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Report on the individual review of the annual submission of Sweden 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 Sweden, 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 29 August to 3 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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Contents

I. Introduction[1]

1. This report covers the review of the 2016 annual submission of Sweden 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 29 August to 3 September 2016 in Bonn, Germany, and was coordinated by Ms. Lisa Hanle and Ms. Claudia do Valle (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT) that conducted the review of Sweden.

Table 1

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

Area of expertise	*Name*	*Party*
Generalist	Ms. Olia Glade	New Zealand
	Mr. Mauro Meirelles de Oliveira Santos	Brazil
Energy	Mr. Graham Anderson	Germany
	Ms. Veronika Ginzburg	Russian Federation
	Ms. Cuimei Ma	China
	Mr. Haakon Marold	Australia
IPPU	Ms. Siriluk Chiarakorn	Thailand
	Mr. Predrag Novosel	Montenegro
	Mr. Alexander Valencia	Colombia
Agriculture	Mr. Amnat Chidthaisong	Thailand
	Mr. Sorin Deaconu	Romania
	Ms. Lilian Portillo	Paraguay
LULUCF	Ms. Bridget Fraser	New Zealand
	Mr. Doru Leonard Irimie	Romania
	Mr. Stanley Wapot	Vanuatu
Waste	Ms. Violeta Hristova	Bulgaria

[1] At the time of publication of this report, Sweden 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.

Area of expertise	*Name*	*Party*
	Mr. Igor Ristovski	The former Yugoslav Republic of Macedonia
Lead reviewers	Ms. Olia Glade	
	Mr. Mauro Meirelles de Oliveira Santos	

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 Sweden, 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 Sweden, 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 Sweden.

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

6. The ERT notes that Sweden's 2015 annual submission was delayed, consistent with decision 6/CMP.9, paragraph 4. As a result, the review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission, in accordance with decision 10/CMP.11, paragraph 1. To the extent that identical information is presented in both annual submissions, the ERT has reviewed this information only once, and, as appropriate, has replicated the findings below in both the 2015 and the 2016 annual review reports.

II. Summary and general assessment of the 2016 annual submission

7. 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.

[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.

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

Assessment			*Issue or problem ID#(s) in tables 3 and/or 5*[a]
Dates of submission	Original submission: 15 June 2016 (NIR), 15 June 2016, Version 3 (CRF tables), 22 July 2016 (SEF tables)		
Review format	Centralized		
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	No	
	3. Development and selection of emission factors	Yes	I.9, L.4
	4. Collection and selection of activity data	Yes	E.4
	5. Reporting of recalculations	No	
	6. Reporting of a consistent time series	Yes	I.8
	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	I.8, L.8
	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	E.6
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
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	
	(b) Performance of the national system functions	No	
	2. National registry:		
	(a) Overall functioning of the national registry	No	
	(b) Performance of the functions of the national registry and the technical standards for data exchange	No	

Assessment			*Issue or problem ID#(s) in tables 3 and/or 5*[a]
	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	No	
	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.5
	(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	No	
	(c) The Party has reported information in accordance with decision 6/CMP.9	Yes	KL.1
	(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	No	
	(e) Other issues	No	
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?	Yes	
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	The ERT accepts that the revised estimate submitted by Sweden 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?	No	

Assessment			*Issue or problem ID#(s) in tables 3 and/or 5*[a]
Questions of implementation	Did the ERT list a question 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, LULUCF = land use, land-use change and forestry, 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 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories: Wetlands*.

[a] The ERT identified additional issues in the energy, industrial processes and product use, 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 Intergovernmental Panel on Climate Change 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

8. Table 3 compiles all the recommendations made in the previous review report. Owing to the unique circumstances of the 2015 annual submission described in paragraph 6 above, the latest available review report was for the review of the 2014 annual submission, published on 3 March 2015. 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 Sweden

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
General			
		There were no recommendations related to general issues in the previous review report	
Energy			
E.1	Comparison with international data – liquid fuels – CO_2 (26, 2014) Comparability*	Initiate a process to harmonize the fuel consumption data used for international reporting of marine bunkers to reduce the observed difference between the data reported in the CRF tables and the IEA data	Addressing. Sweden stated in the NIR (p.131) that efforts have been made to ensure a high quality time series. However, a more detailed description of these efforts and how they contribute to harmonizing the IEA data and the data reported in the CRF tables is not included in the 2016 submission
E.2	1.A.1.b Petroleum	Improve the transparency of the NIR by including information on how the plants with International	Resolved. Sweden explained that five refineries account for more

ID#	*Issue and/or problem classification[a, b]*	*Recommendation made in previous review report[c]*	*ERT assessment and rationale*
	refining – liquid fuels – CO_2 (29, 2014) Transparency	Standard Industrial Classification 23200 are reported in the CRF tables	than 99 per cent of the fuel consumption and emissions reported in category 1.A.1.b. In addition to the five refineries, there are a few small manufacturers (e.g. of lubricants) that are also classified as International Standard Industrial Classification 23200 and emissions from which are also reported in category 1.A.1.b (NIR, p.141)
E.3	1.A.3.d Domestic navigation – liquid fuels – CO_2 (33, 2014) Transparency*	Provide an explanation of the observed fuel consumption trends between 2000 and 2012	Addressing. Relevant information was not provided in the NIR. During the review Sweden explained that the statistics show fluctuations in fuel consumption for which it is difficult to provide a clear explanation, but the fuel consumption follows the recession and the economic growth in the country quite well for most years
IPPU			
I.1	2.F. Product uses as substitutes for ozone-depleting substances – HFCs (43, 2014) (56, 2013). Transparency*	Provide information in the NIR confirming that the national model used to calculate emissions from the consumption of halocarbons and SF_6 includes emissions from the collection, destruction and disposal of F-gases	Not resolved. Relevant information was not provided in the NIR. During the review, the ERT included this issue in the list of potential problems and further questions raised by the ERT. This issue will be resolved upon resolution of the issue in I.10 in table 5
I.2	2.F. Product uses as substitutes for ozone-depleting substances – HFCs (44, 2014) (57, 2013). Transparency	Provide information in the NIR on the variation of annual leakage rates corresponding to new or old equipment in tabular format	Resolved. Relevant information was provided in the NIR (section 4.7.1)
I.3	2.F.1 Refrigeration and air conditioning – HFCs (45, 2014) Transparency*	Document in the NIR the methodology used to derive the uncertainty data using expert judgement and revise the uncertainty estimates, if appropriate	Not resolved. Sweden did not document the currently used methodology in the NIR. During the review, the Party indicated that this is a planned improvement for the 2017 annual submission

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
Agriculture			
A.1	3.D Direct and indirect N2O emissions from agricultural soils – N_2O (48, 2014) Transparency	Include information in the annual submission on the N content of some synthetic fertilizers and the country-specific method used to calculate the N_2O emissions from N leaching and run-off	Resolved. Relevant information was provided in the NIR on the N content of synthetic fertilizers (table 5.18) and on the country-specific method used to calculate the N_2O emissions from N leaching and run-off (section 5.4.2.2.2)
A.2	3.D.b Indirect N_2O emissions from managed soils – N_2O (53, 2014) Transparency	Include enhanced justification of the approach used to calculate N_2O emissions from N leaching and run-off	Resolved. Relevant information was provided in the NIR (section 5.4.2)
LULUCF			
L.1	4. General (LULUCF) (56, 2014) (70, 2013) Adherence to UNFCCC Annex I inventory reporting guidelines	Improve the QA/QC procedures and report the correct estimates in a consistent manner in the NIR	Resolved. Sweden improved its QA/QC procedures and corrected the inconsistencies identified in the previous review report
L.2	4.A.1 Forest land remaining forest land – CO_2 (57, 2014) Transparency	Include additional and clearer descriptions of the AD, EFs and other parameters used to estimate removals and emissions from deadwood	Resolved. Relevant information on deadwood was provided in the NIR (annex, pp.89–91)
L.3	4.E. Settlements – CO_2 (59, 2014) Transparency	Include a clearer explanation of the management of litter (e.g. whether the litter is moved to the same land category or to a different one)	Resolved. Relevant information on the management of litter was provided in the NIR (annex 3.1, p.104)
L.4	4 (III) Direct N_2O emissions from N mineralization / immobilization – N_2O (58, 2014) (78, 2013) Accuracy*	Make efforts to develop country-specific carbon/nitrogen ratios based on measurements of SOC to improve the accuracy of the N_2O emission calculations using a tier 2 method	Not resolved. Sweden is still using the default carbon/nitrogen ratio

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
Waste			
W.1	5.A.1 Managed waste disposal sites – CH_4 (63, 2014) Transparency	Provide a description of how the aggregated DOC values reported in the NIR are estimated	Resolved. Sweden provided information on the fraction of DOC for three different periods, on the different matter (wet and dry), for the different waste fractions in the NIR (section 7.2.3.2.3) (see also W.4 in table 5)
W.2	5.A.1 Managed waste disposal sites – CH_4 (63, 2014) Transparency	Provide a quantification of the uncertainty associated with the DOC values	Resolved. Relevant information was provided in the NIR (p.414)
W.3	5.D.1 Domestic wastewater – CH_4 and N_2O (64, 2014) (85, 2013) (106, 2012) (106, 2011) Accuracy	Use the IPCC default method in accordance with the decision tree to estimate CH_4 emissions from domestic wastewater handling	Resolved. Emissions were estimated using the IPCC default method and information was presented by Sweden in the NIR (pp.427–432)
KP-LULUCF			
		There were no recommendations related to KP-LULUCF in the previous review report	

Abbreviations: AD = activity data, CRF = common reporting format, DOC = degradable organic carbon, EF = emission factor, ERT = expert review team, F-gas = fluorinated gas, IEA = International Energy Agency, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, ISIC = International Standard Industrial Classification, 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, N = nitrogen, NIR = national inventory report , QA/QC = quality assurance/quality control, SOC = soil organic carbon, 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".

[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 review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission, and as such, the 2015 annual review report was not available at the time of this review. Therefore, the recommendations reflected in table 3 are from the 2014 annual review report. For the same reason, the year 2015 is excluded from the list of years in which the issue has been identified.

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

9. 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 Sweden, and have not been addressed by the Party.

Table 4
Issues identified in three successive reviews and not addressed by Sweden

ID#[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[b]
General		
	No such general issues were identified	
Energy		
	No such issues for the energy sector were identified	
IPPU		
I.1	Provide information in the NIR confirming that the national model used to calculate emissions from the consumption of halocarbons and SF_6 includes emissions from the collection, destruction and disposal of F-gases	3 (2013–2015/2016)
Agriculture		
	No such issues for the agriculture sector were identified	
LULUCF		
L.4*	Make efforts to develop country-specific carbon/nitrogen ratios based on measurements of SOC to improve the accuracy of the N_2O emission calculations using a tier 2 method	3 (2012–2015/2016)
Waste		
	No such issues for the waste sector were identified	
KP-LULUCF		
	No such issues for KP-LULUCF activities were identified	

Abbreviations: F-gas = fluorinated gas, 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, LULUCF = land use, land-use change and forestry, NIR = national inventory report, SOC = soil organic carbon.

[a] An asterisk is included after any issue 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.

[b] The review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission. As the reviews of the 2015 and 2016 annual submissions are not "successive" reviews, but are rather being held in conjunction, for the purpose of counting successive years in table 4, 2015/2016 is considered as one

year. The ERT noted that this table 4 is the same as that in the 2015 annual review report for Sweden, modified to reflect the combined 2015/2016 review.

V. Additional findings made during the 2016 technical review

10. Table 5 contains findings made by the ERT during the technical review of the 2016 annual submission of Sweden 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 Sweden

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.1	QA/QC and verification	The ERT noted that table ES.1 in the NIR 2016 does not include information on the new gases "unspecified mix of HFCs and PFCs" and NF_3, while CRF tables 10s5 and 10s6 both include information on such gases. During the review, the Party stated that a correction to table ES.1 is planned for the 2017 inventory submission	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
		The ERT recommends that Sweden strengthen its QA/QC process to ensure that all cross-sectoral tables contain up-to-date information and are consistent with the sectoral inventory chapters and the CRF tables	
G.2	QA/QC and verification	The ERT noted that the Party specified in the NIR that several layers of QC activities are performed on the inventory, including checks by the QC team (the team of inventory compilers) followed by checks by the QC coordinator. However, the roles and responsibilities were not transparently described for the various stages of the QC process. During the review, the Party provided a relevant explanation	Yes. Transparency*
		The ERT recommends that Sweden improve the transparency of the QA/QC process by describing in the NIR the roles and responsibilities for the various stages of the process	
G.3	QA/QC and verification	The ERT noted that several sections of the NIR (e.g. sections 3 (p.28) and 10.2.3 (p.482)) and annex 3.2 (section 1.2.3) contain references to the IPCC good practice guidance for LULUCF; however, this document has been superseded by the 2006 IPCC Guidelines	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines*
		The ERT recommends that Sweden correct the outdated references to the IPCC good practice guidance for LULUCF in its NIR	
Energy			
E.4	Fuel combustion-reference approach – peat – CO_2	The ERT noted that in 2014, AD for peat in the reference approach were not available and AD for 2013 (7.75 PJ) were used instead. Meanwhile, the average annual decline in AD for peat was about 19 per cent between 2010 and 2013. During the review, the Party explained that as of the 2016 submission and unlike in earlier submissions, Sweden decided to use the yearly energy balances as AD, and that the AD for peat for 2014 were not available from the energy balances for the 2016 submission. The Party indicated that for the 2017 and future submissions, AD for peat for the entire time series would be available in time for inclusion in the inventory	Yes. Accuracy*
		The ERT recommends that Sweden recalculate previous emissions from peat using AD from yearly energy balances in order to maintain time-series consistency	

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*
E.5	1.A. Fuel combustion – sectoral approach – all fuels	The ERT noted that CO_2 emissions from the following sources were estimated using country-specific EFs: (a) 1.A.2.f (NIR, table 3.13 – non-metallic minerals) (b) 1.A.2.g (NIR, table 3.14 – other industries) (c) 1.A.3.a (NIR, table 3.17 – civil aviation) (d) 1.A.3.c (NIR, table 3.20 – railways) (e) 1.A.3.d (NIR, table 3.22 – navigation) (f) 1.A.3.e (NIR, table 3.23 – other transportation) (g) 1.A.4.a (NIR, table 3.25 – commercial/institutional) (h) 1.A.4.b (NIR, table 3.27 – residential) (i) 1.A.4.c (NIR, table 3.29 – agriculture/forestry/fisheries) (j) 1.A.5.b (NIR, table 3.31 – other mobile) The Party stated that the methods used were tier 1 in the NIR and the CRF tables; however, according to the 2006 IPCC Guidelines (volume 2, section 1.2.1.2), the use of country-specific EFs along with suitable AD for fuel combustion categories signifies a tier 2 approach. During the review, the Party indicated that references to the tier applied for categories 1.A.2.f, 1.A.2.g, 1.A.3.a, 1.A.3.c, 1.A.3.e, 1.A.4.a, 1.A.4.b, 1.A.4.c and 1.A.5.b would be updated in the next submission. Regarding category 1.A.3.d, the Party explained that a tier 1 method is appropriate because Sweden does not have any information on boat types or engine types and the tier 2 method requires country-specific EFs with greater specificity regarding the classification of modes (e.g. ocean-going ships and boats), fuel type (e.g. fuel oil) and even engine type (e.g. diesel) (2006 IPCC Guidelines, p.3.47) The ERT recommends that Sweden correctly reference the methodologies applied for the emission estimates in fuel combustion categories	Yes. Comparability*
E.6	1.A.3.b Road transportation – liquid fuels – CO_2, CH_4 and N_2O	The ERT noted that LPG consumption in category 1.A.3.b was reported as "NO" in CRF table 1.A(a). This would suggest that LPG is not used in cars, trucks or motorcycles; however, the ERT determined that there are about 20 LPG stations in Sweden.[c] During the review, the Party confirmed that LPG consumption does occur in Sweden and that the proportion of LPG used in these vehicle types was 0.14 per cent of the total consumption in 2014. The Party informed the ERT that the emissions from LPG passenger cars would be estimated in the next submission. The ERT concluded that CO_2, CH_4, and N_2O emissions from the category 1.A.3.b presented a potential underestimation of emissions for	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*
		2014, and included this issue in the list of potential problems and further questions raised by the ERT. In response, the Party further explained that the emissions from LPG cars for 2014 (CO_2, CH_4 and N_2O emissions combined) amount to 1,474.55 t CO_2 eq, which is 0.0027 per cent of the total CO_2 eq emissions in Sweden, and provided documentation to support the finding that the total of all insignificant sources is less than 0.1 per cent of national emissions, excluding LULUCF	
		The ERT recommends that Sweden provide documentation in the NIR to support the claim of insignificance for LPG consumption in accordance with decision 24/CP.19, annex I, paragraph 37(b)	
E.7	1.A.5.b Mobile – biomass – CH_4 and N_2O	The ERT noted that there was an inconsistency in the NIR with regard to the description of the estimation of CH_4 and N_2O emissions from biomass used for transportation fuel in the military in category 1.A.5.b (other – mobile). According to the NIR (p.69), emissions in the energy sector from FAME used in military transportation between 1999 and 2001 were not estimated. However, according to annex 5 to the NIR (p.155), CH_4 and N_2O emissions from biomass used for other – mobile (category 1.A.5.b) were not estimated for the periods 1999–2001 and 2007–2012. During the review, the Party clarified that biomass FAME was used by the military in the period 1999–2001 while biomass ethanol (not FAME) was used by the military in the period 2007–2012. The Party indicated that this discrepancy would be corrected in the 2017 submission	Yes. Consistency*
		The ERT recommends that Sweden harmonize the information presented in the NIR for the category 1.A.5.b so that the CH_4 and N_2O emissions from the category are reported consistently	
E.8	1.B.1.b Solid fuel transformation – biomass – CH_4	In the 2016 annual submission, Sweden reported AD for category 1.B.1.b. (solid fuel transformation) for the latest year (1,037.41 Mt CH_4 for 2014). However, the Party did not estimate the fugitive CH_4 emissions from the category (reported as "NA" in CRF table 1.B.1). The ERT noted that footnote 5 to CRF table 1.B.1 recognizes that there are no methods for estimating fugitive emissions from coke and charcoal production in the 2006 IPCC Guidelines. During the review, the Party explained that there are no country-specific CH_4 EFs for this category and it would not be good practice to use resources in order to develop such a method	Yes. Transparency*
		The ERT noted that, in accordance with the 2006 IPCC Guidelines (volume 2, table 2.1), emissions from charcoal production are to be included in the category 1.A.1.c (manufacture of solid fuels and other energy industries). Therefore, the ERT concluded that this case presented a potential underestimation of CH_4 emissions from charcoal production for 2014 and included this issue in the list of potential problems and further questions raised by the ERT. In response, the Party further explained that charcoal is produced by small companies. The emissions from these companies are included in the estimates for small industries (category 1.A.2.g (other (manufacturing industries and construction))), for which AD are aggregated from the energy balance, which in turn is based on intermittent surveys. The Party indicated that it is not possible to separate the charcoal producers' emissions from the rest of the aggregate, and hence the fugitive CH_4 emissions from charcoal production are reported in category	

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*
		1.A.2.g	
		The ERT recommends that Sweden report fugitive CH_4 emissions from charcoal production separately in category 1.A.1.c and describe in the NIR where in the CRF tables these emissions are reported	
IPPU			
I.4	2. General (IPPU)	The ERT noted that Sweden often used "D" (default) as a reference to the methodology used in the tables in the NIR titled "Summary of source category description". Specifically, this was found for categories 2.A.2, 2.B.5, 2.B.10, 2.C.2, 2.C.4 and 2.C.7. During the review, the Party provided information on the methodologies applied for each listed category: tier 1 for categories 2.A.2, 2.B.5 and 2.B.10; tier 2 for category 2.C.4; and tier 3 for categories 2.C.2 and 2.C.7	Yes. Transparency*
		The ERT recommends that Sweden transparently report the methodology applied for categories 2.A.2, 2.B.5, 2.B.10, 2.C.2, 2.C.4 and 2.C.7 in the IPPU sector in both the NIR and the CRF tables	
I.5	2.B.10 Other (chemical industry) – CO_2 and CH_4	Sweden reported the notation key "NE" for the AD for several subcategories under category 2.B.8 (petrochemical and carbon black production) and reported a notation key for CO_2 and CH_4 emissions that varies depending on the category. Sweden reported all AD under category 2.B.10 other (chemical industry) as "NE", but reported CO_2, CH_4 and N_2O emissions for the subcategory other (inorganic chemical products) under category 2.B.10. According to the NIR (p.243), petrochemical and carbon black production is reported under other (inorganic chemical products) in category 2.B.10 (other (chemical industry)), and in most cases the Party uses emission measurements provided in companies' environmental reports (a tier 3 approach). During the review, in response to a question raised by the ERT regarding verification of the emission measurements, Sweden explained that the environmental reporting system is described in annex 8.3 to the NIR and that emission measurements are verified by the monitoring authority in line with the audits described in the 2006 IPCC Guidelines (volume 3, chapter 3), for example for petrochemical industries (NIR, section 3.9.4.1). The ERT accepted the Party's explanation as satisfactory	Not an issue
		The ERT encourages Sweden to improve the quality of its reporting by including a more detailed description of the methodology used for calculating emissions for the six subcategories of category 2.B.10: sulphuric acid production; pharmaceutical industry; production of base chemicals for plastic industry; organic chemical production; inorganic chemical production; and other non-specified chemical production	
I.6	2.C.4 Magnesium production – SF_6	The ERT noted that SF_6 emissions from magnesium production are reported (e.g. 0.69 tSF_6 for 2014); however, the AD and the IEF are reported as "NE". During the review, Sweden confirmed that this was an error, and indicated that it would be corrected in the 2017 annual submission	Yes. Transparency*
		The ERT recommends that Sweden ensure that both the AD and SF_6 emissions are reported for	

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
		magnesium production	
I.7	2.D.1 Lubricant use – CO_2	The ERT noted that CO_2 emissions from lubricant use were held constant between 2013 and 2014 (264.26 kt CO_2 eq). Between 1990 (155.84 kt CO_2) and 2013, CO_2 emissions increased by 69.6 per cent. During the review, Sweden explained that emissions for 2014 are the same as for 2013 because the data source has a one year delay. The Party explained during the review that emissions for 2014 would be updated in the 2017 submission. The increase between 1990 and 2013 results from the increased use of lubricants and is consistent with other data sources. The ERT believes that this issue, if it appears in future submissions, should be considered further in future reviews in order to confirm there is not an underestimation of emissions	Yes. Transparency*
		The ERT recommends that Sweden provide in the NIR a detailed explanation of and justification for the chosen method for estimating CO_2 emissions from lubricant use (e.g.holding AD constant for the latest year) to ensure transparency of the methodological approach to estimating emissions from lubricant use	
I.8	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2	The ERT noted that CO_2 emissions from urea used as catalyst are reported as "NE" for the period 1990–1994 because of a lack of AD. During the review, Sweden explained that it would include a complete time series in the 2017 annual submission, probably by using an average of available data to extrapolate to 1990	Yes. Completeness*
		The ERT recommends that Sweden use a method to resolve any data gaps in accordance with the 2006 IPCC Guidelines to estimate CO_2 emissions from urea catalysts for the years for which AD are not available	
I.9	2.F.1 Refrigeration and air conditioning – HFCs	The ERT noted that the product life factor for HFC-125 emissions from commercial refrigeration for 2014 (1.64 per cent) is among the lowest of all reporting Parties (whose values range from 1.5 to 100 per cent). Between 1993 (4.27 per cent) and 2014 (1.64 per cent), the product life factor decreased by 61.6 per cent. During the review, Sweden explained that it aims to examine this issue further for the 2017 annual submission	Yes. Accuracy*
		The ERT recommends that Sweden provide additional documented information in order to justify its use of a country-specific product life factor for HFC-125 emissions for category 2.F.1	
I.10	2.F.1 Refrigeration and air conditioning – HFCs	To estimate disposal HFC emissions from category 2.F.1 (refrigeration and air-conditioning), Sweden used very high country-specific HFC recovery factors that resulted in very low EFs for this category. During the review, Sweden provided a data source to justify the application of these EFs (i.e. monitored data on recovery of HFCs upon disposal of refrigeration and air-conditioning equipment and/or surveys or studies from which recovered amounts can be derived). Sweden also indicated that the EFs used are based on information from manufacturers, national experts at the Swedish Environmental Protection Agency and default values from the 2006 IPCC Guidelines. Sweden further	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*
		noted that the EFs for disposal are not up to date, and that it is looking into the possibility of updating them.[d] For the disposal of mobile air-conditioning units, the country-specific EFs used are based on a national study[e] During the review, the ERT considered the reports provided by the Party but did not find justification for the use of the very low country-specific EFs (e.g. Sweden applies a recovery efficiency of approximately 95 per cent for domestic and commercial refrigeration (the default value provided in the 2006 IPCC Guidelines is 0–70 per cent), 85 per cent for transport refrigeration (the default value provided in the 2006 IPCC Guidelines is 0–70 per cent, depending on the fluorinated gas), and 85 per cent for mobile air conditioning (the default value provided in the 2006 IPCC Guidelines is 0–50 per cent)). The ERT therefore considered that the HFC emissions from disposal of refrigeration and air-conditioning equipment were potentially underestimated and included this issue in the list of potential problems and further questions raised by the ERT. In response, the Party provided explanations and analyses, along with personal communications from national trade associations, to support the use of the EFs. Specifically, according to the Swedish Refrigeration and Heat Pump Association, producers and importers of products such as stationary and mobile refrigeration, air-conditioning and heat pump equipment are obliged to reclaim end-of-life equipment. In addition, importers and distributors of refrigerants are required by law to reclaim, free of charge, recovered amounts of all refrigerant fluids and provide containers for that purpose. Recovered amounts of refrigerants that are not recycled must, by law, be destroyed. No emissions of HFCs are allowed from the destruction and incineration processes. These comments were echoed by the Swedish Car Recyclers Association. The ERT considered that the potential underestimation of emissions was resolved on the basis of the explanations and material submitted by the Party during the review. In its determination, the ERT also considered that there is a range of disposal loss factors reported by other Parties in their national inventory submissions (including Parties reporting 0 per cent losses and some reporting 100 per cent losses) The ERT recommends that Sweden include, in the NIR, reference to the personal communications from the Swedish Refrigeration and Heat Pump Association and the Swedish Car Recyclers Association to support the use of the country-specific disposal loss factors. Further, the ERT encourages Sweden to undertake an independent monitoring study and report the appropriate findings in the NIR in order to technically validate the use of the very high country-specific HFC recovery factors for this category	
I.11	2.F.1 Refrigeration and air conditioning – HFCs	The ERT noted that the QA/QC procedures for HFC emissions from this category are not aligned with the procedures described in the 2006 IPCC Guidelines (volume 3), which state that inventory compilers should compare equipment/product-based estimates at the subapplication level (tier 2a) with the mass-balance tier 1b or tier 2b approach, as EFs at the product level have an inherent associated uncertainty. The 2006 IPCC Guidelines note that this technique will also minimize the possibility that	Not an issue

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*
		certain end uses remain unaccounted for. During the review, the Party assured the ERT that in terms of comparison with a mass-balance approach, all chemicals are accounted for by using annual import/export statistics as the basis for the allocation of chemicals by subcategory rather than by using only a bottom-up approach (tier 2) based on sales statistics (or other assumptions). Sweden has not been able to collect sales statistics, but is considering doing so in future development projects	
		The ERT encourages Sweden to initiate development projects aimed at supporting the implementation of a QA/QC procedure that will allow the comparison of equipment/product-based estimates at the subapplication level (tier 2a) with the mass-balance tier 1b or tier 2b approach	
I.12	2.H Other (industrial processes and product use) – CH_4 and N_2O	The ERT noted that Sweden reported CH_4 and N_2O emissions from pulp and paper (e.g. for 2014, Sweden reported emissions of 0.32 kt CH_4 and 0.27 kt N_2O); however, the AD are reported as "NE", and no description of the AD is provided. During the review, Sweden explained that reporting of AD would be considered for the 2017 annual submission	Yes. Transparency*
		The ERT recommends that Sweden report AD for this category	
Agriculture			
A.3	3. General (agriculture) – CO_2, CH_4, and N_2O	In the sections of the NIR on uncertainties and time-series consistency, at the level of every category in the agriculture sector, only information on time-series consistency is included. In annex 7 to the NIR, general qualitative information is provided together with the uncertainty analysis; however, information on the methodological approach used for the uncertainty estimates for specific agriculture categories is not included. Information on the sources of the uncertainty estimates and the methodological approach used to combine the uncertainties is also missing. During the review, Sweden clarified that information on uncertainties is included in several other sections of the NIR. In particular, the Party noted that section 1.3.7 of annex 7 to the NIR contains a brief description of the sources of the uncertainty estimates for the agriculture sector. Sections 1.1 and 1.2 in the same annex include a general description of the methodology used for calculating the uncertainties	Not an issue
		The ERT encourages Sweden to increase the transparency of the presentation of the uncertainty analysis by including in the category-specific NIR sections on uncertainties and time-series consistency detailed information on uncertainties, including information on the sources of the uncertainty estimates for the AD and EFs and on the methodological approach used to combine the uncertainties	
A.4	3.A.1 Cattle – CH_4	The category-specific planned improvements section of the NIR related to enteric fermentation reports that a project was recently initiated to review the CH_4 EFs Sweden used to estimate emissions from enteric fermentation from cattle. During the review, the Party confirmed that the project has been completed and that the results would be included in the NIR 2017 together with a description of the	Not an issue

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*
		methodology of the study	
		The ERT commends Sweden for implementation of the project to review the EFs used to estimate emissions from enteric fermentation from cattle, and encourages the Party to incorporate the results in the inventory and include a description of the study in the NIR of its 2017 annual submission	
LULUCF			
L.5	4. General (LULUCF)	The ERT noted that, while emissions and land-use changes are required to be reported annually, Sweden only reports the net area changes for the four most recent years	Yes. Comparability*
		The ERT recommends that Sweden provide annual land-use change matrices for all years in CRF table 4.1	
L.6	4. General (LULUCF)	The ERT noted that estimates of non-CO_2 emissions and DOC from drained organic soils, indirect N_2O emissions, N_2O emissions from mineralization of N and HWP have been included for the first time in the 2015 and 2016 annual submissions	Not an issue
		The ERT commends Sweden not only for reporting these additional sources and sinks, but also for the changes it has made to adhere to the 2006 IPCC Guidelines, including validation of the tier 3 models used to estimate emissions	
L.7	4. General (LULUCF) – CO_2, CH_4 and N_2O	The ERT noted that on several occasions, the rationale for the assumptions used is not documented in the NIR, including the assumptions that land converted to forest land was not harvested (key category), that all fertilization is assumed to occur on forest land remaining forest land, and that biomass burning occurs only on forest land remaining forest land and on grassland remaining grassland. The rationale for these assumptions was provided to the ERT during the review	Yes. Transparency*
		The ERT recommends that Sweden provide, in the NIR, the rationale for the assumptions that impact the emissions reported for the key categories in the LULUCF sector (forest land remaining forest land, land converted to forest land, direct N_2O emissions from N inputs to managed soils, and biomass burning)	
L.8	4.F.2 Land converted to other land – CO_2	The Party has not reported carbon stock changes for conversions of forest land, cropland, grassland, wetlands and settlements to other land (reported as "NA" in CRF table 4.F). The 2006 IPCC Guidelines (volume 4, sections 9.1 and 9.3) state that emissions from the loss of living biomass in the land use prior to conversion to other land should be reported. During the review, the Party explained that it does not report emissions for other land as it is unmanaged, that land is converted to other land through non-human-induced processes, and that the type of forest land converted to other land contains low carbon stocks. It is the ERT's view that, as land conversion to other land is associated with changes in carbon stocksregardless of the means of conversion, emissions and removals from this land	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*
		should be estimated using the methodology set out in the 2006 IPCC Guidelines to ensure the inventory submission is complete In response to an earlier draft of this report, Sweden disagreed with the ERT's conclusion, indicating that land converted to other land is not managed but degraded by gradual natural degeneration due to national circumstances. Further, the Party highlighted that decision 24/CP.19, annex I, paragraph 28, requires only the reporting of anthropogenic emissions and the 2006 IPCC Guidelines uses managed land as a proxy for anthropogenic emissions (volume 1, section 1.1, page 1.4). Sweden asserted that both the above-mentioned decision and the 2006 IPCC Guidelines clarify that no reporting on unmanaged land is required since the emissions or removals cannot be considered to be anthropogenic The ERT considered Sweden's response and requested further clarification from the Party as to whether the land in question was ever reported as managed in the period since 1990, and if so, to provide information on the carbon stock estimate that was applied to the area of land prior to the natural degradation. In its response, the Party confirmed that the area of land in question was reported in forest land remaining forest land, but that as it is degraded, it moves to other land and the emissions/removals associated with this land-use change are not reported. The responses from the Party confirm the ERT's view that the Party's approach is not in line with decision 24/CP.19 and the 2006 IPCC Guidelines, because although the conversion of land may not be anthropogenic in nature, the emissions from previous land uses must be reported in Convention reporting. As such, the carbon stock in above-ground biomass on forest land, which was managed, is emitted and needs to be recorded as emissions over the conversion period. The ERT further concludes that there could be emissions (or removals) in the soil carbon pool as a result of the land moving between categories. This too can occur over a number of years and is also not being reported. The ERT notes that this is an issue for reporting under the Convention only, and, consistent with the previous ERT (see document FCCC/ARR/2014/SWE, para. 71), agrees with the Party's interpretation of reporting forest land converted to other land under the Kyoto Protocol The ERT recommends that Sweden report emissions from the loss of living biomass and emissions/removals from mineral soil carbon for all conversions to other land	
L.9	4.G Harvested wood products – CO_2	The ERT noted that CRF table 4.G is blank for the years prior to 1990. AD for the production of HWP are required to be reported from 1960; therefore, Sweden's submission is not complete. During the review, the Party provided information on the sources of data used to estimate production of HWP for the period 1960–1990 The ERT recommends that Sweden complete CRF table 4.G and the additional information box on factors used to convert from product units to carbon (which Parties can do by setting a custom node year within the data entry screen for HWP AD in the CRF Reporter)	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*
L.10	4 (V) Biomass burning – CO_2, CH_4 and N_2O	The Party reported a number of categories within biomass burning as "IE" in CRF table 4(V), including all CO_2 emissions from biomass burning; CH_4 and N_2O emissions from wildfires in land converted to forest land, cropland remaining cropland, land converted to cropland, and land converted to grassland; and all emissions from biomass burning in settlements. However, information on where these emissions have been included is not reported in CRF table 9. Decision 24/CP.19, annex I, paragraph 37(d), states that "Where 'IE' is used in an inventory, the Annex I Party should indicate, in the CRF completeness table, where in the inventory the emissions or removals for the displaced source/sink category have been included…"	Not an issue
		The ERT encourages Sweden to indicate where in the inventory the emissions are included for all subcategories in CRF table 4(V) (biomass burning) for which the notation key "IE" is used	
Waste			
W.4	5.A.1 Managed waste disposal sites – CH_4	Sweden has provided a description of how aggregated DOC values for the major waste fractions reported in the NIR are estimated (see also W.1 in table 3). However, the data presented are not comparable or transparent (e.g. the data on pp.414 and 415 differ from those on p.407, and it is not clear which values were used for the fractions of waste) and the data on the reaction constant k values used for each waste category (or fractions of the municipal waste) have not been provided	Yes. Transparency*
		The ERT recommends that Sweden include information on the content of Swedish household waste as a percentage or the DOC content value for the major waste fractions (specified in table 7.8 on p.407 of the NIR) in the waste	
W.5	5.C Incineration and open burning of waste – CO_2, CH_4 and N_2O	CH_4 and N_2O emissions from the incineration of other biogenic waste and CO_2, CH_4 and N_2O emissions from the incineration of municipal solid waste (both biogenic and non-biogenic) are reported as "IE" in CRF table 5.C. Information to indicate where in the inventory these emissions are reported was not presented in the NIR or in CRF table 9. During the review, the Party informed the ERT that CRF table 9 was not completed correctly as a result of problems with the data transfer to the CRF Reporter during the 2016 submission. The Party provided the necessary information during the review, and informed the ERT that the issue would be corrected in the next submission	Not an issue
		The ERT encourages Sweden to improve the transparency of its reporting by presenting information in the NIR and in CRF table 9 to indicate in which category the emissions reported using the notation key "IE" are included	
KP-LULUCF			
KL.1	General (KP-LULUCF)	CRF table NIR-2 of the 2016 submission does not contain area values; instead, the notation keys "IE", "NO" and "NA" are used. During the review, the Party explained that it is difficult to complete this table because a full cycle of the national forest inventory is only completed every five years. In the	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
		past, the Party was able to calculate and report these areas manually because land-use conversions associated with afforestation/reforestation, deforestation, forest management and other activities were quite uncommon. Since 1990, land may have been converted several times and a manual solution is no longer possible because of the complexity of the calculations. However, in response to a question during the review on multiple land-use changes, Sweden explained that such changes were not common, with only 32 plot intersections with three land-use categories identified. The ERT notes that completion of this table is one of the reporting requirements set out in decision 6/CMP.9, paragraph 1, and enables the accurate assessment of annual GHG inventories	
		The ERT recommends that Sweden complete CRF table NIR-2 on an annual basis in accordance with this mandatory reporting requirement	
KL.2	General (KP-LULUCF)	Decision 2/CMP.7, annex, paragraph 5, requires Parties to report and account for, in accordance with Article 7 of the Kyoto Protocol, all emissions arising from the conversion of natural forests to planted forests. The Party confirmed during the review that it reported all forest land as managed forest land. Accordingly, there are no natural forests, which the Party interprets as forests that have been included under forest management, to convert to planted forests. The ERT accepts the Party's explanation that all emissions arising from the conversion of natural forests to planted forests are included in the inventory submission	Yes. Transparency*
		The ERT recommends that Sweden increase the transparency of its reporting by including information on the definitions selected by the Party for natural forests and planted forests, and the application of these definitions, in its reporting in accordance with the requirements of decision 2/CMP.8, annex II, paragraph 5(d)	
KL.3	Afforestation and reforestation – CO_2, CH_4 and N_2O	Sweden uses the assumption that no afforestation and reforestation lands are harvested; however, the rationale for the assumption is not provided in the NIR. The Party confirmed during the review that harvesting is assumed not to occur on these lands given the long rotation periods for Sweden's forests. The ERT agrees that this reporting is consistent with the Kyoto Protocol Supplement	Not a problem
		The ERT encourages Sweden to include information on the age of harvesting in its NIR to enable an understanding of the rationale for the assumption that harvesting does not occur on afforestation or reforestation lands	
KL.4	Forest management – CO_2, CH_4 and N_2O	The NIR (section 10.1.2) states that forest land converted to wetlands or other land is reported under forest management. The ERT considers that this method of reporting is correct only if the cause of the land-use change is non-anthropogenic. During the review, the Party explained that all forest land is assumed to be managed, and natural degradation to either wetlands or other land is considered to be a non-human-induced conversion. The ERT found this information useful in assessing the correctness of the Party's reporting	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*
		The ERT encourages Sweden to include, in the NIR, information on the processes that lead to non-human-induced conversion of forest land to wetlands or other land	
KL.5	Forest management – CO_2, CH_4 and N_2O	The Party provided information on the FMRL, but the technical corrections did not cover changes in the forest management area or provide reasons for the deviation between forest management activities and the FMRL	Yes. Accuracy*
		The ERT recommends that Sweden provide, in the NIR, information on the technical corrections in accordance with the annex to decision 2/CMP.7 and annex II to decision 2/CMP.8, including how the technical corrections impact areas under forest management and the reasons for the deviation between forest management activities and the FMRL	
KL.6	Direct and indirect N_2O emissions from N fertilization– N_2O	In the NIR (section 13.3.1.1.2), the Party reported that N_2O emissions from fertilizers are not calculated for afforestation land. During the review, the Party explained that in Sweden, forests are fertilized from the age of 40 years, and as all afforestation and reforestation forests under the Kyoto Protocol are younger than this, it is assumed that fertilization does not occur on those lands. The ERT found this information useful in assessing the correctness of the Party's reporting	Not a problem
		The ERT encourages Sweden to include information on the age of fertilization in typical management regimes for its forests	
KL.7	Biomass burning – CO_2, CH_4 and N_2O	As identified for the LULUCF sector (see L.10 above), the Party reported all CO_2 emissions from biomass burning on forest management land as "IE"; however, information on where these emissions are included is not reported in the CRF tables. Decision 24/CP.19, annex I, paragraph 37(d), states that "Where 'IE' is used in an inventory, the Annex I Party should indicate, in the CRF completeness table, where in the inventory the emissions or removals for the displaced source/sink category have been included…"	Not a problem
		The ERT encourages Sweden to indicate where in the inventory the emissions are included for all activities in CRF table 4(KP-II)4 (GHG emissions from biomass burning) for which the notation key "IE" is used	
KL.8	Harvested wood products – CO_2	In CRF table 4(KP-I)A.1, the Party reported emissions from HWP for afforestation/reforestation land as "NE", while the NIR (p.473) states that these emissions are reported and the methodology used by Sweden (p.490) indicates that these emissions are reported under forest management. During the review, the Party confirmed that these emissions should have been reported as "NO" in CRF table 4(KP-I)A.1 because no afforestation/reforestation land has yet been harvested	Yes. Transparency*
		The ERT recommends that Sweden correct the information on HWP in the NIR (which incorrectly indicates that HWP are estimated and reported under forest management) and report the notation keys consistently in the NIR and in CRF table 4(KP-I)C	

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	Harvested wood products – CO_2	The Party used country-specific HWP conversion factors for panels and sawnwood. The ERT commends the Party for moving to a higher tier method. However, the rationale for the conversion factors has not been provided in the NIR. During the review, the Party explained how the factors were calculated and which sources of data were used for the calculations. The Party also explained that the conversion factor for sawn wood should be 0.42 rather than 0.52, as currently reported in the NIR The ERT recommends that, in the NIR, Sweden correct the conversion factor for sawn wood and include information on the rationale for the country-specific HWP conversion factors for panels and sawn wood	Yes. Transparency*

Abbreviations: AD = activity data, CRF = common reporting format, DOC = degradable organic carbon, EF = emission factor, ERT = expert review team, FAME = fatty acid methyl ester, FMRL = forest management reference level, GHG = greenhouse gas, HWP = harvested wood products, IE = included elsewhere. IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance for LULUCF = *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, IPPU = industrial processes and product use, k = CH_4 generation rate constant, 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*, LPG = liquefied petroleum gas, LULUCF = land use, land-use change and forestry, NA = not applicable, NE = not estimated, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, 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", 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] See https://www.mylpg.eu/stations/sweden/list.

[d] The basis for the present EFs for stationary equipment is information from a Swedish expert, and the EFs for most applications can be found in the report "Åtgärder för en begränsad användning av fluorerade växthusgaser" (Measures for limiting the use of fluorinated greenhouse gases) published in 2003.

[e] Gustafsson T. 2011. *Fluorinated Greenhouse Gases and Sweden.* Review of methodology and estimated emissions reported to the UNFCCC and the EU monitoring mechanism. SMED report no. 98. Available at http://www.smed.se/wp-content/uploads/2012/01/Fluorinated-Greenhouse-Gases-in-Sweden.pdf.

VI. Application of adjustments

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

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

12. Sweden 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

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

Annex I

Overview of greenhouse gas emissions and removals for Sweden 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 Sweden.

Table 6
Total greenhouse gas emissions for Sweden, base year[a]–2014[b]
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions including indirect CO_2 emissions[c]*		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)[d]*	*KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)[e]*	*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*	*FM*
FMRL								–41 336.10
Base year	35 085.26	72 057.12	35 085.26	72 057.12	NA		NA	
1990	34 945.40	71 917.26	34 945.40	71 917.26				
1995	41 093.82	74 029.36	41 093.82	74 029.36				
2000	30 732.59	68 868.77	30 732.59	68 868.77				
2010	20 118.83	64 997.09	20 118.83	64 997.09				
2011	21 103.98	60 987.15	21 103.98	60 987.15				
2012	13 078.26	57 578.36	13 078.26	57 578.36				
2013	13 690.80	55 939.52	13 690.80	55 939.52		2 115.70	NA	–49 085.55
2014	9 315.50	54 382.74	9 315.50	54 382.74		1 802.29	NA	–51 471.40

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] Base year refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs SF_6 and NF_3. Sweden 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] Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions.

[c] The Party has not reported indirect CO_2 emissions in common reporting format table 6.
[d] The value reported in this column refers to 1990.
[e] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

Table 7
Greenhouse gas emissions by gas for Sweden, excluding land use, land-use change and forestry, 1990–2014[a]
(kt CO_2 eq)

	CO_2[b]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	57 546.54	7 989.91	5 840.75	4.60	433.72	NA	101.73	NA
1995	59 318.67	7 882.65	6 148.13	149.18	395.55	NA	135.19	NA
2000	54 730.42	7 192.46	5 918.67	631.37	277.06	NA	118.78	NA
2010	53 057.73	5 687.88	5 053.51	950.24	184.82	NA	62.91	NA
2011	49 133.59	5 564.03	5 106.58	915.23	212.95	NA	54.77	NA
2012	46 559.64	5 377.21	4 640.93	869.97	78.28	NA	52.34	NA
2013	44 899.15	5 277.93	4 831.68	838.55	51.00	NA	41.21	NA
2014	43 404.90	5 158.27	4 884.13	807.11	81.70	NA	46.62	NA
Per cent change 1990–2014	**–24.6**	**–35.4**	**–16.4**	**17 437.0**	**–81.2**	**NA**	**–54.2**	**NA**

Abbreviation: NA = not applicable.
[a] Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.
[b] Sweden did not report indirect CO_2 emissions in common reporting format table 6.

Table 8
Greenhouse gas emissions by sector for Sweden, 1990–2014[a, b]
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	53 148.81	7 023.92	8 003.74	–36 971.86	3 740.79	NO
1995	54 951.10	7 241.98	8 275.93	–32 935.54	3 560.35	NO
2000	50 225.73	7 473.84	7 946.63	–38 136.18	3 222.57	NO
2010	48 590.56	7 516.41	6 942.06	–44 878.26	1 948.06	NO
2011	44 727.12	7 051.93	7 337.73	–39 883.16	1 870.36	NO
2012	42 324.85	6 699.70	6 824.47	–44 500.10	1 729.34	NO
2013	40 732.02	6 540.62	7 049.19	–42 248.72	1 617.69	NO
2014	39 285.29	6 432.51	7 143.42	–45 067.23	1 521.51	NO
Per cent change 1990–2014	**–26.1**	**–8.4**	**–10.7**	**21.9**	**–59.3**	**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] Sweden did not report indirect CO_2 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 Sweden

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[c]	*Article 3.3 of the Kyoto Protocol*		*Forest management and elected Article 3.4 activities of the Kyoto Protocol*				
	Land-use change	*Afforestation and reforestation*	*Deforestation*	*Forest management*	*Cropland management*	*Grazing land management*	*Revegetation*	*Wetland drainage and rewetting*
FMRL				–41 336.10				
Technical correction				7 268.39				
Base year	NA				NA	NA	NA	NA
2013		–1 304.29	3 420.00	–49 085.55	NA	NA	NA	NA
2014		–1 402.08	3 204.36	–51 471.40	NA	NA	NA	NA
Per cent change base year–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 CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs SF_6 and NF_3. Sweden 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.

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

Table 10
Key relevant data for Sweden under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Key parameters	*Values*
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	Yes, for afforestation and reforestation and forest management
3.5 per cent of total base year GHG emissions, excluding LULUCF and including indirect CO_2 emissions	2 521.999 kt CO_2 eq (20 175.994 kt CO_2 eq for the duration of the commitment period)
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 Sweden. 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 Sweden
(t CO_2 eq)

	Original submission	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	283 999 121			283 999 121
Annex A emissions for 2014				
CO_2	43 404 903			43 404 903
CH_4	5 158 275			5 158 275
N_2O	4 884 130			4 884 130
HFCs	807 114			807 114
PFCs	81 698			81 698
Unspecified mix of HFCs and PFCs	NA			NA
SF_6	46 618			46 618
NF_3	NA			NA
Total Annex A sources	**54 382 737**			**54 382 737**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014				
3.3 Afforestation and reforestation	–1 402 077			–1 402 077
3.3 Deforestation	3 204 363			3 204 363
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014				
3.4 Forest management for2014	–51 471 396			–51 471 396

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NA = not applicable.

[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 Sweden
(t CO_2 eq)

	Original submission	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2013				
CO_2	44 899 152			44 899 152
CH_4	5 277 933			5 277 933
N_2O	4 831 677			4 831 677
HFCs	838 548			838 548
PFCs	51 001			51 001
Unspecified mix of HFCs and PFCs	NA			NA
SF_6	41 214			41 214
NF_3	NA			NA
Total Annex A sources	**55 939 523**			**55 939 523**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013				
3.3 Afforestation and reforestation	–1 304 294			–1 304 294
3.3 Deforestation	3 419 996			3 419 996
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013				
3.4 Forest management for 2013	–49 085 550			–49 085 550

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NA = not applicable.

[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

Missing categories that may affect completeness

The categories for which methods are included in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* were reported as "NE" (not estimated) or for which the expert review team otherwise determined that there may be an issue with the completeness of reporting in the Party's inventory are the following:

(a) Carbon dioxide (CO_2) emissions from urea used as a catalyst (1990–1994) (see ID#I.8 in table 5);

(b) CO_2 emissions from the loss of living biomass and mineral soil carbon on all conversions to other land (see ID#L.8 in table 5).

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 Sweden for 2016. Available at http://unfccc.int/resource/docs/2016/asr/swe.pdf.

FCCC/ARR/2014/SWE. Report on the individual review of the annual submission of Sweden submitted in 2014. Available at http://unfccc.int/resource/docs/2015/arr/swe.pdf.

FCCC/ARR/2013/SWE. Report of the individual review of the annual submission of Sweden submitted in 2013. Available at http://unfccc.int/resource/docs/2014/arr/swe.pdf.

FCCC/ARR/2012/SWE. Report of the individual review of the annual submission of Sweden submitted in 2012. Available at http://unfccc.int/resource/docs/2013/arr/swe.pdf.

FCCC/ARR/2011/SWE. Report of the individual review of the annual submission of Sweden submitted in 2011. Available at http://unfccc.int/resource/docs/2012/arr/swe.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 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 Sweden for 2016. Available at http://unfccc.int/files/kyoto_protocol/registry_systems/independent_assessment_reports/application/pdf/siar_2016_swe_1_2.pdf.

Standard independent assessment report, part 2, for Sweden for 2016. Available at http://unfccc.int/files/kyoto_protocol/registry_systems/independent_assessment_reports/application/pdf/siar_2016_swe_2_2.pdf.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Hakam Al-Hanbali (Swedish Environmental Protection Agency), including additional material on the methodology and assumptions used. The following documents[1] and personal communications were also provided by Sweden:

M.Abraham. 2016. Swedish Car Recyclers Association, personal communication on the recovery of fluorinated greenhouse gases at decommissioning of mobile air-conditioning systems in Sweden, 2016.

Edborg P, Stenmarck A, Sundqvist J and Szudy M. 2010. *Förbättring av beräkningsunderlag för metangasberäkningar avseende avfallsdeponering* (Improvement of the calculations for methane from landfills). Available online at http://www.smed.se/wp-content/uploads/2012/01/F%C3%B6rb%C3%A4ttring-av-metangasber%C3%A4kningar-avseende-avfallsdeponering.pdf.

P. Jonasson. Swedish Refrigeration and Heat Pump Association, personal communication on recovery of fluorinated greenhouse gases at decommissioning of stationary and mobile systems in Sweden, 2016.

Sundqvist J and Szudy M. 2012. *Analys av reviderade avfallskategoriers DOC-halter i WStatR-rapporteringen 2012 avseende 2010* (Analysis of the revised waste categories DOC concentrations in reporting in 2012 for 2010).

Swedish Environmental Protection Agency. 2003. *Åtgärder för en begränsad användning av fluorerade växthusgaser* (Measures for limiting the use of fluorinated greenhouse gases). Available online at http://www.naturvardsverket.se/Om-Naturvardsverket/Publikationer/ISBN/5300/91-620-5311-6/.

[1] Reproduced as received from the Party.

Annex V

Acronyms and abbreviations

AAU	assigned amount unit
AD	activity data
CER	certified emission reduction
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CM	cropland management
CPR	commitment period reserve
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
FAME	fatty acid methyl ester
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HFCs	hydrofluorocarbons
HWP	harvested wood products
IE	included elsewhere
IEF	implied emission factor
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
ISIC	International Standard Industrial Classification
KP-LULUCF	LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
k	CH_4 generation rate constant
kt	kilotonne
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
Mt	million tonnes
N	nitrogen
NA	not applicable
NE	not estimated
NF_3	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
N_2O	nitrous oxide
PFCs	perfluorocarbon
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

t	tonne
UNFCCC	United Nations Framework Convention on Climate Change
WDR	wetland drainage and rewetting