|--------|--|--|---|
| | guidelines | | tables. Particular attention was given to the QC reporting forms (see section 1.2.2 of the NIR) |
| Energy | | | |
| E.1 | Comparison with international data – general (table 3, E.5, 2015) (24, 2014) (28, 2013) (43, 2012). Not an issue | Investigate further the underlying reasons for the discrepancies between the CRF tables and IEA data sets and include in the NIR a comprehensive analysis that justifies the deviation between the two data sets | No longer relevant. A partial analysis of the comparison between the CRF data and IEA data was provided in the NIR (chapters A.4.2, A.4.3 and 3.2.1). Noting that the comparison with the IEA data is not a mandatory requirement according to decision 24/CP.19, Parties are encouraged to investigate such comparison |
| E.2 | International aviation – liquid fuels (table 3, E.7, 2015) (25, 2014) (29, 2013) (45, 2012). Transparency | Provide an explanation in the NIR for the calculation of emissions from international aviation for the years 1990–1995, including justification for the rate of international aviation for the period | Resolved. A description of the method used to calculate the emissions was included in the NIR together with detailed aircraft and passenger traffic statistics (section A2.12.3) to support the reported rate of international aviation |
| E.3 | International aviation: liquid fuels – CO ₂ , CH ₄ and N ₂ O (table 5, E.21, 2015). Consistency | Apply the overlap methodology to fill the 1991–1995 data gap for the estimation of international aviation emissions | Resolved. Ukraine applied a methodology using proxy data to fill the data gap in the estimation of international aviation emissions |
| E.4 | International aviation: liquid fuels – CO ₂ , CH ₄ and N ₂ O (table 5, E.22, 2015). Transparency | Describe transparently in the NIR the methodology used to estimate emissions for international and domestic navigation | Resolved. The Party has provided transparent information on the estimation of international and domestic aviation emissions in the NIR (section A2.12.3) |
| E.5 | Feedstocks, reductants and other non-energy use of fuels – liquid fuels (table 3, E.9, 2015) (29, 2014) (31, 2013) (49, 2012). Transparency | Report the imported and exported refinery feedstocks and naphtha under the reference approach by including the amounts of these fuels in CRF table 1.A(b) | Resolved. Data have been reported for refinery feedstocks and the notation key “NO” has been used to report naphtha following consultation with SSSU |
| E.6 | Feedstocks, reductants and other non-energy use of fuels – solid fuels (table 5, E.24, 2015). Adherence to the UNFCCC Annex I inventory reporting | Report the non-energy use of coal in carbon black production in CRF table 1.A(d) | Resolved. According to the NIR (section 3.2.3) and the information provided by Ukraine during the review, the Party included the non-energy use of coal used in carbon black production in CRF table 1.A(d). However, it is not clear from the table where this has been |

| ID# | Issue and/or problem classification ^{a, b} | Recommendation made in previous review report ^c | ERT assessment and rationale |
|------|---|--|--|
| | guidelines | | included (see finding E.26 in table 5 below) |
| E.7 | Feedstocks, reductants and other non-energy use of fuels – solid fuels (table 5, E.24, 2015). Completeness | Report data or the appropriate notation key in CRF table 1.A(b) for coke oven/gas coke | Resolved. Data on coke oven/gas coke have been reported in CRF table 1.A(b) |
| E.8 | 1.A. Fuel combustion – sectoral approach – liquid fuels: CO ₂ (table 3, E.11, 2015) (31, 2014). Accuracy* | Develop and use country-specific CO ₂ EFs for liquid fuels (i.e. residual fuel, diesel oil, LPG, petroleum coke and refinery gases) which have a significant share in the fuel mix of stationary combustion | Not resolved. During the review, Ukraine explained that it will try to implement the recommendation, although it is not a priority, since the share of liquid fuel consumption is less than 3% of total stationary fuel consumption and there are more crucial inventory issues for the energy sector |
| E.9 | 1.A. Fuel combustion – sectoral approach – solid fuels: CO ₂ and CH ₄ (table E.25, 2015). Accuracy* | Revise the methodology for the quantification of the carbon content of solid fuels, such that it accounts for the fraction of volatile components in the coal itself | Addressing. The NIR (section 3.2.7.6) indicates the development of a new methodology for the calculation of CO ₂ emissions from the combustion of coal in Ukraine (including the determination of the specific carbon content). During the review, Ukraine provided the report on stage one of the referenced research project ^d |
| E.10 | 1.A.2.d Pulp, paper and print – biomass: CH ₄ and N ₂ O (table 5, E.26, 2015). Transparency | Investigate what happens to all the biomass waste streams from the pulp and paper industry and report the findings of this assessment in the NIR | Resolved. A description of waste streams was provided in the NIR (section 3.2.8.1.4) |
| E.11 | 1.A.3.a Domestic aviation – liquid fuels: CO ₂ , CH ₄ and N ₂ O (table 5, E.27, 2015). Completeness | Report the outcome of the analysis for the AD and emissions from use of aviation gasoline in 2013 and, as appropriate, revise the time series | Resolved. The AD have been revised for the entire time series. The data and a description of the time series have been reported in annex A2.12 to the NIR |
| E.12 | 1.A.3.b Road transportation – liquid fuels: CO ₂ (table 3, E.13, 2015) (20 and 35, 2014) (24 and 33, 2013) (53, 2012) (63, 2011). Accuracy* | Develop country-specific CO ₂ EFs for motor fuels (i.e. gasoline, diesel oil and LPG) based on their carbon content and provide an explanation of the methodology used in the NIR | Addressing. The NIR (section 3.2.9, p. 86) provides information on the initial stages of the Clima East programme ^e which, among other things, aims to develop country-specific EFs for road transportation |

| <i>ID#</i> | <i>Issue and/or problem classification^{a, b}</i> | <i>Recommendation made in previous review report^f</i> | <i>ERT assessment and rationale</i> |
|------------|---|--|---|
| E.13 | 1.A.3.b Road transportation – liquid fuels: CH ₄ (table 3, E.17, 2015) (39, 2014). Transparency | Provide a quantitative analysis in the NIR that justifies the decreasing trend in the CH ₄ IEFs for gasoline and diesel oil by interpreting the AD, parameters and emissions calculated by the COPERT IV model | Resolved. The EFs have been revised and the CH ₄ EFs for gasoline and diesel oil are now constant across the time series |
| E.14 | 1.A.3.b Road transportation – liquid fuels: CO ₂ (table 5, E.28, 2015). Consistency | Submit the revised estimates for CO ₂ emissions from liquid fuel use in road transportation (with a corrected oxidation factor for the 2013 CO ₂ emission estimates), recalculate the time series, and include the results of this analysis in the NIR | Resolved. The oxidation factor has been revised to equal 1, and the emission estimates have been revised to reflect this change |
| E.15 | 1.A.3.b Road transportation – liquid fuels: CO ₂ (table 5, E.29, 2015). Accuracy* | Apply a higher methodological tier for estimating CO ₂ emissions from road transportation | Not resolved. The Party has not implemented a higher methodological tier, and besides referring to the Clima East programme, Ukraine has not reported details of the respective plan, progress or time frame with regard to moving to a higher tier |
| E.16 | 1.A.3.b Road transportation – liquid fuels: CO ₂ , CH ₄ and N ₂ O (table 5, E.30, 2015). Comparability* | Investigate the allocation of emissions from the combustion of lubricants and report the outcome of this assessment | Not resolved. The NIR does not include additional information on the allocation of the emissions from energy use of fuel besides the information contained in annex A2.3 to and table A8.1 of the NIR. During the review, Ukraine confirmed that the emissions from the energy use of lubricants have been reported in the CRF tables under subcategory 1.A.3.b.iv (motorcycles). The rest of the emissions are reported under the subcategories 1.A.1 (energy industries) and 1.A.3.e (other transportation) |
| E.17 | 1.A.3.e Other transportation – biomass: CH ₄ and N ₂ O (table 5, E.31, 2015). Completeness* | Strive to collect data for biodiesel consumption for the period 1990–2012 and report the outcome of those efforts in the NIR and, if impossible, change the notation key for the period 1990–2012 from “NO” to “NE” | Not resolved. During the review, Ukraine informed the ERT that the AD supplier was contacted who explained that biofuel was not covered in the statistical forms for the years prior to 2013 and therefore official statistics did not exist. Ukraine continues to use the notation key “NO” and a justification has not been included in the NIR |

| <i>ID#</i> | <i>Issue and/or problem classification^{a, b}</i> | <i>Recommendation made in previous review report^f</i> | <i>ERT assessment and rationale</i> |
|------------|--|---|--|
| E.18 | 1.A.4.b Residential – liquid fuels: CO ₂ (table 3, E.18, 2015) (20, 2014) (24, 2013). Accuracy | Develop a country-specific CO ₂ EF for fuel oil used under the residential category | No longer relevant. The recommendation has not been implemented. However, the ERT noted that the category is no longer a key category, since the fuel oil consumption in the residential sector has decreased dramatically in the last few years and equalled zero in 2013 and 2014 |
| E.19 | 1.B.1.a Coal mining and handling – solid fuels: CH ₄ (table 5, E.32, 2015). Transparency* | Include the following information in the NIR: (a) Management practices in abandoned underground mines (b) The sampling strategy (c) The methodology used to extrapolate emissions to the years when measurements are not undertaken | Addressing. Points (a) and (b): resolved. The Party has included a partial description of the approach used to estimate the emissions and sampling strategy in the NIR (section 3.3.1.2.1) Point (c): not resolved. Information on the methodology used to calculate the emissions for the time series has not been included in the NIR |
| E.20 | 1.B.1.a Coal mining and handling – solid fuels: CH ₄ (table 5, E.32, 2015). Transparency | Allocate emissions from abandoned underground mines to the category “abandoned underground mines” in place of the previously used notation key “NA” | Resolved. Emissions from abandoned underground mines have been correctly allocated in CRF table 1.B.1 |
| E.21 | 1.B.1.a Coal mining and handling – solid fuels: CH ₄ (table 5, E.33, 2015). Completeness | Identify a suitable means of collecting the AD associated with surface coal mining and report the CH ₄ emission estimates for this category or use an appropriate proxy | Resolved. The Party has reported data on CH ₄ emissions from surface coal mining and included background information in the NIR (section 3.3.1.2.2) |
| E.22 | 1.B.1.a Coal mining and handling – solid fuels: CH ₄ (table 5, E.33, 2015). Completeness | Report the emissions associated with recovery for energy purposes through the coal mine methane projects under manufacture of solid fuels and other energy industries, or manufacturing industries and construction, depending on where the recovered CH ₄ is used | Resolved. Emissions have been estimated, but have been erroneously included under manufacture of solid fuels and other energy industries (1.A.1.c) (see finding E.32 in table 5) |
| E.23 | 1.B.2.b Natural gas – gaseous fuels: CH ₄ (table 3, E.19, 2015). Accuracy | Develop country-specific EFs for fugitive CH ₄ emissions from natural gas leakage from end-users | Resolved. The emissions have been estimated using the default EFs from the Revised 1996 IPCC Guidelines. However, the ERT notes that the category has not been included in the mandatory list of categories in the revised CRF tables |

| <i>ID#</i> | <i>Issue and/or problem classification^{a, b}</i> | <i>Recommendation made in previous review report^c</i> | <i>ERT assessment and rationale</i> |
|-------------|---|---|---|
| IPPU | | | |
| I.1 | 2. General (IPPU) – (I.7, 2015). Transparency | Improve the transparency of the IPPU section in the NIR by correcting the following identified technical errors: (a) The numbering of the subsections in sections 4.19 and 4.22 (b) Three different tables with the same number 4.6 (c) GHG emission data units not corresponding to the data in table P.3.1.1.1 | Resolved. The previous technical errors were corrected. However, some new errors have been detected by the ERT (see findings I.39 and I.40 in table 5) |
| I.2 | 2.A.1 Cement production – CO ₂ (table 5, I.8, 2015). Accuracy | Correct the application of the tier 1 method for the uncertainty assessment with a focus on the uncertainty of the CKD correction factor calculation | Resolved. Ukraine calculated the uncertainty in accordance with the 2006 IPCC Guidelines, taking into account the CKD correction factor |
| I.3 | 2.A.1 Cement production – CO ₂ (table 5, I.9, 2015). Transparency | Specify in the NIR the different sources of AD used, and how time-series consistency has been ensured | Resolved. Ukraine explained in the NIR (section 4.2 and annex 3.1.1) that data are collected from the respective enterprises and checked against the data from the UkrCement association across the time series |
| I.4 | 2.A.1 Cement production – CO ₂ (table 5, I.11, 2015). Accuracy | Either justify the use of the country-specific CKD value, or, if information is not available, revise the CKD correction factor following the methods provided in the 2006 IPCC Guidelines or use the IPCC default value (1.02) | Resolved. The Party used a CKD correction factor corresponding to the IPCC default value (1.02) |
| I.5 | 2.A.2 Lime production – CO ₂ (table 5, I.12, 2015). Transparency | Discuss in the NIR the completeness of the AD (marketed and non-marketed production of lime) used for the estimation of emissions from lime production | Resolved. The required information has been included in the NIR (section 4.3.1), showing that all produced lime (marketed and non-marketed) is covered in the inventory |
| I.6 | 2.A.2 Lime production – CO ₂ (table 5, I.13, 2015). Accuracy | Justify in the NIR that the calculated CO ₂ EFs for lime production are appropriate for the national circumstances (i.e. neither under- nor overestimated) or use the default EFs for lime production from the 2006 IPCC Guidelines | Resolved. Ukraine recalculated the CO ₂ emissions from lime production in accordance with the tier 2 method from the 2006 IPCC Guidelines |
| I.7 | 2.A.2 Lime production – CO ₂ (table 5, I.14, 2015). Accuracy | Correct the application of the tier 1 method for the uncertainty assessment, with a focus on avoiding an overestimation of the uncertainty of the correction factor for lime | Resolved. Ukraine recalculated the uncertainties, taking into account the correction factor for lime kiln dust. The uncertainty of the estimates changed from 26.8% to |

| <i>ID#</i> | <i>Issue and/or problem classification^{a, b}</i> | <i>Recommendation made in previous review report^f</i> | <i>ERT assessment and rationale</i> |
|------------|--|--|---|
| | | kiln dust | 18.9% |
| I.8 | 2.A.2 Lime production – CO ₂ (table 5, I.15, 2015). Consistency | Investigate the reason for the observed changes in the lime production data (quicklime and hydrated lime production) and discuss the time-series consistency in the NIR, or revise the time series, as appropriate | Resolved. Ukraine provided the rationale for the changes in the lime market and explained the driving forces for the reduction in emissions in the NIR (section 4.3.1) |
| I.9 | 2.A.3 Glass production – CO ₂ (table 5, I.16, 2015). Comparability | Report emissions from soda ash use for glass production under glass production (currently reported under soda ash production) | Resolved. Emissions from the use of soda ash in glass production have been reallocated under glass production |
| I.10 | 2.A.3 Glass production – CO ₂ (table 5, I.17, 2015). Transparency* | Include a discussion of the development of the EF (0.11 t/t) for glass production in the NIR, including the comparison analysis undertaken with the EF used by other Parties | Not resolved. The information on the development of the EF was not included in the NIR and only provided during the review. Ukraine included emissions from soda ash use in glass production in the 2016 submission and recalculated the emissions, resulting in an IEF of 0.18 t/t |
| I.11 | 2.A.4 Other process uses of carbonates – CO ₂ (table 5, I.18, 2015). Transparency | Revise the description of the category in the NIR to correctly identify the activities that occur in Ukraine and the carbonates that are consumed | Resolved. The Party revised the description of this category in the NIR (section 4.5) |
| I.12 | 2.A.4 Other process uses of carbonates – CO ₂ (table 5, I.19, 2015). Completeness | Recalculate emissions from ceramic production for the entire inventory period taking into account clay calcination | Resolved. Ukraine recalculated emissions from ceramic production by considering clay calcination |
| I.13 | 2.B.1 Ammonia production – CO ₂ (table 5, I.20, 2015). Transparency | Include in the NIR the description of the methodology used for estimating CO ₂ recovery for ammonia production and report in CRF table 2(I).A-H data on CO ₂ recovery | Resolved. Ukraine included a description of the methodology used for estimating CO ₂ recovery for ammonia production (NIR, section 4.6.2) and reported CO ₂ recovery in CRF table 2(I).A-H |
| I.14 | 2.B.1 Ammonia production – CO ₂ (table 5, I.21, 2015). Transparency | Clarify in the NIR that the natural gas used for energy purposes in ammonia production was not double counted in the energy sector | Resolved. Ukraine confirmed that there is no double counting of emissions from natural gas use in ammonia production and included a further explanation for the allocation of the emissions from natural gas used for energy purposes in ammonia production (NIR, section 4.6.2) |

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| I.15 | 2.B.1 Ammonia production – CO ₂ (table 5, I.22, 2015). Accuracy | Revise the carbon content for natural gas from ammonia production for 2013 using the EF corresponding to the energy sector | Resolved. Ukraine recalculated emissions from ammonia production for the entire time series following the refinement of the data for the carbon content of natural gas and the net calorific value |
| I.16 | 2.B.1 Ammonia production – CO ₂ (table 5, I.23, 2015). Adherence to the UNFCCC Annex I inventory reporting guidelines | Revise the uncertainty assessment for natural gas consumption, taking into account the uncertainty values from the national statistics and plant-specific data; for CO ₂ recovery, use the default uncertainty values (5%) provided in the 2006 IPCC Guidelines (section 3.2.3.2) if country-specific data are not available | Resolved. Ukraine took into account the uncertainty of CO ₂ recovery and the plant-specific uncertainty of natural gas consumption for ammonia production in the estimation of the emission uncertainty and used uncertainty values consistent with the 2006 IPCC Guidelines |
| I.17 | 2.B.2 Nitric acid production – N ₂ O (table 5, I.25, 2015). Transparency | Provide more details in the NIR on how the applied country-specific EF for nitric acid production was developed or use an IPCC default EF from the 2006 IPCC Guidelines for the corresponding technology | Resolved. Ukraine provided additional information on the development of the EF (NIR, section 4.7.1) |
| I.18 | 2.B.2 Nitric acid production – N ₂ O (table 5, I.26, 2015). Transparency | Clarify in the NIR whether abatement systems are used in the Ukrainian plants and, if so, provide information on the number of plants using abatement technology, the type of abatement technology, the destruction efficiency and the utilization | Resolved. Ukraine provided additional information on the abatement technology used (NIR, section 4.7.1). However, the ERT considers that the information needs to be further enhanced by including information on the utilization period of the devices (see finding I.39 in table 5) |
| I.19 | 2.B.3 Adipic acid production – N ₂ O (table 5, I.27, 2015). Consistency | Evaluate whether the AD for the entire time series can be reported and, if so, include this information in the CRF tables | Resolved. The AD for adipic acid for the entire time series were provided in table A3.1.1.9 of annex 3 to the NIR and in CRF table 2(I).A-Hs1 |
| I.20 | 2.B.3 Adipic acid production – N ₂ O (table 5, I.27, 2015). Consistency | Evaluate the time series for the IEF, and either recalculate the emissions from adipic acid production for 2009 or provide in the NIR a clear explanation for the observed trends in the IEF | No longer relevant. In the 2016 submission, the Party has recalculated the time series using a constant EF across the time series |
| I.21 | 2.B.3 Adipic acid production – N ₂ O (table 5, I.28, 2015). Transparency* | Report consistently the information on the tier applied to estimate N ₂ O emissions from adipic acid production and include in the NIR the description of the number and type of abatement systems used in Ukraine and the corresponding destruction and utilization | Not resolved. The NIR does not contain a sufficient amount of new information on abatement technologies (e.g. on the destruction and utilization factors for the abatement systems used in |

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| | | factors | the country) and refers to the 2014 and 2015 submissions for a description of the methodological issues (NIR, section 4.8) for adipic acid production, which does not occur after 2012 |
| I.22 | 2.B.7 Soda ash production – CO ₂ (table 3, I.4, 2015) (50, 2014). Transparency | Report AD for soda ash production and change the notation key for CO ₂ emissions from “NA” to “NO” | Resolved. Soda ash use emissions and AD were reallocated from category 2.B.7 (soda ash production) to category 2.A.4.b (other process uses of carbonates). For CO ₂ emissions in category 2.B.7 (soda ash production), the notation key was changed from “NA” to “NO” |
| I.23 | 2.B.8 Petrochemical and carbon black production – N ₂ O (table 5, I.31, 2015). Comparability | Allocate all CH ₄ emissions from coke production to the energy sector, under manufacture of solid fuels and other energy industries (category 1.A.1.c) | Resolved. CH ₄ emissions from coke production were reallocated to manufacture of solid fuels (category 1.A.1.c.i) under the energy sector |
| I.24 | 2.C.1 Iron and steel production – CO ₂ (table 5, I.32, 2015). Transparency | Clearly document the method applied for the calculation of CO ₂ emissions from this category in the NIR and provide information consistent with the use of that method (i.e. for a tier 3 method, report the calculated emissions and sources of all data, recognizing the possible need to protect confidential data) | Resolved. Ukraine included detailed information on the methodology used for the estimation of the emissions from iron and steel production (NIR, section 4.14.2) |
| I.25 | 2.C.1 Iron and steel production – CO ₂ (table 5, I.33, 2015). Comparability | Review the accuracy of the limestone consumption data for 1990 and, if appropriate, extrapolate specific limestone consumption data based on the period 1991–2013 back to 1990, as recommended in the 2012 and 2013 annual review reports | Resolved. The Party used an extrapolation method to revise the value of limestone consumption per iron produced unit, which changed from 0.151 kt to 0.073 kt (NIR, section 4.14.5) |
| I.26 | 2.C.1 Iron and steel production – CO ₂ (table 5, I.34, 2015). Transparency | Reconcile the inconsistent information between the CO ₂ EF for pig iron production in NIR tables 4.23 and P.3.1.1.15 and address the fact that table 4.23 contains two different CO ₂ EFs for limestone use in the iron and steel industry (0.4335 t/t and 0.4645 t/t) | Resolved. The difference between the tables in the NIR was eliminated, as well as the mistake in the tables (NIR, tables 4.21 and A3.1.1.12) |
| I.27 | 2.C.2 Ferroalloys production – CO ₂ (table 5, I.35, 2015). Comparability | Report emissions from limestone use in ferroalloys production under the category ferroalloys production (2.C.2) | Resolved. Emissions from limestone use in ferroalloys production were correctly allocated |
| I.28 | 2.C.2 Ferroalloys production – CO ₂ (table 5, I.36, 2015). | Exclude CO ₂ emissions from biomass use in ferroalloys production from the total emissions under category 2.C.2 and provide an | Resolved. Emissions from biomass use in ferroalloys production were excluded from the total CO ₂ |

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| | Adherence to the UNFCCC Annex I inventory reporting guidelines | explanatory note in CRF table 2(I).A-H and in the NIR indicating that biomass emissions from the use of biomass as a reductant are excluded from the emissions from ferroalloys production to avoid double counting and are included elsewhere (in the LULUCF sector) | emissions of the category, and the emissions from the category were recalculated for the entire time series. These changes are explained in section 4.15.5 of the NIR |
| I.29 | 2.C.2 Ferroalloys production – CO ₂ (table 5, I.37, 2015). Accuracy | Either justify in the NIR the use of a carbon content of 8% in the wastes after ferroalloys production, with an explanation of all types of wastes under consideration, referencing relevant sources, or use the average value of carbon content for Ukraine (1.8%) reported in the national study | Resolved. The carbon content in wastes after ferroalloys production was revised and an average value of 2% was applied, consistent with the data provided by the enterprises |
| I.30 | 2.C.3 Aluminium production – PFCs and CO ₂ (table 5, I.38, 2015). Transparency* | Include information on aluminium production in the NIR, covering the relevant time period, as required by the UNFCCC Annex I inventory reporting guidelines | Not resolved. Taking into account the fact that aluminium production ceased in 2010, the ERT noted that no additional information was provided in the 2016 submission |
| I.31 | 2.E.5 Other (electronics industry) – NF ₃ (table 5, I.39, 2015). Transparency | Describe in the NIR the absence of NF ₃ emissions in a transparent manner and use the notation key “NO” to report the corresponding emissions in the CRF tables | Resolved. The Party has reported NF ₃ emissions in the CRF tables as “NO” and has included a section on the electronics industry in the NIR (section 4.24), explaining the absence of sources of NF ₃ emissions in the country |
| I.32 | 2.F. Product uses as substitutes for ozone-depleting substances – HFCs (table 3, I.6, 2015) (51, 2014). Transparency | Include additional information in the NIR on the end of the life cycle of the equipment | Resolved. Information on the life cycle of the equipment for all the categories was provided in tables 4.35–4.41 of the NIR |
| I.33 | 2.F. Product uses as substitutes for ozone-depleting substances – HFCs (table 5, I.40, 2015). Transparency | Improve the transparency of the reporting by reporting HFC emissions from industrial air conditioning under stationary air conditioning and not under industrial refrigeration | Resolved. The HFC emissions from industrial air conditioning were included under stationary air conditioning |
| I.34 | 2.F. Product uses as substitutes for ozone-depleting substances – HFCs (table 5, I.41, 2015). Comparability | Correct CRF table 2(II).B-H for HFC-134a stocks in commercial refrigeration, using the corresponding data on stocks and the product life factor from the NIR | Resolved. The discrepancies between the NIR and CRF table 2(II).B-H for HFC-134a stocks were eliminated |
| I.35 | 2.F. Product uses as substitutes for ozone- | Investigate methods for collecting the AD for transport refrigeration and either complete the | Resolved. The AD and emission estimates are still missing. |

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| | depleting substances – HFCs (table 5, I.42, 2015). Completeness | CRF tables with AD and emission values or report the emissions using the relevant notation key (“NE”) | However, the emissions from the category are reported as “NE” and are classified as insignificant (see finding I.42 in table 5) |
| I.36 | 2.F. Product uses as substitutes for ozone-depleting substances – HFCs (table 5, I.43, 2015). Completeness | Investigate further the HFC-134a emissions from stationary air-conditioning equipment after 2010 and document the analysis, and any resulting changes, in the NIR | Resolved. The recalculation of the estimates of HFC-134a emissions for the years 2011–2013 was performed and documented in the NIR (section 4.25.1.2.5) |
| I.37 | 2.F. Product uses as substitutes for ozone-depleting substances – HFCs (table 5, I.43, 2015). Transparency* | Investigate further disposal emissions, noting that the average lifetime for air-conditioning equipment according to the 2006 IPCC Guidelines is between 10 and 20 years, and document the analysis in the NIR | Not resolved. HFC disposal emissions in this category are not yet considered as the Party uses a lifetime of 15–25 years. During the review, the Party informed the ERT that the emissions would be relevant and considered from the 2017 submission onwards only. There is no discussion or justification of the issue in the NIR |
| Agriculture | | | |
| A.1 | 3. General (agriculture) – CH ₄ and N ₂ O (table 5, A.3, 2015). Adherence to the UNFCCC Annex I inventory reporting guidelines | Investigate the data available to estimate fluctuations in populations within the year and develop average annual livestock populations in accordance with the 2006 IPCC Guidelines for the entire time series | Resolved. A national methodology to estimate the average annual livestock has been implemented in line with the 2006 IPCC Guidelines |
| A.2 | 3.A Enteric fermentation – CH ₄ (table 5, A.4, 2015). Accuracy | Investigate the appropriateness of the value used for Y _m for cattle and provide a justification for the current value or recalculate CH ₄ emissions from enteric fermentation of cattle for the entire time series using the Y _m factor from the 2006 IPCC Guidelines | Resolved. Y _m factors from the 2006 IPCC Guidelines have been used for the whole time series |

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| A.3 | 3.A Enteric fermentation – CH ₄ (table 5, A.5, 2015). Transparency* | Provide an explanation of the standard live weights for various groups of non-dairy cattle and the reasons for the trend between 1990 and 2013 in the NIR | Addressing. Average live weights for different cattle subspecies have been included in the NIR (tables A3.2.2.4 and A3.2.2.5), but no explanation of the increased average live weight reported in CRF table 3.As2 has been included in the NIR |
| A.4 | 3.B Manure management – CH ₄ (table 5, A.6, 2015). Transparency | Improve the transparency of the justification for using a country-specific DE value for cattle in the NIR and in the absence of such justification, apply the IPCC default DE value of 60% | Resolved. A DE value of 60% has been used in the 2016 submission, consistent with the 2006 IPCC Guidelines (see also finding A.24 in table 5) |
| A.5 | 3.B Manure management – CH ₄ (table 5, A.7, 2015). Accuracy | Recalculate CH ₄ emissions from manure management of poultry for the entire time series with the appropriate default B ₀ value from the 2006 IPCC Guidelines | Resolved. The default B ₀ value has been used for the estimation of the emissions from poultry for the recalculated time series |
| A.6 | 3.B Manure management – CH ₄ and N ₂ O (table 5, A.8, 2015). Transparency* | Include a transparent explanation for all recalculations made in the distribution of MMS | Not resolved. In the 2016 submission, no changes in the distribution of MMS are mentioned. The Party informed the ERT that a detailed explanation of the MMS recalculations will be provided in the next NIR (see finding A.23 in table 5) |
| A.7 | 3.B Manure management – N ₂ O (table 5, A.10, 2015). Completeness | Calculate direct and indirect N ₂ O emissions from the composting type of MMS and report emissions for the entire time series | Resolved. A recalculation of the emissions has been performed and reported for the entire time series |
| A.8 | 3.B Manure management – N ₂ O (table 5, A.11, 2015). Accuracy | Correct the error in the reporting of Nex per MMS in CRF table 3.B(b) | Resolved. The Nex values reported in CRF table 3.B(b) have been updated |
| A.9 | 3.B Manure management – N ₂ O (table 5, A.12, 2015). Consistency* | Use the available separate statistics on populations for fox plus raccoon, and mink plus polecat animal groups, apply separate default Nex rates from 2004, apply the average population ratio for fur animals for the period 2004–2013 and apply separate default Nex rates for the period 1990–2003 | Addressing. Separate Nex values for fur-bearing species have been applied for 2004 onwards. For the period 1990–2003, there are large differences in the Nex values for fur bearing animals compared to the estimated Nex from 2004 and onwards. This can be avoided by using the weighted Nex average as estimated for the period 2004–2014 |

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| A.10 | 3.B Manure management – N ₂ O (table 5, A.13, 2015). Transparency | Provide a more transparent description of the methodology used for estimating indirect N ₂ O emissions from MMS, including exact information on the type of indirect N ₂ O emissions that are estimated and the applied equations | Resolved. The estimation of indirect N ₂ O emissions is based on the methodology provided in the 2006 IPCC Guidelines and the relevant reference has been included in the NIR (section 5.3.2.2). Leaching is reported as “NA” in the CRF tables; however, as Ukraine uses the default leaching factor for category 3.D.b.2, the correct notation key should be “IE” (the inclusion of a value for category 3.B(b) would result in an overestimation of emissions) |
| A.11 | 3.D.a Direct N ₂ O emissions from managed soils – N ₂ O (table 5, A.14, 2015). Accuracy | Recalculate the N input into soils with manure from the composting type of MMS to eliminate double counting by removing the N of manure composted from the values of F _{COMP} | Resolved. The Party has performed a recalculation to avoid the double counting of N ₂ O emissions from composting |
| A.12 | 3.D.a Direct N ₂ O emissions from managed soils – N ₂ O (table 5, A.15, 2015). Transparency | Improve the transparency in the NIR by describing how the AD for the amount of N input from F _{ON} were calculated for the estimation of direct N ₂ O emissions from rice fields | Resolved. The NIR (section 5.4.2) explains that the input for F _{ON} is taken from SSSU forms and the values for organic fertilizer application are provided in table A.3.2.4.1 |
| A.13 | 3.D.a Direct N ₂ O emissions from managed soils – N ₂ O (table 5, A.16, 2015). Accuracy | Check the correctness of the method currently used for calculating the residues removed and left in fields and provide a justification for the current approach or recalculate the entire time series of F _{CR} by applying the Frac _{REMOVE} only to the respective part of crop residues | Resolved. The time series has been recalculated to take into account the recommendation of the previous ERT |
| A.14 | 3.D.a Direct N ₂ O emissions from managed soils – N ₂ O (table 5, A.17, 2015). Transparency* | Clarify in the NIR how the area of burning of crop residues on cropland is accounted | Not resolved. The Party has explained in the NIR (section 5.7) that field burning of crop residues is prohibited. In the NIR (p.195), Ukraine states that “The fact of fires in the cultivated agricultural soils was taken for GHG emissions estimation”. However, in section 5.7 of the NIR there is no information on the actual field burning |
| A.15 | 3.D.a Direct N ₂ O emissions from managed soils – N ₂ O (table 5, A.18, 2015). | Estimate direct and indirect N ₂ O emissions from mineralization of soil carbon on cropland remaining cropland and reallocate these N ₂ O emissions from the LULUCF | Resolved. The emissions from mineralization of soil carbon have been reported under the agriculture sector |

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| | Completeness | sector to the agriculture sector | |
| A.16 | 3.D.b.1 Atmospheric deposition – N ₂ O (table 5, A.20, 2015). Accuracy | Recalculate the direct and indirect N ₂ O emissions from synthetic fertilizers for the entire time series using the methodology provided in the 2006 IPCC Guidelines: the total amount of N synthetic fertilizers applied to soils should be used to estimate direct N ₂ O emissions (without adjusting it for the NH ₃ /NO _x volatilization prior to that estimation). Indirect N ₂ O emissions should be estimated on the basis of equations 11.9 and 11.10 of the 2006 IPCC Guidelines (volume 4, chapter 11) | Resolved. Direct and indirect N ₂ O emissions from synthetic fertilizers have been recalculated for the entire time series using a country-specific methodology in line with the 2006 IPCC Guidelines |
| A.17 | 3.D.b.1 Atmospheric deposition – N ₂ O (table 5, A.21, 2015). Transparency* | Report the coefficients (e.g. Frac _{GAS}) used for the estimation of indirect N ₂ O emissions from soils and the sources for these values | Addressing. The description provided in the NIR (section 5.5.2.2) includes a reference to a study without providing the actual values of the coefficients used for the different fertilizer components (see also finding A.28 in table 5) |
| A.18 | 3.G Liming – CO ₂ (table 5, A.22, 2015). Accuracy | Investigate the use of other liming materials, except limestone for liming of soils in Ukraine, and estimate the CO ₂ emissions, if any, with the corresponding EF and report the results in the NIR | Resolved. In table A8.1 of the NIR and during the review, Ukraine confirmed that there is no information on the use of other liming materials in the country besides ground lime (see also finding A.28 in table 5) |
| LULUCF | | | |
| L.1 | 4. General (LULUCF) (table 3, L.1, 2015) (63, 2014). Transparency | Report in the NIR, for each data type, the source of the information, and for each numerical value, the metric unit of that value | Resolved. Ukraine reported the information and metric values of data used in the inventory. The source of the information for the uncertainty data is, however, missing (see finding L.2 below for pending information on uncertainties) |
| L.2 | 4. General (LULUCF) (table 3, L.2, 2015) (65, 2014). Transparency* | Improve the transparency of the uncertainty analysis in terms of the data sources for each category | Not resolved. The references for the uncertainty data presented in tables 6.5 and 6.7 were not included in the NIR. During the review, Ukraine indicated that the tables contain the uncertainty of the national AD, provided by national suppliers, the uncertainty of the EFs, derived from national sources and the 2006 IPCC Guidelines, as |

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| | | | well as calculated uncertainties |
| L.3 | 4. General (LULUCF) (table 3, L.4, 2015) (67, 2014). Adherence to the UNFCCC Annex I inventory reporting guidelines | For the model used to calculate the net changes in SOM in mineral soils, verify the model's outputs with measurements annually conducted in the country | Not resolved. Ukraine explained that scientific research would be needed to address the issue of the verification of the tier 3 model's outputs with measurements with regard to the calculation of SOM changes in mineral soils in cropland and grassland |
| L.4 | 4. General (LULUCF) (table 3, L.5, 2015) (67, 2014). Transparency* | Ensure consistency among the different methods used, including the consistency of the soil depth for which the SOC and associated CSCs are calculated, for the different land-use categories, especially for the transfer of land between categories for which different methods are applied | Not resolved. Ukraine explained that additional studies and the revision of land-use statistics would be needed in order to implement the recommendation |
| L.5 | 4. General (LULUCF) (table 3, L.6, 2015) (67, 2014). Consistency* | Ensure the consistency of the time series of the CSCs in SOM for the entire transition period (i.e. default 20 years) in all land-conversion categories | Not resolved. Ukraine explained that owing to the complexity of the recommendation, it will make efforts to consider the recommendation in its future submissions |
| L.6 | 4. General (LULUCF) – (table 5, L.18, 2015). Transparency | Enhance the information reported in the NIR to improve transparency and include, for each estimated category, the following information in the NIR to improve transparency: (a) The methodology used, including the assumptions and evidence on which the assumptions are based, and inferences (b) The input data and parameters, including the sources of input data and parameters (see finding L.1 above) and any methodological elaboration to make them suitable for use in the GHG estimates, including for ensuring their time-series consistency | Resolved. Ukraine has implemented most of points (a) and (b) and has included additional information in the relevant sections of chapter 6 of and annex 3.3 to the NIR (see finding L.2 above for the pending information on uncertainties) |
| L.7 | 4. General (LULUCF) – (table 5, L.18, 2015). Transparency* | Enhance the information reported in the NIR to improve transparency and include, for each estimated category, the following information in the NIR to improve transparency: (a) The verification of outputs (i.e. GHG estimates), if any, noting that the verification of outputs is mandatory for tier 3 estimates | Not resolved. Ukraine informed the ERT that the correctness of the methodology was confirmed by expert judgement from the Odessa State Ecological University. However, no further verification was implemented. The Party informed the ERT that it will take the necessary action to address this |

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| | | | recommendation |
| L.8 | 4. General (LULUCF) – CO ₂ and N ₂ O (table 5, L.21, 2015). Transparency* | Use formulation A of the 2006 IPCC Guidelines (volume 4, chapter 4, p.234) for calculating the SOM CSCs in mineral soils, and because the land representation is not spatially explicit, use ancillary data or expert judgement when assigning the soil type to land-use change conversion of mineral soils as currently assumed by Ukraine | Not resolved. Ukraine has applied a country-specific model to calculate the SOM CSCs and used a combination of existing data and information to distribute the soil types to land-use categories |
| L.9 | 4. General (LULUCF) – CO ₂ and N ₂ O (table 5, L.23, 2015). Accuracy | Provide information to clarify the apparent inconsistency between information on land conversion and the category land converted to forest land | Resolved. The approach reported by Ukraine for land conversion to forest land (including the use of a default 20-year period) is consistent with the 2006 IPCC Guidelines |
| L.10 | 4. General (LULUCF) – CO ₂ and N ₂ O (table 5, L.23, 2015). Accuracy | Ensure that GHG emissions and removals in formerly managed land subsequently abandoned are estimated until the carbon stocks in the land achieve the equilibrium level associated with the new land category (by default, for a 20-year period) | Resolved. The approach reported by Ukraine for land conversion took into account the use of the default 20-year period in line with the 2006 IPCC Guidelines |
| L.11 | 4.A Forest land – CO ₂ and N ₂ O (table 5, L.24, 2015). Comparability* | Report all areas that are included under forest land and that are unstocked because of management activities (e.g. firebreaks, forest roads, etc.) under the category managed forest land, possibly under a subdivision such as “unstocked managed forest land”, or alternatively according to their dominant use (e.g. firebreaks as grassland and forest roads as settlements) | Not resolved. During the review, Ukraine explained that it will improve the approach used for the identification of managed and unmanaged forests (see also finding L.34 in table 5 below) |
| L.12 | 4.A Forest land – CO ₂ (table 5, L.25 2015). Transparency | Report the factors used for estimating the carbon stock losses associated with harvesting (i.e. BEF, basic wood density and/or BCEF) together with a justification for each value selected for each factor | Resolved. Ukraine provided in the NIR information on parameter values including BEF, basic wood density and BCEF (annex 3.3.1 to the NIR) |
| L.13 | 4.A Forest land – CO ₂ (table 5, L.26 2015). Completeness | Include in the estimates the below-ground biomass carbon stock losses associated with harvesting and with other disturbances that cause the death of the entire tree | Resolved. Ukraine included the below-ground biomass pool associated with harvesting and other disturbances in the estimates |
| L.14 | 4.A Forest land – CO ₂ (table 5, L.27 2015). Accuracy* | Revise the calculations of GHG emissions and removals from forest land in mineral soils in forest land following the methods presented in the 2006 IPCC Guidelines and implement sector-specific QC procedures to ensure the accuracy of the estimates reported across the | Not resolved. Ukraine explained during the review that the recommendation will be implemented in the next annual submission |

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| | | time series | |
| L.15 | 4.A.1 Forest land remaining forest land – CO ₂ (table 3, L.8, 2015) (68, 2014). Consistency* | Revise the estimates of DOM and establish sector-specific QC procedures to check the time-series consistency of the estimates and their coherence among carbon pools and categories | Not resolved. Ukraine acknowledged that the estimation of the CSCs in the DOM pool requires further improvement. The Party informed the ERT that the Clima East project currently being implemented in Ukraine will help to improve the reporting of the DOM pool |
| L.16 | 4.B Cropland – CO ₂ and N ₂ O (table 5, L.29, 2015). Consistency* | Enhance data collection on the use under which organic soils are reported, and supplement the current data gaps with available ancillary data and expert judgement, where needed, to ensure that no systematic errors affect the estimates of GHG emissions in the time series | Not resolved. Ukraine explained that in order to implement the recommendation, additional research is needed on the retrospective analysis of previously cultivated agricultural organic soils. The Party informed the ERT that it will make efforts to conduct scientific research and implement the recommendation |
| L.17 | 4.B Cropland and 4.C grassland – CO ₂ and N ₂ O (table 5, L.30, 2015). Transparency* | Include justification for the use of the IPCC default values for the warm temperate climate zone for estimating CO ₂ emissions from drained organic soils under cropland and grassland | Not resolved. Ukraine explained in the NIR (p.218) that it used the values for the warm temperate climate zone in accordance with expert judgement without providing details. A clear justification for this choice is still missing |
| L.18 | 4.D.1 Wetlands remaining wetlands – CO ₂ and N ₂ O (table 5, L.32, 2015). Consistency* | Enhance the data collection on the drainage status of peat production sites once abandoned; supplement the current data gaps with available ancillary data and expert judgement, where needed; and estimate GHG emissions in sites for peat production which, although abandoned, are still under drainage, to ensure that no errors affect the GHG emission trend | Not resolved. Ukraine explained that to implement the recommendation, additional research is required and that it will make efforts to conduct scientific research to this end |
| L.19 | 4.D.2 Land converted to wetlands – CO ₂ (table 3, L.13, 2015) (75, 2014). Accuracy* | Revise the methodology and CSC factors applied for forest land converted to wetlands | Not resolved. Ukraine explained that it will carry out scientific research in order to implement the recommendation |

| ID# | Issue and/or problem classification ^{a, b} | Recommendation made in previous review report ^f | ERT assessment and rationale |
|------|--|--|--|
| L.20 | 4.D.2 Land converted to wetlands – CO ₂ and N ₂ O (table 5, L.33, 2015). Completeness* | Identify the areas of land converted to flooded land, especially forest land converted to flooded land, and apply the default IPCC methodology (volume 4, section 7.3.2.1 of the 2006 IPCC Guidelines) or any other method considered more appropriate for the Ukrainian national circumstances | Not resolved. Ukraine explained that additional research is required to implement the recommendation |
| L.21 | 4.E.2 Land converted to settlements and 4.F.2 land converted to other land – CO ₂ and N ₂ O (table 5, L.34, 2015). Completeness* | Report the CSCs for land converted to settlements (4.E.2) and land converted to other land (4.F.2) by applying the default IPCC method and factors or any method and factors considered by Ukraine to be more appropriate to its national circumstances, while ensuring that they are in line with good practice | Not resolved. For 2014, the land-use change matrix provided by Ukraine contains conversions of all land to settlements and to other land. However, the relevant CSCs were not reported. Thus, for forest land converted to settlements, the notation key “NO” was reported for all carbon pools and only the CSCs for mineral soils were reported for cropland converted to settlements (see CRF table 4.E), which is the largest area of land converted to settlements reported by Ukraine for 2014 |
| L.22 | 4.F Other land – CO ₂ (table 5, L.36, 2015). Comparability* | Revise the classification of category 66 (“dry open lands with special vegetation cover”), noting that category 66 appears to more closely match the definition of the IPCC category grassland than other land | Not resolved. Ukraine indicated that the recommendation will be taken into account in the next submission |
| L.23 | 4.F.2.1 Forest land converted to other land – CO ₂ and N ₂ O (table 5, L.37, 2015). Adherence to the UNFCCC Annex I inventory reporting guidelines | Strengthen the QC procedures for the LULUCF sector (correct the 1990 value for the SOM CSC factor for mineral soils) and report on the improvements implemented | Not resolved. Ukraine acknowledged that the estimation of the CSCs in SOM is an area that requires improvement and explained that the recommendation will be implemented in the next submission |

| <i>ID#</i> | <i>Issue and/or problem classification^{a, b}</i> | <i>Recommendation made in previous review report^f</i> | <i>ERT assessment and rationale</i> |
|------------|--|--|---|
| L.24 | 4.F.2.1 Forest land converted to other land – CO ₂ and N ₂ O (table 5, L.38, 2015). Comparability* | Subdivide and report separately deforested areas between those that did contain trees and those that did not contain trees before deforestation; report in the NIR a table where, for each carbon pool, the standing carbon stocks before deforestation and after deforestation are reported for those lands that did contain trees before deforestation | Not resolved. Ukraine acknowledged the issue and indicated that it will make efforts to take the recommendation into account in the next submission |
| L.25 | 4(III) Direct N ₂ O emissions from N mineralization/immobilization – N ₂ O (table 5, L.39, 2015). Consistency* | Revise the calculations of direct N ₂ O emissions from N mineralization/immobilization and implement sector-specific QC procedures to ensure the consistency of the emission estimates across the time series | Not resolved. Ukraine explained that the recommendation will be taken into account in the next submission |
| L.26 | 4(III) Direct N ₂ O emissions from N mineralization/immobilization – N ₂ O (table 5, L.40, 2015). Accuracy* | Revise the calculations of N ₂ O emissions from mineralization of SOM, ensuring that such emissions are only estimated and reported in land categories where a net carbon stock loss occurs | Not resolved. Ukraine explained that the recommendation will be implemented in the next submission |
| L.27 | 4(IV) Indirect N ₂ O emissions from managed soils – N ₂ O (table 5, L.41, 2015). Completeness | Estimate and report indirect N ₂ O emissions from sources of N mineralization associated with SOM losses | Resolved. Ukraine estimated indirect N ₂ O emissions from sources of N mineralization associated with SOM losses, but reported the emissions using the notation key “NE” in CRF table 4(IV) because of the insignificance of the source |
| L.28 | 4(V) Biomass burning – CO ₂ , CH ₄ and N ₂ O (table 3, L.14, 2015) (78, 2014) (67, 2013) (108, 2012). Consistency | Estimate the emissions from biomass burning on grassland for the years 1990–2004 by applying one of the estimation techniques described in volume 1, chapter 5, of the 2006 IPCC Guidelines | Resolved. In the 2016 submission, Ukraine reported emissions from biomass burning for the entire time series (1990–2014) using the IPCC tier 1 method together with default EFs. To derive the area burned for the years 1990–2004, for which data are not available, Ukraine applied a conservative approach using the average of burned areas for the years 2005–2014 |
| L.29 | 4(V) Biomass burning – CO ₂ (table 3, L.16, 2015) (79, 2014). Transparency | Provide, in the NIR, a table with the average biomass carbon stocks used for estimating GHG emissions from biomass burning in forest land | Resolved. Ukraine included in its 2016 submission the data used for estimating GHG emissions from biomass burning in forest land (section 6.2 and annex 3.3.1) |

| <i>ID#</i> | <i>Issue and/or problem classification^{a, b}</i> | <i>Recommendation made in previous review report^f</i> | <i>ERT assessment and rationale</i> |
|------------|--|--|---|
| L.30 | 4(V) Biomass burning – CO ₂ (table 3, L.17, 2015) (80, 2014). Accuracy | Revise the calculation method used and implement sector-specific QC procedures for estimating GHG emissions from biomass burning in forest land | Resolved. Ukraine recalculated the emissions from biomass burning applying the method consistent with the 2006 IPCC Guidelines and applied relevant QC procedures for the category |
| L.31 | 4(V) Biomass burning – CO ₂ , CH ₄ and N ₂ O (table 5, L.42). Consistency | Apply the techniques provided in the 2006 IPCC Guidelines for preparing GHG estimates for biomass burning in land converted to forest land | Resolved. Ukraine estimated the emissions from biomass burning in land converted to forest land using equation 2.14 of the 2006 IPCC Guidelines and reported the emissions under forest land remaining forest land |
| L.32 | 4(V) Biomass burning – CO ₂ , CH ₄ and N ₂ O (table 5, L.43, 2015). Consistency | Implement category-specific QC procedures to ensure the consistency of the emission estimates from biomass burning across the time series and the ratio of different gases | Resolved. The estimates were recalculated and category-specific QC procedures implemented in line with the 2006 IPCC Guidelines, which resulted in consistent emissions and ratios between the gases across the time series |

Waste

| | | | |
|-----|---|--|--|
| W.1 | 5.A Solid waste disposal on land – CH ₄ (table 5, W.4, 2015). Transparency | Include a more transparent explanation of when the managed SWDS were constructed and became operational | Resolved. The Party provided an appropriate explanation of when managed SWDS became operational in the NIR (section 7.2.2.3, p.235) |
| W.2 | 5.A Solid waste disposal on land – CH ₄ (table 5, W.5, 2015). Transparency | Include in the NIR detailed information on how the amounts of waste disposal on various types of SWDS were determined | Resolved. A detailed description of the solid waste disposal on various types of SWDS was provided in the NIR (section 7.2.2.3, p.235) |
| W.3 | 5.A Solid waste disposal on land – CH ₄ (table 5, W.6, 2015). Transparency | Include in the NIR the information on how the operators of MSW landfills determine the amount of CH ₄ flared and the amount of CH ₄ used for energy recovery | Resolved. The Party provided an appropriate explanation of the amount of CH ₄ flared and the amount of CH ₄ used for energy recovery in the NIR (section 7.2.2.3, p.240) |
| W.4 | 5.A Solid waste disposal on land – CH ₄ (table 5, W.7, 2015). Transparency | Include in the NIR the information on the source of the CH ₄ flaring AD for the full time series as reported in CRF table 5.A | Resolved. The Party provided the appropriate information on the source of the CH ₄ flaring AD for the period 2003–2014 in the NIR (section 7.2.2.3, p.240) |
| W.5 | 5.A Solid waste disposal on land – CH ₄ (table 5, W.8, 2015). Adherence to the | Ensure that the QA/QC plan includes the procedure for cross-checking that the data for the amount of waste at SWDS reported in the NIR and the CRF tables are the same, in order | Resolved. Ukraine implemented additional cross-checking procedures to ensure that the information on solid waste disposal |

| <i>ID#</i> | <i>Issue and/or problem classification^{a, b}</i> | <i>Recommendation made in previous review report^c</i> | <i>ERT assessment and rationale</i> |
|------------------|--|--|---|
| | UNFCCC Annex I inventory reporting guidelines | to minimize or avoid inconsistencies between the NIR and the CRF tables | in the NIR (annex A3.4) and CRF table 5.A is consistent |
| W.6 | 5.A Solid waste disposal on land – CH ₄ (table 5, W.9, 2015). Accuracy* | Examine the accuracy of the population data used for reporting emissions from solid waste disposal on land to ensure that the population data best reflect the population of Ukraine in the respective inventory years and present the results of this analysis in the NIR | Addressing. The Party provided an updated table for the AD (annexes 3.4.1 and 3.4.2 to the NIR) with the population data used for reporting emissions from solid waste disposal on land in the NIR. However, the explanations to the table are not sufficiently clear to enable the ERT to understand whether the rural population was taken into consideration in the emission estimates (see finding W.11 in table 5) |
| W.7 | 5.B. Biological treatment of solid waste – CO ₂ , CH ₄ and N ₂ O (table 5, W.10, 2015). Consistency* | Further investigate the AD for composting and, if the data quality is not sufficient, apply interpolation for 2012, using data for 2011 and 2013 | Addressing. The Party continues to investigate the trend of waste composting and in the NIR (section 7.3.6, p.243) Ukraine reports that a verification of the waste composition by experts from SSSU is planned for the next inventory submission |
| W.8 | 5.C Incineration and open burning of waste – CO ₂ , CH ₄ and N ₂ O (table 5, W.11, 2015). Consistency | Further investigate the AD for waste incineration and use the results of this analysis to support the observed trends, or, if appropriate, revise the AD | Resolved. The Party provided information on the AD for waste incineration and an appropriate explanation in the NIR (section 7.4.1) |
| W.9 | 5.E Other (waste) – CH ₄ and N ₂ O (table 5, W.13, 2015). Accuracy | Report emissions from waste composting under the category biological treatment of solid waste, in line with the UNFCCC Annex I inventory reporting guidelines, to avoid the double counting of these emissions | Resolved. The Party reported emissions from waste composting under the category biological treatment of solid waste in line with the UNFCCC Annex I inventory reporting guidelines |
| KP-LULUCF | | | |
| KL.1 | General (KP-LULUCF) | There were no recommendations related to KP-LULUCF in the 2015 annual review report ^e | |
| KL.2 | Afforestation and reforestation – CO ₂ and N ₂ O (90, 2014). Transparency* | Report in the NIR additional information on the model applied to estimate the SOM CSCs in land converted to forest land, as well as a table where the areas converted to forest land and the CSCs in each carbon pool are reported, stratified by land-use conversion | Not resolved. A project funded by the European Union (Clima East) is expected to provide data on carbon stocks and CSCs to be used to improve the GHG estimates and the Party's reporting |

| ID# | Issue and/or problem classification ^{a, b} | Recommendation made in previous review report ^c | ERT assessment and rationale |
|------|--|---|---|
| KL.3 | Deforestation – CO ₂ and N ₂ O (94, 2014). Transparency* | Report in the NIR additional information on how the CSC factors applied to estimate the CSCs in forest land converted to other land use are calculated, as well as a table where the areas converted to forest land and the CSCs in each carbon pool are reported, stratified by land-use conversion type, climatic zone and year of conversion | Not resolved. A project funded by the European Union (Clima East) is expected to provide data on carbon stocks and CSCs to be used to improve the GHG estimates and the Party's reporting |

Abbreviations: AD = activity data, B₀ = methane-producing capacity, BCEF = biomass conversion and expansion factor, BEF = biomass expansion factor, CKD = cement kiln dust, CRF = common reporting format, CSC = carbon stock change, DE = digestible energy, DOM = dead organic matter, EF = emission factor, ERT = expert review team, F_{COMP} = annual amount of compost N applied to soils, F_{CR} = fraction of crop residues, F_{ON} = fraction of organic N fertilizer applied to soils, Frac_{GAS} = fraction of managed livestock manure that volatilizes as NH₃ and NO_x, Frac_{REMOVE} = fraction of removed residues, GHG = greenhouse gas, IE = included elsewhere, IEA = International Energy Agency, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LPG = liquefied petroleum gas, LULUCF = land use, land-use change and forestry, MMS = manure management system, MSW = municipal solid waste, N = nitrogen, NA = not applicable, NE = not estimated, Nex = nitrogen excretion, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, SOC = soil organic carbon, SOM = soil organic matter, SSSU = State Statistics Service of Ukraine, SWDS = solid waste disposal sites, UNFCCC Annex I inventory reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”, Y_m = methane conversion factor, 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

^a References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) where the issue was raised. Issues are further classified as defined in decision 13/CP.20, annex, paragraph 81. In the review of the supplementary information reported in accordance with Article 7, paragraph 1, of the Kyoto Protocol, the ERT has applied the classification in decision 22/CMP.1, annex, paragraph 69, in conjunction with decision 4/CMP.11.

^b An asterisk is included next to each issue type for all issues that are also problems, as defined in decision 22/CMP.1, annex, paragraphs 68 and 69, including those that lead to an adjustment or a question of implementation.

^c The Clima East programme supports efforts to mitigate the effects of climate change and adaptation in the Russian Federation and the Eastern Neighbourhood Partnership countries.

^d Coal Energy Technology Institute of the National Academy of Sciences of Ukraine. 2016. *Calculations of Greenhouse Gas Emissions from Coal Combustion in Thermal Power Plants of Ukraine for 1990 – 2015*. Technical report on research performance. Intermediate. Kiev.

^e The individual review of the inventory submission of Ukraine submitted in 2015 was assessed under the Convention only and therefore does not include the review of KP-LULUCF activities. Therefore, relevant recommendations from the 2014 annual review report are included in this table.

IV. Issues identified in three successive reviews and not addressed by the Party

8. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three successive reviews, including the review of the 2016 annual submission of Ukraine, and have not been addressed by the Party.

Table 4

Issues identified in three successive reviews and not addressed by Ukraine

| <i>ID#^a</i> | <i>Previous recommendation for the issue identified</i> | <i>Number of successive reviews issue not addressed</i> |
|------------------------|--|---|
| General | No such general issues were identified | |
| Energy | | |
| E.8* | Develop and use country-specific CO ₂ EFs in road transportation for liquid fuels (i.e. residual fuel, diesel oil, LPG, petroleum coke and refinery gases) that have a significant share in the fuel mix of stationary combustion | 3 (2014–2016) |
| E.12* | Develop country-specific CO ₂ EFs for motor fuels (i.e. gasoline, diesel oil and LPG) based on their carbon content and provide an explanation of the methodology used in the NIR | 6 (2011–2016) |
| IPPU | No such issues for the IPPU sector were identified | |
| Agriculture | No such issues for the agriculture sector were identified | |
| LULUCF | | |
| L.2 | Improve the transparency of the uncertainty analysis in terms of the data sources for each category | 3 (2014–2016) |
| L.3 | For the model used to calculate the net changes in SOM in mineral soils, verify the model's outputs with measurements conducted annually in the country | 3 (2014–2016) |
| L.4 | Ensure consistency among the methods used, including the consistency of the soil depth for which the SOC and associated CSCs are calculated, for the different land-use categories, especially for the transfer of land between categories for which different methods are applied | 3 (2014–2016) |
| L.5 | Ensure the consistency of the time series of the CSCs in SOM for the entire transition period (i.e. default period of 20 years) for all land conversion categories | 3 (2014–2016) |
| L.15 | Revise the estimates of DOM for forest land remaining forest land and establish sector-specific QC procedures to check the time-series consistency of the estimates and their coherence among carbon pools and categories | 3 (2014–2016) |
| L.19* | Revise the methodology and CSC factors applied for forest land converted to wetlands | 3 (2014–2016) |

| <i>ID#^a</i> | <i>Previous recommendation for the issue identified</i> | <i>Number of successive reviews issue not addressed</i> |
|------------------------|---|---|
| Waste | No such issues for the waste sector were identified | |

Abbreviations: CSC = carbon stock change, DOM = dead organic matter, EF = emission factor, IPPU = industrial processes and product use, LPG = liquefied petroleum gas, LULUCF = land use, land-use change and forestry, NIR = national inventory report, QC = quality control, SOC = soil organic carbon, SOM = soil organic matter.

^a An asterisk is included after any issue identification number (ID#) where the underlying issue is related to accuracy or completeness of a key category, a missing category or a potential key category, as indicated in decision 13/CP.20, annex, paragraph 83.

V. Additional findings made during the 2016 technical review

9. Table 5 contains findings made by the ERT during the technical review of the 2016 annual submission of Ukraine that are additional to those identified in table 3 above.

Table 5

Additional findings made during the 2016 technical review of the annual submission of Ukraine

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|---------|---------------------------|--|--|
| General | | | |
| G.2 | Commitment period reserve | <p>The ERT found an error in the estimation of the assigned amount (see ID# 1 in FCCC/IRR/2016/UKR) and the CPR reported in the NIR. For the CPR, Ukraine has not used the information contained in the latest inventory submission but the total GHG emissions for 2012 from the 2014 submission. During the review, Ukraine agreed to use the information from the latest inventory submission (i.e. 2016) and recalculated the CPR. In addition, in response to the list of potential problems and further questions raised by the ERT, Ukraine provided a revised value for the total GHG emissions for 2014. The final value of the CPR was recalculated to be 2,834,780,294 t CO₂ eq and is included in annex II to this report</p> <p>The ERT recommends that Ukraine present the revised value of the CPR in the next NIR using the latest inventory submission as the basis for the calculation of the CPR in accordance with the annex to decision 13/CMP.1, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18, and that the Party take into account the provisions of decision 13/CMP.1, annex, paragraph 8 quinquies^c</p> | Yes. Accuracy |
| G.3 | National registry | <p>The ERT noted from the SIAR that as of 3 August 2015 the technical administration of the registry ceased and the connection with the ITL was discontinued. During the review, the Party explained that detailed information regarding the national registry issues was provided in the “Written submission from Ukraine under section X, paragraph 1(e), of the annex to decision 27/CMP.1 submitted in response to the decision of the enforcement branch of the Compliance Committee of CC-2016-1-4/Ukraine/EB”. In addition to the information provided in the written submission, since 3 August 2016 Ukraine has re-established the connection between the ITL and the “National electronic registry of anthropogenic emissions and absorption of greenhouse gases of Ukraine”, renewed the secure sockets layer certificate and successfully exchanged test messages. Upon the request of the ITL administrator, the status of the national registry was set to “reconciliation only”. On 23 August 2016, reconciliation and time synchronization were successfully completed</p> <p>The ERT noted that the decision of the enforcement branch of the Compliance Committee recommends that the review of Ukraine’s annual GHG inventory submission in 2016 carefully consider the situation regarding the Ukrainian national registry. It also recommends that, subject to the availability of financial resources, the next regular review of the annual submission of the GHG inventory of Ukraine be organized as an in-country review</p> <p>The ERT carefully considered the situation concerning the national registry of Ukraine</p> | Yes. Comparability |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|-----|------------------------|--|--|
| | | <p>and took into account the decision of the enforcement branch of the Compliance Committee, the information provided by the Party, the information contained in the previous SIARs, which indicated that there were no problems with the functioning of the national registry of Ukraine prior to its disconnection, the national circumstances of Ukraine as a country with an economy in transition and the willingness expressed by the Party to re-establish the proper functioning of the national registry</p> <p>The ERT decided to reiterate the recommendation of the Compliance Committee (see CC-2016-1-6/Ukraine/EB, paragraph 10) that the next review of the Party be conducted as an in-country review (see annex III, section B, to this document). The ERT further recommends that Ukraine ensure the proper functioning of the national registry and that it meet the requirements specified in section II of the annex to decision 13/CMP.1 and the detailed technical requirements for national registries defined in the data exchange standards</p> | |
| G.4 | National registry | <p>The ERT noted from the SIAR that the national registry has not been operating since 3 August 2015, as also explained by the Party in the NIR. However, the SIAR notes that this information was not publicly available on the national registry website. Therefore, the national registry has not fulfilled the requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1</p> <p>The ERT recommends that the Party update the information on the national registry website (carbonunitsregistry.gov.ua) and ensure that the publicly available information is up to date (i.e. updated as close to real time as possible, but updated on a monthly basis at a minimum). Further, the ERT recommends that the Party include up-to-date account information, project information under Article 6 of the Kyoto Protocol, holding and transaction information, and a list of legal entities authorized by the Party</p> | Yes. Transparency |
| G.5 | Kyoto Protocol units | <p>The ERT noted from the SIAR that Ukraine did not report information on Kyoto Protocol units in accordance with section I.E of the annex to decision 15/CMP.1 and did not report information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and annex II to decision 13/CMP.11. The SIAR identified the fact that Ukraine has not submitted SEF tables for the second commitment period for 2014 and 2015, consistent with the ITL records, as a problem that requires corrective action by the Party</p> <p>The ERT recommends that the Party report information on Kyoto Protocol units in accordance with decision 15/CMP.1 and decision 3/CMP.11</p> | Yes. Transparency |
| G.6 | Kyoto Protocol units | <p>The ERT noted from the SIAR that the information on Kyoto Protocol units has not been reported in accordance with section I.E of the annex to decision 15/CMP.1 in terms of fulfilling all requirements with regard to the Party's reporting conformance with the</p> | Yes. Transparency |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|--------|---|--|--|
| | | required technical standards, security, data integrity and recovery measures | |
| | | The ERT reiterates the recommendation in the SIAR that the Party prepare and submit a disaster recovery plan and the other information collected annually on the registry transactions and security | |
| Energy | | | |
| E.24 | 1. General (energy sector): all fuels – all gases | In its original submission, the Party reported that the national and regional energy statistics do not include fuels consumed and produced in the Autonomous Republic of Crimea, Sevastopol city and some districts of the Donetsk and Lugansk regions (territories with a special status) for 2014. During the review, the Party provided information on how it ensured the completeness of the GHG emission reporting and compliance with the main principles of reporting defined in the UNFCCC Annex I inventory reporting guidelines (decision 24/CP.19), namely the full geographical coverage of the sources and sinks of Parties included in Annex I to the Convention | Yes. Transparency* |
| | | The ERT recommends that the Party summarize and report in the NIR, to the extent possible, the details of the methodologies used to estimate the AD and emissions across the territory of the Party to ensure the transparency of the emission estimates | |
| E.25 | Fuel combustion – reference approach: solid fuels – CO ₂ | The ERT noted that the apparent energy consumption of solid fuels under the reference approach was reported as 1,286.58 PJ for 2014, while for the sectoral approach only 893.03 PJ was reported. Similar large differences exist for other years, with the average difference across the time series being 58%. During the review, the Party explained that the difference was due to the allocation of coke and coke oven gas under the reference and sectoral approaches. Coke consumption for iron and steel production is excluded from the sectoral approach, while coke oven/gas coke (which, under the reference approach, includes the coke for iron and steel production and is included under solid fuels) is reported under gaseous fuels in the sectoral approach | Yes. Comparability* |
| | | The ERT recommends that the Party review the allocation of coke and coke oven/gas coke under the reference and sectoral approaches with a view to reducing the differences reported for solid fuel consumption and/or provide relevant explanatory information in the NIR. With regard to the allocation of fuels under the sectoral approach, see finding E.30 below | |
| E.26 | Feedstocks, reductants and other non-energy use of fuels: solid and gaseous fuels – | The ERT noted that CRF table 1.A(d) has not been correctly completed. For example, there are no references to explain where the emissions from non-energy use are reported in the inventory. The table reports information on carbon stored for other bituminous coal, but the fuel quantity for non-energy use has not been reported in the table. The carbon excluded/stored between the tables differs substantially, with 10,957.14 kt C reported in CRF table 1.A(b) and 554.59 kt C reported in CRF table 1.A(d) for solid fuels | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|-----------------|---|--|--|
| CO ₂ | | <p>and 1,743.41 and 87.96 kt C, respectively, for gaseous fuels. In addition, coke oven/gas coke is not reported in CRF table 1.A(d), while the carbon stored is reported in CRF table 1.A(b) (10,402.55 kt C). The Party reported technical difficulties in completing CRF table 1.A(d) and informed the ERT that the reporting will be corrected in the next submission</p> <p>The ERT recommends that Ukraine correct the errors in CRF tables 1.A(b) and 1.A(d) and follow the guidance in section 6.6 of the 2006 IPCC Guidelines to ensure that the carbon excluded reported in CRF table 1.A(b) matches the carbon excluded reported in CRF table 1.A(d), ensuring that for each non-energy use of fuels information is provided on the fuel quantity, the carbon stored and the estimates and allocation of the relevant emissions</p> | |
| E.27 | 1.A.1 Energy industries: gaseous, liquid and solid fuels – all gases | <p>In the 2016 submission, CO₂ emissions from energy industries were recalculated and decreased by 1,697.93 kt for 2013 compared with the value reported in the 2015 submission. The NIR provides the overall comparison of the estimates and the reasons for any differences. However, no information has been provided at a disaggregated level or on the impact of each recalculation on the emissions and their trend in the NIR (section 3.2.7.5). During the review, the Party provided detailed information on the recalculations. The ERT was satisfied with the level of detail and the explanations provided by the Party</p> <p>The ERT recommends that Ukraine include detailed information on the specific reasons for any conducted recalculations at a disaggregated level in the NIR</p> | Yes. Transparency* |
| E.28 | 1.A.1.a Public electricity and heat production: solid fuels – all gases | <p>The Party has used non-default carbon oxidation factors (see NIR table A2.17) to report the combustion of coal in this category, without providing proper justification for the value used. During the review, the Party provided a plant-specific time series of oxidation factors for coal combusted in electricity generation over the period 2003–2014. For the other subcategories, the Party made reference to the use of typical oxidation factors from a national study^d (“Development of GHG inventory that lead to greenhouse effect in energy sector of Ukraine for the period 1991–1998”)</p> <p>The ERT recommends that the Party report the country-specific oxidation factors in the NIR, and report further information on how the oxidation factors were established, including the ash sampling protocols followed. The ERT further recommends that the Party include supporting information from the research work referenced in the NIR as the source for the typical oxidation factor values used for the subcategories</p> | Yes. Transparency* |
| E.29 | 1.A.1.c Manufacture of solid fuels and other energy | <p>The Party has used non-default carbon oxidation factors and has not provided a justification for the values used. During the review, the Party confirmed that the oxidation factor of 0.99 was used for all liquid fuels for stationary combustion</p> | Yes. Accuracy* |

| <i>ID#</i> | <i>Finding classification</i> | <i>Description of the finding with recommendation or encouragement</i> | <i>Is finding an issue^a and/or a problem^b? If yes, classify by type</i> |
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| | industries: liquid fuels – all gases | The ERT recommends that the Party provide a justification for the use of an oxidation factor lower than 1, or use the default oxidation factor of 1 provided in the 2006 IPCC Guidelines | |
| E.30 | 1.A.2 Manufacturing industries and construction: gaseous, liquid and solid fuels – all gases | <p>The ERT noted that the CO₂ IEF for gaseous fuels for 2014 was 53.63 t/TJ, which was the lowest among all Parties (54.26–63.28 t/TJ, excluding Ukraine), and 4.4% lower than the higher IPCC default EF of 56.1 t/TJ, and 1.2% lower than the lower IPCC default EF of 54.3 t/TJ. The value of the CO₂ IEF for 2014 decreased from the 2013 value of 54.34 t/TJ. During the review, the Party confirmed that the low IEF for natural gas was due to the inclusion of refinery gas and coke oven gas under gaseous fuels. The ERT considers this to be an incorrect allocation of liquid and solid fuels to gaseous fuels</p> <p>The ERT recommends that the Party report coke oven gas under solid fuels (derived gases), and report refinery gases and propylene under liquid fuels (other oil)</p> | Yes. Comparability* |
| E.31 | 1.A.4 Other sectors: all fuels – all gases | <p>In the 2016 submission, CO₂ emissions were recalculated and decreased by 1,666.02 kt CO₂ eq for 2013 compared with the value reported in the 2015 submission, while at the same time emissions increased by 2,535.44 kt CO₂ eq for 1990 compared with the value reported in the 2015 submission. Section 3.2.10.5 of the NIR explains that the changes in the AD for natural gas and the redistribution of fuels between subcategories under transportation and other sectors are the reasons for the recalculations. However, the trend of the recalculations was not explained. During the review, the Party provided detailed information on the recalculations. The ERT was satisfied with the level of detail and the explanations provided</p> <p>The ERT recommends that Ukraine include in the NIR detailed information on the recalculations and their impact on the estimates over the time series</p> | Yes. Transparency* |
| E.32 | 1.B.1.a Coal mining and handling: solid fuels – CO ₂ and CH ₄ | <p>The Party has included flaring of coal bed methane with no energy recovery in category 1.A.1.c (manufacture of solid fuels and other energy industries). However, according to the 2006 IPCC Guidelines (volume 2, p.4.13), “When the methane is simply combusted with no useful energy, as in flaring or catalytic oxidation to CO₂, the corresponding CO₂ production should be added to the total greenhouse gas emissions (expressed as CO₂ equivalents) from coal mining activities”. Therefore, the ERT considers that the correct allocation of the emissions is under fugitive emissions</p> <p>The ERT recommends that Ukraine allocate the CO₂ emissions from flaring of coal bed methane under underground mines: mining activities, consistent with the 2006 IPCC Guidelines</p> | Yes. Comparability* |
| E.33 | 1.B.1.a Coal mining and handling: | The description of the method and EFs used to calculate emissions from flaring of drained methane are not reported in the NIR. During the review, the Party explained that the default method and EFs provided in the 2006 IPCC Guidelines were used, with | Yes. Transparency* |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
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| | solid fuels – CO ₂ | <p>specific reference to equation 4.1.5 of the 2006 IPCC Guidelines (volume 2)</p> <p>The ERT recommends that Ukraine include the information on the methodology used for the estimates of the emissions from flaring of drained methane in the NIR</p> | |
| E.34 | 1.B.2 Oil and natural gas and other – CO ₂ and CH ₄ | <p>The Party has made recalculations for the category oil and natural gas as part of the transition to the use of the 2006 IPCC Guidelines. The impact of the recalculations on the CH₄ emissions is an increase of 3,005.78 kt CO₂ eq and a 12.6% increase in emissions. However, the NIR (section 3.3.2.5) is too general in terms of the explanation provided for the reasons for the recalculations, and detailed information on the impact of the change in the AD or EFs on the recalculations was not provided. During the review, the Party provided further information on the reasons for the recalculations and particularly on the changes in the EFs used for the subcategories</p> <p>The ERT recommends that the Party include information on the changes in the EFs, together with justification of the recalculations and of the new EFs used, and information on the impact of the recalculations on the emissions from the category, along with information on the recalculations resulting from other reasons, such as an update of AD</p> | Yes. Transparency* |
| E.35 | 1.B.2 Oil and natural gas and other – CO ₂ and CH ₄ | <p>The ERT noted variability in the CO₂ IEF for oil exploration (from 773.92 kg/number of wells to 4,228.36 kg/number of wells). The CO₂ IEF values for 2013 and 2014 are 3,092.14 and 2,109.11 kg/number of wells, respectively. At the same time, the CH₄ IEF remained relatively stable across the time series, ranging from 944.1 kg/unit to 951.51 kg/unit. The ERT notes that the default EFs for well drilling provided in the 2006 IPCC Guidelines, table 4.2.5 (volume 4, p.4.55) are 1.0e-4 to 1.7e-3 Gg CO₂ per 10³ m³ total oil production and 3.3e-5 to 5.6e-4 Gg CH₄ per 10³ m³ total oil production. During the review, the Party provided further information on the sources of the EFs used for fugitive emissions from oil and gas operations. The ERT considers that the EFs used for well drilling, testing and servicing with the units “per 1 geological exploration wells completed with drilling” are not consistent with the IPCC default EFs, and that the Party has not provided a justification for using the country-specific EFs</p> <p>The ERT recommends that the Party better document and justify the selected CH₄ and CO₂ EFs used for oil exploration and include information on the trend of the CO₂ IEF across the time series or use the default EFs from the 2006 IPCC Guidelines</p> | Yes. Transparency* |
| E.36 | 1.C.2 Injection and storage – CO ₂ and CH ₄ | <p>The ERT noted that Ukraine reported the notation key “NA” for emissions from CO₂ transport and storage. This notation key is appropriate for activities taking place in the country that do not result in emissions; however, the Party reports that there are no CO₂ storage activities in the country</p> <p>The ERT recommends that for emissions from CO₂ transport and storage Ukraine use the notation key “NO” in the CRF tables, in line with decision 24/CP.19, annex I, paragraph</p> | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
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| 37 | | | |
| IPPU | | | |
| I.38 | 2.B.1 Ammonia production – CO ₂ | <p>The carbon content of natural gas used for ammonia production varies for the years 2004–2014, while it is constant for the years 1990–2003. During the review, Ukraine stated that the carbon content of natural gas was determined in accordance with the data from the passport certificates of the physical and chemical parameters of natural gas obtained from gas-producing and gas-transporting companies in Ukraine. Owing to the fact that the passport certificate data for the years 1990–2003 are missing, the carbon content of natural gas was assumed to be equal to the value for 2004</p> <p>The ERT recommends that Ukraine include information in the NIR on the time series of the carbon content of the natural gas used in ammonia production, including information and justification for the assumption used for the years 1990–2003</p> | Yes. Transparency* |
| I.39 | 2.B.2 Nitric acid production – N ₂ O | <p>The ERT noted that Ukraine is using an almost constant N₂O EF (ranging between 4.5 kg/t and 4.6 kg/t) across the time series to account for the emissions from nitric acid produced by five plants (four medium-pressure plants, one low-pressure plant). The EF is a weighted average of the EFs for medium-pressure plants (4.5 kg/t) and low-pressure plants (5 kg/t). However, during the review, Ukraine explained that secondary catalysts for catalytic reduction of nitrous oxide and an automated emissions monitoring system were installed in 2009 at two of the nitric acid production plants. One of these enterprises has currently dismantled the secondary catalysts for catalytic reduction of nitrous oxide. The ERT noted that the implementation of the abatement technologies was not accounted for in the emission estimates</p> <p>The ERT recommends that the Party reconsider the EF used to take into account the use of abatement technologies after 2009 instead of using the same EF across the entire time series and recalculate the N₂O emissions, as necessary</p> | Yes. Accuracy* |
| I.40 | 2.B.5 Carbide production – CO ₂ | <p>Ukraine reported CO₂ emissions from carbide production for 2014 as 12.10 kt in CRF table 2(I)s1, but reported the same emissions as 31.25 kt in table 4.16 of the NIR. During the review, Ukraine stated that this inconsistency resulted from a technical error for 2014 only and not for the entire time series, and that it will be corrected in the next submission</p> <p>The ERT recommends that Ukraine eliminate the inconsistency between the CRF tables and the NIR for CO₂ emissions from carbide production</p> | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |
| I.41 | 2.C.1 Iron and steel production – CO ₂ | <p>According to the information provided in the NIR on steel production (section 4.14.2.2), the Party has applied tier 3 methods using country-specific EFs for different still production (in BOFs, EAFs and OHFs). The ERT noted that the country-specific BOF EF (120 kg/t) is higher than the OHF EF (110 kg/t), although the opposite is to be</p> | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |

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| | | <p>expected. During the review, Ukraine stated that a misprint had occurred and the EF for OHF production should be 126 kg/t rather than the EF reported in the NIR (110 kg/t). The Party informed the ERT that the error will be corrected in the next submission</p> <p>The ERT recommends that Ukraine correct the error in the EFs in the NIR and eliminate the inconsistency between the CRF tables and the NIR for the CO₂ emissions from steel production</p> | |
| I.42 | 2.F.1 Refrigeration and air conditioning – HFCs | <p>Fluorinated gases from transport refrigeration (category 2.F.1.d) are reported as “NE” by Ukraine. During the review, the Party explained to the ERT that it is not possible to estimate emissions from transport refrigeration due to a lack of statistical data: there is no information on transport refrigerators containing HFCs produced in Ukraine, nor is there information on exports and imports of the same equipment</p> <p>The ERT considered that lack of data is not a sufficient justification to omit the category from the national inventory, and included this issue in the list of potential problems and further questions raised by the ERT. In response, Ukraine obtained data from the main companies using HFCs as a refrigerant in automobile and railroad refrigerators for the years 2013–2015, using an extrapolation method to determine the amount of used HFCs for the period 2000–2014 in accordance with the gap-filling approaches suggested in the 2006 IPCC Guidelines (volume 1, chapter 5, section 5.3, “Resolving data gaps”). Emissions for the period 1990–1999 did not occur as the Party did not import HFCs used as refrigerants in refrigerating equipment. The estimation of emissions in the subcategory transport refrigeration (2.F.1.d) was carried out in accordance with the 2006 IPCC Guidelines using a tier 1a method and the IPCC default EFs. The resulting emissions from the subcategory for the entire time series did not exceed 0.05% of the total national emissions excluding LULUCF and, in accordance with decision 24/CP.19, annex I, paragraph 37(b), are insignificant, thereby enabling the use of the notation key “NE” to report the emissions for this subcategory. The actual shares of the emissions across the time series range from 0.00002 to 0.00176% of the total emissions for the years between 2000 and 2014</p> <p>The ERT recommends that Ukraine provide quantitative estimates for emissions from transport refrigeration or include in the NIR the justifying information for the insignificance of the category in accordance with the provisions of decision 24/CP.19, annex I, paragraph 37</p> | Yes. Completeness* |
| | Agriculture | | |
| A.19 | 3. General (agriculture) – CO ₂ , CH ₄ and | The ERT noted some errors in the NIR, such as the lack of an update of the text since the 2015 submission, and some misleading headings in some tables (e.g. table 5.8 includes data for 1990 and 2013 only, and not for 2014) | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
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| N ₂ O | | The ERT recommends that Ukraine improve its quality checks in relation to the NIR in order to ensure that the data for the latest inventory year are included in the NIR | |
| A.20 | 3.A.1 Cattle – CH ₄ | <p>The methodology used for estimating CH₄ emissions from enteric fermentation for cattle is based on fodder consumption data from SSSU. For the purposes of the GHG inventory, the total fodder consumption is distributed across the different cattle subcategories. The methodology provided in the 2006 IPCC Guidelines is based on the energy demand for different cattle activities and a comparison between the two models was made by the ERT</p> <p>For mature dairy cattle, Ukraine reported a decreasing energy intake from 1990 to 2000 and then an increasing trend until 2014. The decreasing trend in the 1990s coincides with an increased milk yield which would normally require a higher fodder/energy demand. When comparing the two models, the Ukrainian model estimates a higher energy intake for 1990 compared with the IPCC model. In the mid-1990s, the Ukrainian model shows a lower energy intake than the IPCC model, and during the period 2010–2014, the Ukrainian model again shows a higher energy intake than the IPCC model. The observed trend is unusual in relation to the energy demand for dairy cattle</p> <p>Given the fluctuating reported fodder consumption per head compared with the expected developments based on fodder/energy demand, the ERT recommends that Ukraine investigate the reason for the fluctuation in fodder consumption as reported by SSSU and provide explanatory information in the NIR to justify the estimates. The ERT further recommends that Ukraine provide in the NIR an explanation for the decrease in fodder consumption while, at the same time, the milk production from mature dairy cattle increases</p> | Yes. Accuracy* |
| A.21 | 3.A.1 Cattle – CH ₄ | <p>The ERT noted that for growing cattle, the Ukrainian model shows an increase in feed intake/head/year of approximately 50% from 1990 to 2014. In addition, the average weight of growing cattle in the same period is reported to increase by only 12%. Further, the ERT noted that the reported CH₄ IEF for enteric fermentation for growing cattle is the highest among all reporting Parties (e.g. for 2014, the value is 67.19 kg CH₄/head/year for Ukraine, but ranges from 18.71 to 54.27 kg CH₄/head/year for other Parties) and the IEF shows significant inter-annual variability. During the review, the Party explained that the EF is directly linked to the values for fodder consumption received from SSSU</p> <p>The ERT recommends that Ukraine describe why the fodder intake for growing non-dairy cattle increased by approximately 50% between 1990 and 2014 without any significant changes in weight gain. The ERT further recommends that the Party consider the values and trend of the CH₄ IEF for growing cattle and the assumptions and data affecting it, and make any necessary corrections</p> | Yes. Accuracy* |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
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| A.22 | 3.B Manure management – CH ₄ and N ₂ O | <p>The Nex values for all animal categories, for which national data are used, are based on country-specific DM excretion data combined with the country-specific N content of the manure. The reported inter-annual variations in Nex values in the CRF tables are therefore due to changes in the animal numbers within that animal group. Mature dairy cattle is a single subgroup and the same Nex value is reported for all years from 1990 to 2014 despite the reported fluctuating fodder consumption over the years. The reported DM excretion is high to very high (up to 5.82 kg DM/day) compared with the default values provided in the 2006 IPCC Guidelines (4.5 kg DM/day). Currently, there is no relation between the changes in the VS daily excretion rate as reported in the estimation of CH₄ emissions from manure management in CRF table 3.B(a) and the DM excretion rate used for estimating the Nex values and the subsequent N₂O emissions from manure management reported in CRF table 3.B(b)</p> <p>The N content of the manure is based on national data from a study^e submitted to the ERT. These data are not included in the NIR. The N content of manure was reported in table 21 of the document provided by the Party. However, the ERT considers that, consistent with the title of the table, the figures in the table provide the expected N value of the manure when it is applied to land for fertilization purposes and not Nex. Therefore, the ERT considers that the Nex values should also account for the N volatilization in the manure stores</p> <p>The ERT recommends that Ukraine reconsider the country-specific methodology used for the estimation of the Nex value or apply the methodology suggested in the 2006 IPCC Guidelines (volume 4, chapter 10, equations 10.31 and 10.32). The ERT also recommends that the Party further justify and thoroughly document in the NIR the Nex values used</p> | Yes. Accuracy* |
| A.23 | 3.B.1 Cattle – CH ₄ | <p>The ERT noted that Ukraine has reported that the use of uncovered anaerobic lagoons occurs for both cattle and swine manure. Anaerobic lagoons are an MMS where all applied organic matter is allowed to degrade inside the lagoon and only nutrient containing effluent is removed from the lagoon. The share of the manure handled in this type of MMS for cattle was comparatively high at the beginning of the time series (21% for the years 1990–1991). During the review, the Party provided a reference^f explaining how the Ukrainian lagoons function. The ERT considered that the definitions used by Ukraine to report lagoons were not in accordance with the definitions provided in the 2006 IPCC Guidelines, because the lagoons are normally only well-functioning in warm climates and not in a relatively cold climate, such as in Ukraine, because it takes too long for the organic matter to degrade completely. If the construction and temperature conditions do not meet the criteria, the lagoons should be emptied occasionally and the DM that has not degraded should be applied to the fields. As a result, the organic matter is fully degraded and the amount of CH₄ generated will be lower</p> | Yes. Transparency* |

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| A.24 | 3.B.1 Cattle – CH ₄ | <p>During the review, the ERT did not receive sufficient information on the management and emptying of the lagoons. The ERT considered that the most likely situation under the Ukrainian climatic conditions is that the lagoons are emptied on a regular basis every spring in order to use the manure as fertilizer. Therefore, the ERT concluded that there is a misallocation of the cattle manure and part of it should be treated as solid systems (with an MCF of 2%) and liquid/slurry systems (with an MCF of 10 to 17%), rather than as treated in anaerobic lagoons (with an MCF of 66%) and included this issue in its list of potential problems and further questions. In response, Ukraine provided a recalculated time series where the manure previously reported as treated in anaerobic lagoons was reallocated to liquid/slurry MMS with an MCF of 10% (the default value for liquid manure stores with crusting cover). The ERT accepted the estimates, noting that these do not overestimate emissions in the base year</p> <p>The ERT recommends that Ukraine include in the NIR relevant information on the reported MMS (e.g. how manure is handled, mechanically separated and stored, and the emptying frequencies of the lagoons/manure stores and field application). The description should include a mass balance for all handled manure based on excreted VS in each MMS and if the manure is covered by a crusting layer or not. If the lagoons do not have a crusting layer, the ERT recommends that Ukraine use the most appropriate MCF from table 10.17 of the 2006 IPCC Guidelines</p> <p>In finding A.6 of the 2015 annual review report, the ERT recommended that Ukraine use a DE value for the feed of 60% when estimating the VS in the MMS for cattle, if justification for the use of the country-specific value is not available. The Party recalculated the time series using the value of 60% based on the recommended value for Eastern Europe provided in the 2006 IPCC Guidelines</p> <p>Noting that Ukraine is already using a detailed analysis of national cattle fodder and that the category is a key category, the ERT recommends that Ukraine continue to make efforts to develop and justify the use of country-specific DE values for the different cattle categories in order to improve the accuracy of the emission estimates for manure management</p> | Yes. Accuracy* |
| A.25 | 3.B.3 Swine – CH ₄ | <p>The ERT noted that the reported DM excretion for swine is high. For growing swine, Ukraine reported a DM excretion value of 0.73 kg dm/day in agricultural enterprises, equivalent to 0.62 kg VS/head/day. The experience of the ERT is that growing swine are generally fed with 2–2.25 kg dm/day, with a DE of 80–85%. This leads to an estimated DM of 0.3–0.45 kg dm/head/day. The default value provided in the 2006 IPCC Guidelines for Eastern Europe is 0.3 kg VS/head/day</p> <p>The ERT recommends that Ukraine investigate in detail the VS excretion rates for swine, revise them as needed and report their values together with the supporting information in</p> | Yes. Accuracy* |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
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| | | the NIR | |
| A.26 | 3.B.5 Indirect N ₂ O emissions – N ₂ O | <p>The ERT noted that Ukraine also reports under the Convention on Long-range Transboundary Air Pollution (CLRTAP) and reports N volatilization from agricultural sources. The ERT further noted that the reported total N volatilized as NH₃ and NO_x differs significantly as reported under both the UNFCCC and under CLRTAP. For example, for 2014, the value for NH₃ reported in the CRF table is 337.99 kt, while the value reported under CLRTAP is 12.74 kt</p> <p>The ERT encourages Ukraine to coordinate the N volatilization estimates reported under CLRTAP and under the UNFCCC in its future reporting by choosing the most appropriate methodology and documenting it as necessary</p> | Not an issue |
| A.27 | 3.D.a.6 Cultivation of organic soils (histosols) – N ₂ O | <p>The ERT noted that Ukraine uses the 2006 IPCC Guidelines to estimate the N₂O emissions from organic soils</p> <p>The ERT encourages the Party to use updated EFs for organic soils from the Wetlands Supplement</p> | Not an issue |
| A.28 | 3.D.b.1 Atmospheric deposition – N ₂ O | <p>The ERT noted that Ukraine reports in the NIR that for indirect N₂O emissions from managed soils it considers synthetic fertilizers, organic fertilizers, urine, dung and crop residues to soils and N mineralization associated with loss of soil organic matter. However, the NIR does not contain sufficient information on the type and quantity of fertilizers used in the country and the EFs used in the inventory</p> <p>The ERT recommends that Ukraine include in the NIR information on the consumed amounts of different fertilizers (mentioned above) and their related ammonia EFs</p> | Yes. Transparency* |
| A.29 | 3.G Liming – CO ₂ | <p>Ukraine reported that only “ground lime” is used for liming of soils and data are provided in table A3.2.6.1 of the NIR. The ERT notes that ground lime often contains a significant amount of inert material</p> <p>The ERT encourages Ukraine to provide additional information on the content of inert materials in the ground lime. This could be achieved by testing the lime for its acid neutralization capacity. If the analysis of the ground lime includes inert materials, the ERT encourages Ukraine to recalculate the CO₂ emissions for the entire time series of the emissions, taking into account the portion of the inert material in the ground lime</p> | Not an issue |
| LULUCF | | | |
| L.33 | Land representation – CO ₂ , CH ₄ and | Ukraine applied approach 2 of the 2006 IPCC Guidelines for land representation and provided in the NIR (chapter 6, table 6.4) land-use change matrices for all years of the time series. The land-use change matrices were developed using annual data on the land area from the State Service of Geodesy, Cartography and Cadastre of Ukraine, which do | Yes. Accuracy* |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
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| N ₂ O | | <p>not contain information on conversions between lands. In addition, some other existing data are used (e.g. for actual areas of afforestation and deforestation from a database on activities under Article 3, paragraph 3, of the Kyoto Protocol). The ERT noted that the information provided in the NIR was not sufficiently clear on how the conversions between categories were detected and derived. The ERT understands that approach 2 only tracks land area changes without spatially explicit location data</p> <p>In response to a question raised by the ERT during the review, Ukraine indicated that no verification activities were carried out by the Party to confirm the land-use categories and the conversions between lands. In addition, Ukraine was not able to distinguish forest land converted to flooded land. Also, in its land classification, Ukraine defined “other land” as “land not included in forest land, cropland, grassland, wetlands and settlements but including rocks, sand, billows, and other land”. The ERT identified that the conversion of other land (as defined by Ukraine) to lands such as wetlands, as included in the land-use change matrices, is unlikely to take place. The findings of the ERT suggest that there are problems with the land representation reported by Ukraine. During the review, Ukraine explained that its improvement plan for 2017 includes the improvement of data and information on land representation and identification for all land-use categories for the time series 1990–2014</p> <p>The ERT recommends that Ukraine collect sufficient data on the land area and changes in the land area, verify the conversions between land-use categories and demonstrate how the accuracy of land representation has improved, clearly documenting the AD used for the sector in the NIR</p> | |
| L.34 | 4.A.1 Forest land remaining forest land – CO ₂ , CH ₄ and N ₂ O | <p>The ERT noted that Ukraine excluded from the inventory 59.00 kha of forest land as unmanaged land. The approach used to detect and define managed and unmanaged forest was not clearly described in the NIR. In response to a question raised by the ERT during the review, Ukraine explained that, currently, the category unmanaged forest land remaining forest land includes primary forests (59.00 kha), a restricted area of the Chernobyl nuclear plant (150.00 kha), and opened lands not covered by trees but considered as forest land by Ukrainian legislation (forest roads, fire-preventive open strips of forest, temporarily opened forest land due to fires, disturbances, etc.)</p> <p>The ERT recommends that Ukraine include clear definitions of managed and unmanaged forest land and of how unmanaged forest land is detected in the land representation and, if necessary, revise the distribution of forest land between managed and unmanaged</p> | Yes. Transparency* |
| L.35 | 4.A.1 Forest land remaining forest land – CO ₂ | <p>In CRF table 4.A, Ukraine used the notation key “NO” to report the CSCs in mineral soils for forest land remaining forest land. During the review, Ukraine explained that the IPCC tier 1 method was applied assuming that there are no changes in the soil pool. Given that forest land remaining forest land is a key category for 1990 and 2014 for</p> | Yes. Accuracy* |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|------|--|--|--|
| L.36 | 4.A.2 Land converted to forest land – CO ₂ , CH ₄ and N ₂ O | <p>Ukraine, the ERT considers that the use of a tier 1 method is inappropriate and that it is very likely that soil is a significant pool, unless Ukraine demonstrates the contrary</p> <p>The ERT recommends that Ukraine apply a higher-tier method to estimate the CSCs in mineral soils for forest land remaining forest land or demonstrate that forest soil is not a significant pool. If this is not possible, the ERT recommends that the Party explain in the NIR the reasons why it was unable to implement a higher-tier method in accordance with the decision tree in the 2006 IPCC Guidelines, consistent with decision 24/CP.19, annex I, paragraph 11</p> <p>In CRF table 4.A, for land converted to forest land, the CSCs and emissions and removals are reported as “NO” for all pools (living biomass, dead wood, litter and organic soils) except for mineral soils for 1990. The ERT found that using this notation key for this type of conversion is inappropriate. For 2014, all pools were reported with values except for organic soils. In response to a question raised by the ERT during the review, Ukraine explained that the CSCs in land converted to forest land for 1990 will be revised and included in the 2017 submission</p> <p>The ERT recommends that Ukraine report the CSCs and emissions and removals for all pools for land converted to forest land for the entire time series</p> | Yes. Completeness* |
| L.37 | 4.B.1 Cropland remaining cropland – CO ₂ | <p>In CRF table 4.B, losses from living biomass in cropland remaining cropland are reported as “NO” for 2014, while losses were estimated for 1990. In response to a question raised by the ERT during the review, Ukraine explained that in its land classification approach, a decrease in the total area of orchards in comparison with the previous year was considered as an area of biomass losses. As a result, because the area of orchards was higher in 2014 than in 2013, Ukraine considered no biomass losses from living biomass, whereas the area was smaller in 1990 than in 1989, leading to an estimation of the CSCs. The ERT considered that changes in land area do not justify the absence or otherwise of the loss of biomass from the living biomass pool and that the assumption used by Ukraine is not in line with the 2006 IPCC Guidelines (volume 4, chapter 5, section 5.2)</p> <p>The ERT recommends that Ukraine revise the assumption used for estimating the losses from living biomass for cropland remaining cropland and improve the completeness of the inventory by including the missing component “loss” in the CSCs for living biomass</p> | Yes. Completeness* |
| L.38 | 4.B.2.1 Forest land converted to cropland – CO ₂ , CH ₄ and N ₂ O | <p>In CRF table 4.B, the ERT identified that the living biomass and DOM pools were estimated and reported under land converted to cropland for 1990, but were reported using the notation key “NO” for 2014. In response to a question raised by the ERT during the review, Ukraine indicated that in 1990 there were conversions of forest land to cropland (confirmed by the land-use change matrix), justifying the reporting of living biomass, DOM and mineral soils and that in 2014 there were no conversions of forest land to cropland and thus no emissions were reported for living biomass and DOM. The</p> | Yes. Completeness* |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|------|--|--|--|
| L.39 | 4.C.1 Grassland remaining grassland – CO ₂ , CH ₄ and N ₂ O | <p>ERT identified that the land-use change matrix reported by Ukraine for 2014 includes conversions of forest land to cropland</p> <p>The ERT recommends that Ukraine estimate and report the CSCs and emissions and removals for all pools for forest land converted to cropland for the entire time series</p> <p>In CRF table 4.C for managed grassland remaining managed grassland, only the CSCs in mineral and organic soils were reported with values. The remaining pools were reported as “NO”. During the review, Ukraine explained that it applied a tier 1 method to the other pools</p> <p>The ERT recommends that Ukraine provide information in the NIR that it applied a tier 1 method to all pools, other than mineral and organic soils, together with appropriate justification</p> | Yes. Accuracy* |
| L.40 | 4.E.2 Land converted to settlements – CO ₂ , CH ₄ and N ₂ O | <p>The ERT noted that the notation key “NO” has been used to report the CSCs in land converted to settlements, which, in many cases, is not in line with the 2006 IPCC Guidelines. The land-use change matrix for 2014 contains information on the following conversions: forest land to settlements, cropland to settlements, grassland to settlements, and wetlands to settlements. However, in CRF table 4.E, despite providing the AD for the conversion of forest land and wetlands to settlements, the CSCs were reported as “NO”. Ukraine justified the use of the notation key during the review by explaining that the conversion of forest land to settlements did not occur in 2014 and that there is no methodology available to calculate the conversion of wetlands to settlements. However, the Party’s land-use change matrix (CRF table 4.1) includes the conversion of 31,000 ha of forest land to settlements for 2014</p> <p>The ERT recommends that Ukraine estimate and report the CSCs and emissions and removals for forest land converted to settlements for all years where these conversions occur. The ERT also recommends that Ukraine improve the use of the notation keys, in particular using the notation key “NE” instead of “NO” for land conversions occurring in Ukraine, when an IPCC methodology is not available</p> | Yes. Completeness* |
| L.41 | 4.D.2.3 Land converted to wetlands – CO ₂ , CH ₄ and N ₂ O | <p>In CRF table 4.D (land converted to wetlands), the CSCs for all pools were reported as “NO” for 2014, while the CSCs were reported for living biomass, DOM and mineral soils for 1990. In response to a question raised by the ERT during the review, Ukraine explained that emissions were reported for forest land converted to wetlands for 1990 only and that a methodology is not available to estimate the other conversions. Ukraine also explained that emissions from forest land converted to wetlands were not reported for 2014 because such conversions did not occur. However, in the land-use change matrix (CRF table 4.1), the Party reported that 2,820.60 ha of forest land was converted to wetlands in 2014. The conversion AD are also reflected in CRF table 4.D</p> | Yes. Completeness* |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|------|--|---|--|
| | | The ERT recommends that Ukraine estimate and report the CSCs for all pools and the emissions occurring from the conversion of forest land to wetlands for 2014, applying the methods from the 2006 IPCC Guidelines or other approaches deemed appropriate to the national circumstances of Ukraine | |
| | Waste | | |
| W.10 | 5.A Solid waste disposal on land – CH ₄ | <p>The ERT noted that Ukraine recalculated the entire time series for the category solid waste disposal using updated country-specific EFs. The recalculations resulted in CO₂ eq emission reductions from MSW disposal sites of 13.16–15.74% across the time series, compared with the previous submission. The use of the national biodegradable carbon content in food waste is one of the main reasons for the reduction in emissions based on an unpublished study referenced in the NIR</p> <p>After considering the study during the review, the ERT concluded that there are some concerns related to the use of the country-specific DOC values regarding the limited time period of the year covered by the research (autumn period: September–November) and the size of the town Borispol included in the study (around 60,000 inhabitants), which is not representative of the entire country, excluding cities such as Kiev, Kharkov and Dnepropetrovsk. The ERT concluded that the approach used by Ukraine to develop the country-specific EF is not in line with the 2006 IPCC Guidelines regarding the sampling method used to derive the waste composition data (volume 1, chapter 2, of the 2006 IPCC Guidelines, “Approaches to data collection” and volume 5, pp.2.14 and 2.15)</p> <p>During the review, in response to the list of potential problems and further questions raised by the ERT, Ukraine submitted revised estimates based on a revised DOC value for food waste ranging from 7.9 to 15.0% for the whole time series (1990–2014), which was used in the 2014 and 2015 submissions and is a default value according to the 2006 IPCC Guidelines (volume 5, chapter 2, table 2.4). The revised estimates for solid waste disposal on land resulted in an increase in CH₄ emissions from 19.4 to 23.1% for the whole time series (1990–2014)</p> <p>The ERT recommends that Ukraine continue to further investigate MSW, taking into consideration the fact that the sampling should be conducted in several typical cities in each season and that the methods, frequency of sampling and implications for the time series should be documented with a view to developing a country-specific EF for the category</p> | Yes. Accuracy* |
| W.11 | 5.A Solid waste disposal on land – CH ₄ | The ERT noted that, according to the NIR (table A3.4.1, pp.498–501), the amount of waste disposed in landfills in the period 1990–2014, which was used to estimate the CH ₄ emissions from SWDS (managed, unmanaged shallow and deep), included waste generated in urban areas only. Therefore, the waste generated by the rural population, which is considered to be around 30% of the total population of Ukraine, is not included | Yes. Transparency* |

| ID# | Finding classification Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|------|---|--|
| W.12 | <p data-bbox="436 1189 613 1273">5.A Solid waste disposal on land – CH₄</p> <p data-bbox="638 1189 1594 1361">The ERT noted an inconsistency between the NIR and CRF table 5.A regarding the reporting of the value of DOC_f. The value reported in the NIR (p.237) equals 0.5%, but in CRF table 5.A the DOC_f value is equal to 13.73%. During the review, Ukraine confirmed that the DOC_f value of 0.5% was used for the entire time series to estimate GHG emissions from SWDS and informed the ERT that the technical mistake in the CRF tables will be corrected in the next submission</p> <p data-bbox="638 1382 1594 1436">The ERT recommends that Ukraine strengthen its QA/QC checks for the waste sector and ensure that the DOC_f value is corrected in the CRF tables and consistently reported</p> | Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|-----------|--|--|--|
| | | between the NIR and the CRF tables | |
| W.13 | 5.C.2 Open burning of waste – CO ₂ , CH ₄ and N ₂ O | <p>The ERT noted an inconsistency in the reporting of emissions from open burning of waste. In the NIR (p.249), it is mentioned that national legislation prohibits thermal treatment of waste outside specially designed equipment areas. In CRF table 5.C (category 5.C.2), open burning of waste is reported as “NA”. According to the UNFCCC Annex I inventory reporting guidelines (decision 24/CP.19, annex I, paragraph 37(c)), this means that open burning occurs within the country but does not result in emissions. During the review, the Party explained that the analysis of official statistics and legislation shows that open burning of waste does not occur in Ukraine. According to the 2006 IPCC Guidelines, for countries with well-functioning waste collection systems in place, it is good practice to investigate whether any fossil carbon is openly burned. The ERT considers that basic data on the amount of waste and on treatment practices may not be available within some countries. Therefore, according to the 2006 IPCC Guidelines (volume 5, chapter 5, section 5.3.2, “Amount of waste open-burned”), emissions from open burning of waste should be considered in detail, while emissions from open burning should also be quantified if expected to be relevant</p> <p>The ERT recommends that Ukraine further investigate this issue and quantify the CO₂, CH₄ and N₂O emissions from open burning if considered to be significant (see finding W.11 above)</p> | Yes. Completeness* |
| KP-LULUCF | | | |
| KL.4 | Forest management – CO ₂ , CH ₄ and N ₂ O | <p>The ERT notes that when a portion of the forest area is excluded from reporting under forest management, afforestation and reforestation, or deforestation, it is good practice to report information on the impact of such exclusion, in terms of GHG emissions and removals</p> <p>Given that Ukraine excludes a portion of its forest area that it considers to be unmanaged from forest management reporting (see also finding L.34 above), but does not provide information on what forest area is considered unmanaged, the ERT recommends that Ukraine report information on how unmanaged forest land is defined and identified and document, if unmanaged forest land is subject to the impact of any human activity, how any possible unbalanced accounting is avoided</p> | Yes. Accuracy* |
| KL.5 | Forest management – CO ₂ , CH ₄ and N ₂ O | <p>According to the method provided in the Kyoto Protocol Supplement (equation 2.7.1), the technical correction is to be calculated as the difference between the corrected FMRL (FMRL_{corr}) and the FMRL inscribed in decision 2/CMP.7 (–48,700 kt CO₂ eq). However, the Party reported in CRF table 4(KP-I)B.1.1 and in the CRF accounting table the value of the recalculated FMRL (–62,135 kt CO₂ eq). As a consequence, a large artefact debit is accounted for under forest management</p> | Yes. Accuracy* |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|------|--|--|--|
| KL.6 | Forest management – CO ₂ , CH ₄ and N ₂ O | <p>The ERT recommends that Ukraine report as a technical correction in CRF table 4(KP-I)B.1.1 and in the CRF accounting table the value resulting from the subtraction of the FMRL value inscribed in decision 2/CMP.7 from the recalculated FMRL_{corr} value</p> <p>The ERT notes that in cases where a technical correction to the FMRL is calculated, it is good practice to report the following information: (i) the rationale for calculating the FMRL_{corr} value; (ii) the methods used to calculate the FMRL_{corr} value (including all background data and parameters used); (iii) the results (i.e. the FMRL_{corr} and the technical correction value) and a discussion of the differences between the FMRL_{corr} and the FMRL values (i.e. the causes and, where possible, the percentage impact for each cause); in particular, for this purpose, it is good practice to report a comparison of the recalculated estimates with the previous estimates (see table 2.7.2 of the Kyoto Protocol Supplement); and (iv) complete information that demonstrates consistency between the FMRL_{corr} value and the forest management GHG estimates. The ERT noted that the NIR does not provide information on the causes of the differences between the FMRL and the FMRL_{corr} and on the consistency between the FMRL_{corr} value and the forest management GHG estimates (this issue is addressed in findings KL.7 and KL.9 below). During the review, Ukraine reported that a larger forest area, a larger quantity of harvesting, and a larger area of forest fires were the main differences between the FMRL and the FMRL_{corr} value. The ERT also noted that a larger amount of harvesting and a larger amount of fires should have caused a decrease in the FMRL value (i.e. less negative); however, the FMRL_{corr} value is a more negative value than the FMRL</p> <p>The ERT recommends that Ukraine report complete and clear information, as described above, to ensure the transparency of each technical correction to its FMRL</p> | Yes. Transparency* |
| KL.7 | Forest management – CO ₂ | <p>The ERT notes that the biomass carbon stock gains in forest management are calculated by applying the average increment rates calculated across regions to the forest type areas. However, the FMRL has been calculated by applying the age-class structure</p> <p>To ensure consistency between the FMRL and the forest management GHG estimates, the ERT recommends that Ukraine either calculate the biomass carbon stock gains in forest land, applying the forest age-class structure and age-class dependent increment rates, or take this inconsistency into consideration when calculating the technical correction to the FMRL</p> | Yes. Accuracy* |
| KL.8 | Forest management – CO ₂ , CH ₄ and N ₂ O | <p>The ERT notes that Ukraine has recalculated the time series 1990–2009 for the managed forest land area that was used for calculating the FMRL in the 2016 submission.</p> <p>Considering that the forest area is one of the elements for which consistency between the FMRL and the forest management estimates has to be ensured (see decision 2/CMP.7, annex, paragraph 14), the recalculation of the time series of the managed forest area determines the need to implement a technical correction of the FMRL. Further, the ERT</p> | Yes. Accuracy* |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|-------|--|--|--|
| KL.9 | Forest management – CO ₂ , CH ₄ and N ₂ O | <p>noted that this recalculation has not been taken into account in the FMRL_{corr} value reported in the 2016 submission</p> <p>The ERT recommends that Ukraine implement a technical correction to its FMRL in order to ensure consistency among areas of forest land included in the FMRL and areas reported under forest management during the commitment period</p> <p>Although Ukraine has reported the general definition of forest in the NIR (p.281), the ERT noted that the Party has not reported a definition of “natural forest” and of “planted forest” as required by good practice for reporting under the Kyoto Protocol (see the Kyoto Protocol Supplement, step 1.2, p.1.8)</p> <p>The ERT recommends that Ukraine report the definitions of “natural forest” and “planted forest” as per the IPCC good practice. The Party may consider the definition of “planted forest” as provided by the Food and Agriculture Organization of the United Nations⁸ and may define “natural forest” as all forests that do not conform to the definition of “planted forest”</p> | Yes. Transparency* |
| KL.10 | Forest management – CO ₂ | <p>The ERT notes that Ukraine has estimated the HWP contribution by using the default methodology for the production approach from the 2006 IPCC Guidelines and has aggregated HWP according to such method (i.e. solid wood products and paper products), and has consistently applied the associated half-life values. However, Ukraine has not reported information that demonstrates that the IPCC methodology is more appropriate to its national circumstances than the default methodology contained in decision 2/CMP.7 and included in the Kyoto Protocol Supplement. Further, the ERT notes that the IPCC default methodology from the 2006 IPCC Guidelines, as applied by Ukraine, does not exclude from the accounting the HWP produced in Ukraine with imported wood</p> <p>The ERT recommends that Ukraine apply the default methodology contained in the Kyoto Protocol Supplement (equations 2.8.2 and 2.8.3) for estimating the contribution of HWP, including the equations to estimate and exclude from the accounting the HWP domestically produced with imported wood</p> | Yes. Accuracy* |
| KL.11 | Forest management – CO ₂ | <p>The ERT notes that Ukraine has included in the calculation of the contribution of HWP, in the FMRL and in the GHG estimates, the HWP produced during the first commitment period and which has already been accounted for during the first commitment period as instantaneously oxidized. The ERT notes that although this is a departure from reporting requirements (decision 2/CMP.7, annex, paragraph 16), it results in conservative accounting of the contribution of HWP</p> <p>Therefore, the ERT encourages Ukraine to remove HWP produced during the first</p> | Not a problem |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue ^a and/or a problem ^b ? If yes, classify by type |
|-------|--|--|--|
| | | commitment period from the calculation of the contribution of HWP | |
| KL.12 | Forest management – CO ₂ , CH ₄ and N ₂ O | <p>The ERT notes that Ukraine has not reported the forest management cap value either in the initial report or in the CRF accounting tables. After resubmitting the GHG inventory and the correction made to the base year emissions, the ERT recalculated the forest management cap over the eight years of the commitment period as 262,671.177 kt CO₂ eq</p> <p>The ERT recommends that Ukraine report the forest management cap in the CRF accounting tables to ensure the correct quantification of credits accounted for under forest management</p> | Yes. Transparency* |
| KL.13 | N ₂ O emissions from N mineralization/immobilization due to carbon loss/gain associated with land-use conversions and management change in mineral soils – N ₂ O | <p>Ukraine has reported N₂O emissions (0.003 kt N₂O emissions in 2014) from the subdivision of the afforested area: units of land harvested since the beginning of the commitment period (0.0009 kt N₂O), for which an associated net SOC increment is reported. The ERT notes that N₂O emissions, as well as CO₂ emissions, are the consequence of SOC losses, while a net increment in SOC does not cause either CO₂ or N₂O emissions</p> <p>The ERT recommends that Ukraine exclude areas with a net SOC increment from the calculation of N₂O emissions from N mineralization associated with SOC losses in afforested lands</p> | Yes. Accuracy* |
| KL.14 | N ₂ O emissions from N mineralization/immobilization due to carbon loss/gain associated with land-use conversions and management change in mineral soils – N ₂ O | <p>Ukraine has reported in its NIR (section 11.3.1.1) that indirect N₂O emissions from N mineralization associated with net SOC losses in mineral soils have not been reported since the CRF tables do not contain a specific row in which to report them. The ERT notes that CRF table NIR-1 includes the coverage of indirect N₂O emissions from managed soils and that CRF table 4(KP-II)3 does not exclude the reporting of indirect N₂O emissions</p> <p>Therefore, the ERT recommends that Ukraine report, in CRF table 4(KP-II)3, indirect N₂O emissions together with direct N₂O emissions originating from N mineralization associated with net SOC loss in mineral soils (see the 2006 IPCC Guidelines, volume 4, chapter 11, equation 11.10). The ERT further recommends that Ukraine report in the NIR indirect N₂O emissions disaggregated from direct N₂O emissions</p> | Yes. Completeness* |

Abbreviations: AD = activity data, BOF = basic oxygen furnace, CPR = commitment period reserve, CRF = common reporting format, CSC = carbon stock change, DM = dry matter, DOC = degradable organic carbon, DOC_f = fraction of degradable organic carbon that decomposes, DOM = dead organic matter, EAF = electric arc furnace, EF = emission factor, ERT = expert review team, FMRL = forest management reference level, FMRL_{corr} = FMRL recalculated for the purpose of calculating the technical correction, GHG = greenhouse gas, HWP = harvested wood products, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, ITL = international transaction log, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol Supplement = *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*, LULUCF = land use, land-use change and forestry, MCF = methane conversion factor, MMS = manure management system, MSW = municipal solid waste, NA = not applicable, NE = not estimated, Nex = nitrogen excretion, NIR = national inventory report, NO = not occurring, OHF = open hearth furnace, QA/QC = quality assurance/quality control, SEF = standard electronic format, SIAR = standard independent assessment report, SOC = soil organic carbon, SWDS = solid waste disposal site, UNFCCC Annex I inventory reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”, VS = volatile solids, Wetlands Supplement = *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*, 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

^a Recommendations are related to issues as defined in decision 13/CP.20, annex, paragraph 81, or problems as identified in decision 22/CMP.1, annex, paragraph 69, identified by the ERT during the review. Encouragements are made to the Party to address all findings not related to such issues.

^b An asterisk is included next to each issue type that is also a problem, as defined in decision 22/CMP.1, annex, paragraphs 68 and 69, including those that lead to an adjustment or a question of implementation.

^c Where a Party applies the cancellation pursuant to Article 3, paragraph 7 ter, the CPR for the second commitment period under decision 11/CMP.1, annex, paragraph 6, for that Party shall not drop below 90 per cent of eight times its average annual emissions for the first three years of the first commitment period, or 100 per cent of eight times its most recently reviewed inventory, whichever is lower (decision 3/CMP.11, annex I, paragraph 8 quinquies).

^d Разработка кадастра выбросов газов, которые вызывают парниковый эффект в энергетическом секторе в Украине в период 1991-1998: Отчёт про научно-исследовательскую работу (заключительный) / [Кулик М.Н., Костюковский Б.А., Линецкий Й.К. и др.]; под рук. Б.А. Костюковского. – Институт общей энергетики НАН Украины. – Киев, 1999. – 43 с. (Development of GHG inventory from energy sector in Ukraine for the period 1991–1998, final project report; in Russian).

^e Ministry of Agriculture, Kiev 2006. *Системи видалення, обробки, підготовки та використання гною. Відомчі норми технологічного проектування* (Technological norms: systems for removal, processing, preparation and use of manure; in Ukrainian).

^f See <<http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-7615/BAE-1736web2011.pdf>>.

VI. Application of adjustments

10. The ERT has not identified the need to apply any adjustments to the 2016 annual submission of Ukraine.

VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol

11. Ukraine has elected commitment period accounting and therefore the issuance and cancellation of units for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol are not applicable for the 2016 review.

VIII. Questions of implementation

12. No questions of implementation were identified by the ERT during the review.

13. The ERT noted that two questions of implementation were raised in the “Report on the individual review of the report upon expiration of the additional period for fulfilling commitments (true-up period) for the first commitment period of the Kyoto Protocol of Ukraine” (FCCC/KP/CMP/2016/TPR/UKR) published on 8 April 2016, as follows:

(a) Question of implementation relating to reporting requirements: Ukraine submitted the true-up period report submission after the deadline of 2 January 2016, which was set out in decision 3/CMP.9, and after the centralized review of the true-up period reports for all Parties included in Annex I with a commitment inscribed in Annex B to the Kyoto Protocol (February 2016). In addition, the information submitted was not consistent with the information provided by the international transaction log (ITL) and therefore the ERT responsible for the review of the true-up period report concluded that Ukraine did not fully comply with the requirements included in the modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol (decision 13/CMP.1) and/or the “Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol” (decision 15/CMP.1). The ERT responsible for the review of the true-up period report concluded that this was an unresolved problem pertaining to language of a mandatory nature, and therefore considered this as a question of implementation;

(b) Question of implementation relating to Article 3, paragraph 1, of the Kyoto Protocol: the ERT responsible for the review of the true-up period report concluded that the aggregate anthropogenic GHG emissions of Ukraine for the first commitment period exceeded the quantities of emission reduction units, certified emission reductions, temporary certified emission reductions, long-term certified emission reductions, assigned amount units and removal units in the retirement account of Ukraine for the first commitment period. In particular, the ERT responsible for the review of the true-up period report concluded that this was an unresolved problem pertaining to language of a mandatory nature, and therefore considered this as a question of implementation.

14. The ERT further noted that the enforcement branch of the Compliance Committee, in its decision of 7 September 2016 (CC-2016-1-6/Ukraine/EB and FCCC/KP/CMP/2016/3), decided to maintain its previous finding contained in paragraph 27 of the preliminary finding (CC-2016-1-4/Ukraine/EB) that Ukraine was not in compliance with Article 7, paragraph 1, of the Kyoto Protocol, in conjunction with

paragraph 4. The enforcement branch also concluded that the information provided by Ukraine in its written submission demonstrated that the national registry of Ukraine, which was not in place at the time of the adoption of the preliminary finding, was now connected to the ITL. The fact of the connection being re-established had also been confirmed by the ITL administrator. The branch therefore considered that its finding, contained in paragraph 28 (CC-2016-1-4/Ukraine/EB) with regard to the national registry, no longer stood. At the tenth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), Ukraine was given time, on an exceptional basis, until CMP 13 to make arrangements to demonstrate compliance with its commitments under Article 3, paragraph 1, of the Kyoto Protocol (FCCC/KP/CMP/2016/8, para. 50).

Annex I

Overview of greenhouse gas emissions and removals for Ukraine for submission year 2016 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

1. Tables 6–9 provide an overview of total greenhouse gas emissions and removals, as submitted by Ukraine.

Table 6

Total greenhouse gas emissions for Ukraine, base year–2014^a

(kt CO₂ eq)

| | Total GHG emissions excluding indirect CO ₂ emissions | | Total GHG emissions including indirect CO ₂ emissions ^b | | Land-use change (Article 3.7 bis as contained in the Doha Amendment) ^c | KP-LULUCF activities (Article 3.3 of the Kyoto Protocol) ^d | KP-LULUCF activities (Article 3.4 of the Kyoto Protocol) | |
|-----------|--|------------------------|---|------------------------|---|---|--|------------|
| | Total including LULUCF | Total excluding LULUCF | Total including LULUCF | Total excluding LULUCF | | | CM, GM, RV, WDR ^e | FM |
| | | | | | | | | |
| FMRL | | | | | | | | –48 700 |
| Base year | 891 927.62 | 937 954.20 | 891 927.62 | 937 954.20 | NA | NA | | |
| 1990 | 891 927.62 | 937 954.20 | 891 927.62 | 937 954.20 | | | | |
| 1995 | 505 680.52 | 557 047.94 | 505 680.52 | 557 047.94 | | | | |
| 2000 | 372 882.68 | 413 923.44 | 372 882.68 | 413 923.44 | | | | |
| 2010 | 370 459.59 | 401 929.09 | 370 459.59 | 401 929.09 | | | | |
| 2011 | 400 868.43 | 421 635.99 | 400 868.43 | 421 635.99 | | | | |
| 2012 | 382 780.92 | 409 531.35 | 382 780.92 | 409 531.35 | | | | |
| 2013 | 386 513.94 | 401 066.97 | 386 513.94 | 401 066.97 | | –917.97 | NA | –67 689.02 |
| 2014 | 341 434.10 | 354 347.54 | 341 434.10 | 354 347.54 | | –963.89 | NA | –68 647.65 |

Abbreviations: CM = cropland management, FM = forest management, FMRL = forest management reference level, GHG = greenhouse gas, GM = grazing land management, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, RV = revegetation, WDR = wetland drainage and rewetting.

^a Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions.

^b The Party has not reported indirect CO₂ emissions in common reporting format table 6.

^c The value reported in this column refers to 1990.

^d Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

^e Ukraine has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol.

Table 7

Greenhouse gas emissions by gas for Ukraine, excluding land use, land-use change and forestry, 1990–2014^a(kt CO₂ eq)

| | CO ₂ ^b | CH ₄ | N ₂ O | HFCs | PFCs | Unspecified mix of HFCs and PFCs | SF ₆ | NF ₃ |
|----------------------------|------------------------------|-----------------|------------------|-----------|-----------|-------------------------------------|------------------|-----------------|
| 1990 | 693 024.77 | 189 322.96 | 55 370.65 | NO | 235.82 | NO | 0.01 | NO |
| 1995 | 380 871.28 | 140 557.06 | 35 441.46 | NO | 178.06 | NO | 0.07 | NO |
| 2000 | 271 429.77 | 118 474.58 | 23 882.93 | 20.01 | 115.74 | NO | 0.42 | NO |
| 2010 | 287 113.61 | 86 107.83 | 27 932.30 | 738.98 | 26.67 | NO | 9.71 | NO |
| 2011 | 301 273.50 | 85 863.58 | 33 679.85 | 810.65 | NO | NO | 8.41 | NO |
| 2012 | 295 706.06 | 80 865.70 | 32 120.19 | 828.41 | NO | NO | 10.99 | NO |
| 2013 | 287 436.40 | 76 562.53 | 36 186.94 | 868.55 | NO | NO | 12.54 | NO |
| 2014 | 247 561.22 | 70 341.50 | 35 593.65 | 834.76 | NO | NO | 16.41 | NO |
| Per cent change | | | | | | | | |
| 1990–2014 | -64.3 | -62.8 | -35.7 | NA | NA | NA | 214 906.8 | NA |

Abbreviations: NA = not applicable, NO = not occurring.

^a Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.

^b Ukraine did not report indirect CO₂ emissions in common reporting format table 6.

Table 8
Greenhouse gas emissions by sector for Ukraine, 1990–2014^{a, b}
 (kt CO₂ eq)

| | <i>Energy</i> | <i>IPPU</i> | <i>Agriculture</i> | <i>LULUCF</i> | <i>Waste</i> | <i>Other</i> |
|--|---------------|--------------|--------------------|---------------|--------------|--------------|
| 1990 | 710 599.84 | 117 018.32 | 98 554.92 | –46 026.59 | 11 781.13 | NO |
| 1995 | 421 683.70 | 57 338.08 | 66 592.06 | –51 367.41 | 11 434.10 | NO |
| 2000 | 296 835.32 | 66 610.08 | 39 186.40 | –41 040.76 | 11 291.65 | NO |
| 2010 | 278 888.62 | 74 174.90 | 36 537.06 | –31 469.50 | 12 328.52 | NO |
| 2011 | 289 098.38 | 79 083.70 | 41 057.19 | –20 767.56 | 12 396.72 | NO |
| 2012 | 281 380.76 | 75 905.70 | 39 935.95 | –26 750.43 | 12 308.95 | NO |
| 2013 | 271 091.24 | 72 797.71 | 44 772.57 | –14 553.03 | 12 405.45 | NO |
| 2014 | 238 980.65 | 58 838.79 | 44 228.66 | –12 913.43 | 12 299.44 | NO |
| Per cent change 1990–2014 | –66.4 | –49.7 | –55.1 | –71.9 | 4.4 | NA |

Abbreviations: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry, NA = not applicable, NO = not occurring.

^a Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.

^b Ukraine did not report indirect CO₂ emissions in common reporting format table 6.

Table 9
Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year^{a, b}–2014, for Ukraine
 (kt CO₂ eq)

| | <i>Article 3.7 bis as contained in the Doha Amendment^c</i> | | | <i>Article 3.3 of the Kyoto Protocol</i> | | <i>Forest management and elected Article 3.4 activities of the Kyoto Protocol</i> | | |
|----------------------------------|---|--|----------------------|--|----------------------------|---|---------------------|---------------------------------------|
| | <i>Land-use change</i> | <i>Afforestation and reforestation</i> | <i>Deforestation</i> | <i>Forest management</i> | <i>Cropland management</i> | <i>Grazing land management</i> | <i>Revegetation</i> | <i>Wetland drainage and rewetting</i> |
| FMRL | | | | –48 700.00 | | | | |
| Technical correction | | | | –13 435.00 ^d | | | | |
| Base year | NA | | | | NA | NA | NA | NA |
| 2013 | | –929.83 | 11.86 | –67 689.02 | NA | NA | NA | NA |
| 2014 | | –972.41 | 8.52 | –68 647.65 | NA | NA | NA | NA |
| Per cent change 1990–2014 | | | | | NA | NA | NA | NA |

Abbreviations: FMRL = forest management reference level, NA = not applicable.

^a Base year refers to the base year under the Kyoto Protocol, which is 1990 for all gases. Ukraine has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol. For activities under Article 3, paragraph 3, of the Kyoto Protocol, and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

^b Values in this table include emissions on lands subject to natural disturbances, if applicable.

^c The value reported in this column refers to 1990.

^d The value provided in the CRF tables is not the technical correction but the corrected value of the FMRL (FMRL_{corr}). This value was calculated by the expert review team based on the FMRL and FMRL_{corr} provided by the Party (see ID# KL.5 in table 5).

2. Table 10 provides an overview of relevant key data for Ukraine's reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 10

Key relevant data for Ukraine under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

| <i>Key parameters</i> | <i>Values</i> |
|--|---|
| Periodicity of accounting | (a) Afforestation/reforestation: commitment period accounting (b) Deforestation: commitment period accounting (c) Forest management: commitment period accounting (d) Cropland management: not elected (e) Grazing land management: not elected (f) Revegetation: not elected (g) Wetland drainage and rewetting: not elected |
| Election of activities under Article 3, paragraph 4 | None |
| Election of application of provisions for natural disturbances | No |
| 3.5% of total base year GHG emissions, excluding LULUCF | 262 627.177 kt CO ₂ eq |
| Cancellation of AAUs, ERUs, CERs and/or issuance of RMUs in the national registry for: | |
| 1. Afforestation and reforestation in 2014 | NA |
| 2. Deforestation in 2014 | NA |
| 3. Forest management in 2014 | NA |
| 4. Cropland management in 2014 | NA |
| 5. Grazing land management in 2014 | NA |
| 6. Revegetation in 2014 | NA |
| 7. Wetland drainage and rewetting in 2014 | NA |

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, ERU = emission reduction unit, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not applicable, RMU = removal unit.

Annex II

Information to be included in the compilation and accounting database

Tables 11 and 12 include the information to be included in the compilation and accounting database for Ukraine. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable), as well as the final data to be included in the compilation and accounting database.

Table 11

Information to be included in the compilation and accounting database for 2014, including the commitment period reserve, for Ukraine

(t CO₂ eq)

| | <i>Original submission</i> | <i>Revised estimates</i> | <i>Adjustment^a</i> | <i>Final^b</i> |
|--|----------------------------|--------------------------|-------------------------------|--------------------------|
| Commitment period reserve | 3 087 465 622 | 2 834 780 294 | | 2 834 780 294 |
| Annex A emissions for 2014 | | | | |
| CO ₂ | 247 561 221 | | | 247 561 221 |
| CH ₄ | 69 053 878 | 70 341 498 | | 70 341 498 |
| N ₂ O | 35 572 539 | 35 593 651 | | 35 593 651 |
| HFCs | 834 757 | | | 834 757 |
| PFCs | NO | | | |
| Unspecified mix of HFCs and PFCs | NO | | | |
| SF ₆ | 16 409 | | | |
| NF ₃ | NO | | | |
| Total Annex A sources | 353 038 805 | 354 347 537 | | 354 347 537 |
| Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014 | | | | |
| 3.3 Afforestation and reforestation | | -972 407 | | -972 407 |
| 3.3 Deforestation | | 8 521 | | 8 521 |
| Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014 | | | | |
| 3.4 Forest management for 2014 | | -68 647 648 | | -68 647 648 |

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b "Final" includes revised estimates, if any, and/or adjustments, if any.

Table 12

Information to be included in the compilation and accounting database for 2013, for Ukraine(t CO₂ eq)

| | <i>Original submission</i> | <i>Revised estimates</i> | <i>Adjustment^a</i> | <i>Final^b</i> |
|--|--------------------------------|--------------------------|-------------------------------|--------------------------|
| Annex A emissions for 2013 | | | | |
| CO ₂ | 287 436 404 | | | 287 436 404 |
| CH ₄ | 75 256 195 | 76 562 527 | | 76 562 527 |
| N ₂ O | 36 167 477 | 36 186 940 | | 36 186 940 |
| HFCs | 86 8551 | | | 86 8551 |
| PFCs | NO | | | NO |
| Unspecified mix of HFCs and PFCs | NO | | | NO |
| SF ₆ | 12 543 | | | 12 543 |
| NF ₃ | NO | | | NO |
| Total Annex A sources | 399 741 171 | 401 066 966 | | 401 066 966 |
| Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013 | | | | |
| 3.3 Afforestation and reforestation | | -929 834 | | -929 834 |
| 3.3 Deforestation | | 11 859 | | 11 859 |
| Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013 | | | | |
| 3.4 Forest management for 2013 | | -67 689 022 | | -67 689 022 |

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b "Final" includes revised estimates, if any, and/or adjustments, if any.

Annex III

Additional information to support findings in table 2

A. Missing categories that may affect completeness

1. The categories for which methods are included in the Intergovernmental Panel on Climate Change (IPCC) 2006 IPCC Guidelines for National Greenhouse Gas Inventories were reported as “NE” (not estimated) or for which the expert review team (ERT) otherwise determined that there may be an issue with the completeness of reporting in the Party’s inventory are the following:

- (a) Methane (CH₄) and nitrous oxide (N₂O) emissions from biomass used for other transportation (category 1.A.3) (see finding E.17 in table 3 above); 1990–2012;
- (b) Carbon dioxide (CO₂) and N₂O emissions from land converted to flooded land, especially forest land converted to flooded land (see finding L.20 in table 3 above);
- (c) CO₂ and N₂O emissions from soil organic matter for mineral soils in land converted to settlements and other land (see finding L.21 in table 3 above);
- (d) CO₂ emissions and removals for all pools for land converted to forest land for the entire time series (see finding L.36 in table 5 above);
- (e) Losses in the carbon stock changes in living biomass in cropland remaining cropland (see finding L.37 in table 5 above);
- (f) CO₂ emissions and removals for all pools for forest land converted to cropland (see finding L.38 in table 5 above);
- (g) CO₂ emissions and removals for forest land converted to settlements (see finding L.40 in table 5 above);
- (h) CO₂ emissions from conversion of forest land to wetlands for 2014 for all pools (see finding L.41 in table 5 above);
- (i) CO₂, CH₄ and N₂O emissions from open burning of waste (see finding W.13 in table 5 above) (accepted as negligible during the review).

B. Recommendation for an in-country review: list of issues

2. The ERT has recommended that the next review for Ukraine be conducted as an in-country review. In accordance with decision 13/CP.20, annex, paragraph 64, the ERT has provided a list of questions and issues to be addressed during this in-country review, in addition to the list of unresolved issues in table 3 and the issues identified in table 5. The two main additional issues are linked to the national registry and land representation for activities related to land use, land-use change and forestry (LULUCF) and to LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (KP-LULUCF), as set out below.

1. National registry

3. During the review, the Party had unresolved questions of implementation related to the disconnection of the national registry from the international transaction log (ITL) in 2015. In addition, owing to the interruption of the registry functions, the ERT was not able to assess the national registry and the standard electronic format (SEF) tables, which were not submitted.

4. The ERT took note of the final decision of the enforcement branch of the Compliance committee contained in document CC-2016-1-6/Ukraine/EB and particularly the recommendation in paragraph 10 of that document, that the next regular review of the annual submission of the greenhouse gas (GHG) inventory of Ukraine be organized as an in-country review.

5. The in-country review should:

- (a) Review the proper functioning of the national registry;
- (b) Assess the institutional arrangements in place in order to ensure the continuous maintenance of the national registry;
- (c) Check the creation of the accounts for the second commitment period;
- (d) Check the publicly available information provided by the national registry;
- (e) Check the SEF reports for the second commitment period for 2014 and 2015.

2. Land representation (accuracy)

6. During the review, the ERT noted several recurring recommendations related to land representation in the LULUCF sector and issues linked to the KP-LULUCF activities. During the review, Ukraine explained that according to its improvement plan, it will improve the data and the information on land representation and identify all land-use categories for the time series 1990–2014 in its 2017 submission.

7. The in-country review should:

- (a) Assess the implementation status of planned improvements;
- (b) Assess the data and information provided in relation to land representation and the technical capacity within the national system of Ukraine to properly address land representation;
- (c) Check if all information on the technical correction to the forest management reference level (FMRL) is reported (see finding KL.6 in table 5 above) and whether the technical correction has been revised to ensure methodological consistency between the FMRL and the forest management actual GHG estimates;
- (d) Check if all KP-LULUCF activities were correctly identified and tracked across the time series.

Annex IV

Documents and information used during the review

A. Reference documents

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at <<http://unfccc.int/resource/webdocs/agi/2015.pdf>>.

Annual status report for Ukraine for 2016. Available at <<http://unfccc.int/resource/docs/2016/asr/ukr.pdf>>.

FCCC/ARR/2015/UKR. Report on the individual review of the annual submission of Ukraine submitted in 2015. Available at <<http://unfccc.int/resource/docs/2016/arr/ukr.pdf>>.

FCCC/ARR/2014/UKR. Report on the individual review of the annual submission of Ukraine submitted in 2014. Available at <<http://unfccc.int/resource/docs/2015/arr/ukr.pdf>>.

FCCC/ARR/2013/UKR. Report of the individual review of the annual submission of Ukraine submitted in 2013. Available at <<http://unfccc.int/resource/docs/2014/arr/ukr.pdf>>.

“Guidelines for national systems for the estimation of anthropogenic greenhouse gas emissions by sources and removals by sinks under Article 5, paragraph 1, of the Kyoto Protocol”. Decision 19/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>>.

“Guidelines for review under Article 8 of the Kyoto Protocol”. Decision 22/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>.

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”. Annex I to decision 24/CP.19. Available at <<http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=4>>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Decision 15/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>.

“Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”. Annex to decision 13/CP.20. Available at <<http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf#page=6>>.

“Implications of the implementation of decisions 2/CMP.7 to 4/CMP.7 and 1/CMP.8 on the previous decisions on methodological issues related to the Kyoto Protocol, including those relating to Articles 5, 7 and 8 of the Kyoto Protocol, part I: implications related to accounting and reporting and other related issues”. Decision 3/CMP.11. Available at <<http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf#page=5>>.

“Implications of the implementation of decisions 2/CMP.7 to 4/CMP.7 and 1/CMP.8 on the previous decisions on methodological issues related to the Kyoto Protocol including those relating to Articles 5, 7 and 8 of the Kyoto Protocol, part II: implications related to review and adjustments and other related issues”. Decision 4/CMP.11. Available at <<http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf#page=30>>.

Intergovernmental Panel on Climate Change. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>>.

Intergovernmental Panel on Climate Change. 2014. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/kpsg>>.

Intergovernmental Panel on Climate Change. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html>>.

Standard independent assessment report, part 1, for Ukraine for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_ukr_1_1.pdf>.

Standard independent assessment report, part 2, for Ukraine for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_ukr_1_2.pdf>.

Enforcement branch of the Compliance Committee. Final decision with respect to Ukraine (CC-2016-1-6/Ukraine/EB). Available at <http://unfccc.int/files/kyoto_protocol/compliance/questions_of_implementation/application/pdf/cc-2016-1-6_ukraine_eb_final_decision.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Natalia Usenko (National Centre for Greenhouse Gas Emissions Inventory), including additional material on the methodology and assumptions used. The following documents¹ were also provided by Ukraine:

Ministry of Agriculture, Kiev 2006. *СИСТЕМИ ВИДАЛЕННЯ, ОБРОБКИ, ПІДГОТОВКИ ТА ВИКОРИСТАННЯ ГНОЮ. ВІДОМЧІ НОРМИ ТЕХНОЛОГІЧНОГО ПРОЕКТУВАННЯ* (in Ukrainian)

State Statistics of Ukraine, Kiev 2015. *Statistical Yearbook 2014 – Animal production of Ukraine*.

N. Zakharenko, V. Kovalenko, A. Yaremchuk, U. Pyrozhenko. *On the question of calculation the greenhouse gas emissions of livestock waste* // Biological Resources and Nature Management. — 2014. Volume 6, № 3—4. — P. 63—70.

S. L. Shmarin. *Biodegradable Carbon Content in Food Waste of Ukraine: Case Study in Boryspil City* (in Russian). Kiev, 2016.

Coal Energy Technology Institute of the National Academy of Sciences of Ukraine. Technical Report on Research performance. Intermediate. *Calculations of Greenhouse Gas Emissions from Coal Combustion in Thermal Power Plants of Ukraine for 1990 – 2015*. Kiev, 2016.

¹ Reproduced as received from the Party.

Annex V

Acronyms and abbreviations

| | |
|------------------------|---|
| AAU | assigned amount unit |
| AD | activity data |
| B ₀ | methane-producing capacity |
| BCEF | biomass conversion and expansion factor |
| BEF | biomass expansion factor |
| BOF | basic oxygen furnace |
| C | carbon |
| CER | certified emission reduction |
| CH ₄ | methane |
| CKD | cement kiln dust |
| CM | cropland management |
| CMP | Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol |
| CO ₂ | carbon dioxide |
| CO ₂ eq | carbon dioxide equivalent |
| CPR | commitment period reserve |
| CRF | common reporting format |
| CSC | carbon stock change |
| DE | digestible energy |
| DM | dry matter |
| DOC | degradable organic carbon |
| DOC _f | fraction of degradable organic carbon that decomposes |
| DOM | dead organic matter |
| EAF | electric arc furnace |
| EF | emission factor |
| ERT | expert review team |
| ERU | emission reduction unit |
| F _{COMP} | annual amount of compost N applied to soils |
| F _{CR} | fraction of crop residues |
| FM | forest management |
| FMRL | forest management reference level |
| FMRL _{corr} | FMRL recalculated for the purpose of calculating the technical correction |
| F _{ON} | fraction of organic N fertilizer applied to soils |
| Frac _{GAS} | fraction of managed livestock manure that volatilizes as NH ₃ and NO _x |
| Frac _{REMOVE} | fraction of removed residues |
| Gg | gigagram |
| GHG | greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ and NF ₃ , without GHG emissions and removals from LULUCF |
| GM | grazing land management |
| ha | hectare |
| HFCs | hydrofluorocarbons |
| HWP | harvested wood products |
| IE | included elsewhere |
| IEA | International Energy Agency |
| IEF | implied emission factor |
| IPCC | Intergovernmental Panel on Climate Change |
| IPPU | industrial processes and product use |
| ITL | international transaction log |

| | |
|------------------|--|
| kha | kilohectare (1 kha = 1,000 ha) |
| kg | kilogram (1 kg = 1,000 grams) |
| KP-LULUCF | LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol |
| kt | kilotonne |
| LPG | liquefied petroleum gas |
| LULUCF | land use, land-use change and forestry |
| m ³ | cubic metre |
| MCF | methane conversion factor |
| MMS | manure management system |
| MSW | municipal solid waste |
| N | nitrogen |
| N ₂ O | nitrous oxide |
| NA | not applicable |
| NE | not estimated |
| Nex | nitrogen excretion |
| NF ₃ | nitrogen trifluoride |
| NH ₃ | ammonia |
| NIR | national inventory report |
| NO | not occurring |
| NO _x | nitrogen oxide |
| OHF | open hearth furnace |
| PFCs | perfluorocarbons |
| PJ | petajoule (1 PJ = 10 ¹⁵ joule) |
| QA/QC | quality assurance/quality control |
| RMU | removal unit |
| RV | revegetation |
| SEF | standard electronic format |
| SF ₆ | sulphur hexafluoride |
| SIAR | standard independent assessment report |
| SOC | soil organic carbon |
| SOM | soil organic matter |
| SWDS | solid waste disposal site |
| t | tonne (1 t = 1,000 kg) |
| TJ | terajoule (1 TJ = 10 ¹² joule) |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VS | volatile solids |
| WDR | wetland drainage and rewetting |
| Ym | methane conversion factor |
