# Report of the individual review of the annual submission of Slovenia submitted in 2020

### Note by the secretariat

The report of the individual review of the annual submission of Slovenia submitted in 2020 was published on 14 May 2021. 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/2020/SVN, 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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# Report on the individual review of the annual submission of Slovenia submitted in 2020*

## Note by the expert review team

*Summary*

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases 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 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 review of the 2020 annual submission of Slovenia, 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 12 to 17 October 2020 remotely.

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\* In the symbol for this document, 2020 refers to the year in which the inventory was submitted, not to the year of publication.

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# Abbreviations and acronyms

| | |
|---|---|
| AAU | assigned amount unit |
| AD | activity data |
| Annex A source | source category included in Annex A to the Kyoto Protocol |
| AR | afforestation and reforestation |
| Article 8 review guidelines | "Guidelines for review under Article 8 of the Kyoto Protocol" |
| BCEF | biomass conversion and expansion factor |
| $B_o$ | maximum methane-producing capacity |
| BOD | biochemical oxygen demand |
| C | carbon |
| $C_{after}$ | biomass stocks on land type "i" immediately after conversion |
| CER | certified emission reduction |
| $CH_4$ | methane |
| CM | cropland management |
| COD | chemical oxygen demand |
| Convention reporting adherence | adherence to the "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" |
| COPERT | software tool for calculating road transport emissions |
| CORINAIR | Core Inventory of Air emissions (project) |
| $CO_2$ | carbon dioxide |
| $CO_2$ eq | carbon dioxide equivalent |
| CP | commitment period |
| CPR | commitment period reserve |
| CRF | common reporting format |
| DC | degradable organic component |
| DOM | dead organic matter |
| EEA | European Environment Agency |
| EF | emission factor |
| EMEP | Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe |
| ERT | expert review team |
| ERU | emission reduction unit |
| EU | European Union |
| FECS | Forest Ecosystem Condition Survey |
| FM | forest management |
| FMRL | forest management reference level |
| GHG | greenhouse gas |
| GM | grazing land management |
| HFC | hydrofluorocarbon |
| HWP | harvested wood products |
| IE | included elsewhere |
| IEF | implied emission factor |
| IPCC | Intergovernmental Panel on Climate Change |
| IPCC good practice guidance | *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* |
| IPPU | industrial processes and product use |
| KP-LULUCF | activities under Article 3, paragraphs 3–4, of the Kyoto Protocol |

| KP reporting adherence | adherence to the reporting guidelines under Article 7, paragraph 1, 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(s) |
| NA | not applicable |
| NCV | net calorific value |
| NE | not estimated |
| Nex | nitrogen excretion |
| $NF_3$ | nitrogen trifluoride |
| NIR | national inventory report |
| NO | not occurring |
| $N_2O$ | nitrous oxide |
| PFC | perfluorocarbon |
| QA/QC | quality assurance/quality control |
| RMU | removal unit |
| RV | revegetation |
| SEF | standard electronic format |
| $SF_6$ | sulfur hexafluoride |
| SOC | soil organic carbon |
| SORS | Statistical Office of Slovenia |
| TOW | total organic load in wastewater |
| 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" |
| UNFCCC review guidelines | "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" |
| WDR | wetland drainage and rewetting |
| 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* |
| 2019 Refinement to the 2006 IPCC Guidelines | *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* |
| $\Delta C_G$ | annual increase in carbon stocks due to biomass growth |
| $\Delta C_L$ | annual decrease in carbon stocks due to biomass loss |

# I.  Introduction

1.      This report covers the review of the 2020 annual submission of Slovenia, organized by the secretariat in accordance with the Article 8 review guidelines (adopted by decision 22/CMP.1 and revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention" (annex to decision 13/CP.20). The review took place from 12 to 17 October 2020 remotely[1] and was coordinated by Claudia do Valle, Javier Hanna Figueroa and Pedro Torres (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for Slovenia.

Table 1
**Composition of the expert review team that conducted the review for Slovenia**

| Area of expertise | Name | Party |
|---|---|---|
| Generalist | Mausami Desai | United States |
| | David Glen Thistlethwaite | United Kingdom |
| Energy | Brooke Elizabeth Perkins | Australia |
| | Regine Röthlisberger | Switzerland |
| | Aynur Tokel | Turkey |
| IPPU | Jacek Skośkiewicz | Poland |
| | Erhan Ünal | Turkey |
| Agriculture | Kingsley Kwako Amoako | Ghana |
| | Ole-Kenneth Nielsen | Denmark |
| LULUCF and KP-LULUCF | Rehab Ahmed Hassan | Sudan |
| | Inge G. C. Jonckheere | Belgium |
| | Nele Inge Gabrielle Rogiers | Switzerland |
| Waste | Phindile Mangwana | South Africa |
| | Sirinthornthep Towprayoon | Thailand |
| Lead reviewers | David Glen Thistlethwaite | |
| | Sirinthornthep Towprayoon | |

2.      The basis of the findings in this report is the assessment by the ERT of the Party's 2020 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines.

3.      The ERT has made recommendations that Slovenia resolve identified findings, including issues[2] designated as problems.[3] Other findings, and, if applicable, the encouragements of the ERT to Slovenia to resolve related issues, are also included.

4.      A draft version of this report was communicated to the Government of Slovenia, which provided no comments.

5.      Annex I presents the annual GHG emissions of Slovenia, including totals excluding and including LULUCF, indirect $CO_2$ emissions, and emissions by gas and by sector, and contains background data on emissions and removals from KP-LULUCF, if elected by the Party, by gas, sector and activity.

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[1]  Owing to the circumstances related to the coronavirus disease 2019, the review had to be conducted remotely.
[2]  Issues are defined in decision 13/CP.20, annex, para. 81.
[3]  Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

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

## II.  Summary and general assessment of the Party's 2020 annual submission

7.     Table 2 provides the assessment by the ERT of the Party's 2020 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.

Table 2
**Summary of review results and general assessment of the 2020 annual submission of Slovenia**

| Assessment | | | Issue/problem ID#(s) in table 3 or 5[a] |
|---|---|---|---|
| Dates of submission | Original submission: NIR, 15 April 2020; CRF tables (version 5), 13 April 2020; SEF tables (SEF-CP2-2019), 13 April 2020 | | |
| Review format | Centralized review conducted remotely | | |
| Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable) | Have any issues been identified in the following areas: | | |
| | (a) Identification of key categories? | No | |
| | (b) Selection and use of methodologies and assumptions? | Yes | I.6, I.13, A.3, A.11, L.3, L.21, L.24 |
| | (c) Development and selection of EFs? | Yes | E.3, E.6, E.16, I.14, A.12, L.3, L.9 |
| | (d) Collection and selection of AD? | Yes | L.7, W.13 |
| | (e) Reporting of recalculations? | Yes | G.6, I.12, W.10 |
| | (f) Reporting of a consistent time series? | Yes | I.3 |
| | (g) Reporting of uncertainties, including methodologies? | Yes | L.1, W.1 |
| | (h) QA/QC? | QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below) | |
| | (i) Missing categories, or completeness?[b] | Yes | I.8, I.9, L.13, W.11 |
| | (j) 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? | NA | The Party did not report any insignificant categories as "NE" |
| 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.20, L.25 |
| Supplementary information under the Kyoto Protocol | Have any issues been identified related to the following aspects of the national system: | | |
| | (a) 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 | |
| | Have any issues been identified related to the national registry: | | |
| | (a) Overall functioning of the national registry? | No | |

| Assessment | | | Issue/problem ID#(s) in table 3 or 5[a] |
|---|---|---|---|
| | (b) Performance of the functions of the national registry and the adherence to technical standards for data exchange? | No | |
| | Have any issues been identified related to the reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the standard independent assessment report? | No | |
| | Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of the reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission? | Yes | G.1 |
| | Have any issues been identified related to the following reporting requirements for KP-LULUCF: | | |
| | (a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5? | Yes | KL.4 |
| | (b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14? | Yes | KL.10, KL.11 |
| | (c) Reporting requirements of decision 6/CMP.9? | Yes | KL.5 |
| | (d) Country-specific information to support provisions for natural disturbances in accordance with decision 2/CMP.7, annex, paragraphs 33–34? | No | |
| CPR | Was the CPR reported in accordance with decision 18/CP.7, annex; decision 11/CMP.1, annex; and decision 1/CMP.8, paragraph 18? | No | G.3 |
| Adjustments | Has the ERT applied any adjustments under Article 5, paragraph 2, of the Kyoto Protocol? | No | |
| | Has the Party submitted a revised estimate to replace a previously applied adjustment? | No | Slovenia does not have a previously applied adjustment |
| 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 assessing 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 | |
| Questions of implementation | Did the ERT list any questions of implementation? | No | |

[a]  Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.
[b]  Missing categories for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

# III. Status of implementation of recommendations included in the previous review report

8.    Table 3 compiles the recommendations from previous review reports that were included in the most recent previous review report, published on 15 April 2019,[4] and had not been resolved by the time of publication of the review report of the Party's 2018 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances. The ERT noted that the individual review of Slovenia's 2019 annual submission did not take place in 2019 owing to insufficient funding for the review process.

Table 3
**Status of implementation of recommendations included in the previous review report for Slovenia**

| ID# | Issue/problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| General | | | |
| G.1 | Article 3, paragraph 14, of the Kyoto Protocol (G.4, 2018) Convention reporting adherence | Provide information on any change(s) in the reporting on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in accordance with decision 15/CMP.1 in conjunction with decision 3/CMP.11. | Addressing. Slovenia reported on the minimization of adverse impacts in its NIR (pp.380–381). During the review, the Party explained that the Ministry of Environment updates annually the reporting on the minimization of adverse impacts by adding any new information on activities under Article 3, paragraph 14. In the 2020 submission, the last two paragraphs of the relevant text were updated. The Party clarified that its contribution to the Green Climate Fund is the major change since the previous submission. However, the ERT found that the Party did not clearly indicate what had changed in its reporting since the previous year as required by decision 15/CMP.1, annex, paragraph 25. |
| G.2 | Key category analysis (G.3, 2018) Convention reporting adherence | Ensure better consistency between the information provided in CRF table 7 and related information in the NIR with respect to which categories are considered key. | Resolved. The information provided in CRF table 7 and in the NIR on which categories are considered key was corrected by the Party and is now consistent. The NIR (table 1.5.1, and annex 1, tables 1–4 (key category analysis)) was revised accordingly. |
| Energy | | | |
| E.1 | Fuel combustion – reference approach – all fuel types – $CO_2$ (E.13, 2018) Transparency | Indicate, for the reference approach, which data sources were used for the NCVs of individual fuel types, along with the respective carbon EFs. | Addressing. Slovenia reported in the NIR (section 3.2.1, p.46) that NCVs from SORS were used for all fuels except lubricants and bitumen, for which IPCC default values were used. For carbon content, IPCC default values were used for all fuel types except petroleum coke, lignite and natural gas, for which country-specific values were used. The NCVs for oil products, solid fuels and natural gas were reported in the NIR (annex 4, tables A4.1, A4.2 and A4.3, respectively). However, no information regarding NCVs and carbon content was provided in the NIR for other fossil fuels or biomass. In addition, there are discrepancies between the carbon content reported in CRF table 1.A(b) and the |

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[4]  FCCC/ARR/2018/SVN. The ERT notes that the report on the individual inventory review of Slovenia's 2019 annual submission has not been published yet. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2018 annual submission.

| | | | country-specific $CO_2$ EF for petroleum coke and lignite (see NIR tables 3.2.1 and 3.1.14 for lignite and 3.2.33 and 3.2.34 for petroleum coke). |
| E.2 | Feedstocks, reductants and other non-energy use of fuels – gaseous fuels – $CO_2$ (E.14, 2018) Transparency | Update the NIR to reflect the revised estimates for $CO_2$ emissions from natural gas used as feedstock for hydrogen production, including providing information on the applied methodology, AD and EFs, as well as any assumptions adopted, if applicable. | Resolved. Slovenia updated the NIR to reflect the revised estimates of $CO_2$ emissions from natural gas used as feedstock for hydrogen production. The Party explained in the NIR that natural gas used as feedstock for hydrogen production was reported under category 2.B.10 (other (chemical industry)) for the entire time series (1986–2018) (section 3.2.3, p.51), and all natural gas reported as feedstock was assumed to be used in hydrogen production and the same NCV and EF as for the energy sector were used (section 4.3.5, p.144). |
| E.3 | 1.A Fuel combustion – sectoral approach – liquid fuels – $CO_2$ (E.4, 2018) (E.8, 2016) (E.8, 2015) (31, 2014) (29, 2013) (45, 2012) (35, 2011) (33, 2010) Accuracy | Develop country-specific $CO_2$ EFs for all fuels that have a significant share in the fuel mix for each category. | Not resolved. Slovenia reported in the NIR (table 10.2.1, p.350) that this issue has not been resolved and no data on the carbon content of liquid fuels were available. During the review, the Party clarified that it had hoped to address this issue through an EU capacity-building project. However, the project only resulted in the provision of instructions for member States to determine their own EFs, not in country-specific EFs that could be used by them. At present, Slovenia has no plan as to how and when it will address this issue (see ID# E.5 below). |
| E.4 | 1.A Fuel combustion – sectoral approach – liquid fuels – $CO_2$ (E.5, 2018) (E.15, 2016) (E.15, 2015) Transparency | Include in the submission the results of discussions with SORS regarding the use of constant NCVs for liquid fuels for most of the time series (1986–2013). | Not resolved. Slovenia reported in the NIR (table 10.2.1, p.350) that this recommendation has not yet been implemented. During the review, the Party explained that revision of the SORS energy statistics, focusing on renewables and fuel consumption in the service sector, started in 2020. As part of this project, the discrepancies between the data reported by SORS and the data reported in the CRF tables, as well as the use of constant NCVs for liquid fuels, may be addressed. The project had been planned to be completed by the end of 2021; however, the first meeting scheduled for spring 2020 had to be postponed owing to the circumstances related to the coronavirus disease 2019 and the project now faces a delay. |
| E.5 | 1.A Fuel combustion – sectoral approach – liquid fuels – $CO_2$ (E.6, 2018) (E.15, 2016) (E.15, 2015) Transparency | Report in the submission how Slovenia intends to periodically monitor NCVs for liquid fuels. | Not resolved. Slovenia reported in the NIR (table 10.2.1, p.350) that this issue has not been resolved and no data on the carbon content of liquid fuels were available. During the review, the Party clarified that it had hoped to address this issue through an EU capacity-building project. However, the project only resulted in the provision of instructions for member States to determine their own EFs, not in country-specific EFs that could be used by them. At present, Slovenia has no plan as to how and when it will address this issue (see ID# E.3 above). |
| E.6 | 1.A Fuel combustion – sectoral approach – gaseous fuels – $CO_2$ (E.7, 2018) (E.14, 2016) | Make all possible efforts to obtain the missing composition data for natural gas after 1996 and recalculate the emissions. | Not resolved. Slovenia reported in the NIR (table 10.2.1, p.349) that this issue has not been resolved and no data on the composition of natural gas after 1996 were available. Furthermore, the Party stated in the NIR (section 3.2, p.44) that it considers the variation in the $CO_2$ EF of natural gas to be small and the costs |

| ID# | Issue/problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| (E.14, 2015) Accuracy | | | of sampling and analysing natural gas by an accredited laboratory would be disproportionally large. During the review, the Party clarified that it is not possible to obtain country-specific NCVs and $CO_2$ EFs for natural gas from the European Union Emissions Trading System, because, owing to the relatively low emissions from these fuels and small variations in NCVs and EFs, all installations under the European Union Emissions Trading System are allowed to calculate their emissions using a tier 2a method, that is taking the NCV and $CO_2$ EF from the latest national inventory submission. While the ERT acknowledges that it may be impossible to obtain data retrospectively, there may be other options that the Party could consider, as suggested by the ERT during the 2018 review, for example obtaining data on natural gas composition from the importing sources or conducting a study similar to that done in 1998. |
| E.7 | 1.A.1.c Manufacture of solid fuels and other energy industries – gaseous fuels – $CO_2$, $CH_4$ and $N_2O$ (E.15, 2018) Consistency | Make all possible efforts to improve the time-series consistency of this category by reallocating the $CO_2$, $CH_4$ and $N_2O$ emissions from natural gas consumption for oil and gas extraction from 1986 until 2005 and for 2007 from category 1.A.4.a to subcategory 1.A.1.c.ii, or, if this is not possible, provide the reasons and report the notation key "IE" for natural gas consumption under this category from 1986 until 2005 and for 2007, with a description that the emissions are reported under category 1.A.4.a (commercial/institutional). | Resolved. Slovenia did not reallocate emissions from category 1.A.4.a to subcategory 1.A.1.c.ii but it reported emissions from natural gas consumption for oil and gas extraction for 1986–2005 and 2007 as "IE" accordingly. During the review, the Party explained that no disaggregated data were available for before 2005 and for 2007. CRF table 9 provides information on where these emissions were reported. |
| E.8 | 1.A.2.d Pulp, paper and print – biomass – $CO_2$, $CH_4$ and $N_2O$ (E.16, 2018) Completeness | Report GHG emissions from black liquor consumption for 1986–2003. | Resolved. Slovenia included AD for black liquor consumption for 1986–2003 under the reporting of biomass for this category. The AD for black liquor for 2004–2006 were already included in the estimates of biomass emissions in the previous submission. The use of black liquor ceased in 2006. All AD were reported in the NIR (annex 3, p.9) (see ID# E.17 in table 5). |
| E.9 | 1.A.3.b Road transportation – liquid fuels – $CO_2$ (E.8, 2018) (E.11, 2016) (E.11, 2015) (35, 2014) (34, 2013) Transparency | Continue to improve the characterization of the physical and chemical properties of gasoline and diesel fuel for road transportation and report on the results achieved. | Addressing. Slovenia reported in the NIR (table 10.2.1, p.350) that this issue has not been resolved and no data on the carbon content of liquid fuels were available. During the review, the Party clarified that it had hoped to address this issue through an EU capacity-building project. However, the project only resulted in the provision of instructions for member States to determine their own EFs, not in country-specific EFs that could be used by them. At present, Slovenia has no plan as to how and when it will address this issue. The Party explained that it verified the default EFs reported in the 2019 submission by comparing its $CO_2$ EFs for diesel oil and gasoline with those of Italy because the majority of Slovenia's diesel oil and about one third of its gasoline have been imported from Italy in recent years. The differences between the $CO_2$ EFs used by Italy and Slovenia were below 1 per cent. |

| ID# | Issue/problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| E.10 | 1.A.3.e.i Pipeline transport – gaseous fuels – $CO_2$, $CH_4$ and $N_2O$ (E.17, 2018) Comparability | Change the notation key from "NO" to "IE" in CRF table 1.A(a)s3 for the emissions from natural gas combusted in compressor stations for 2002–2007, and explain in CRF table 9 where these emissions are reported. | Resolved. Slovenia changed the notation key from "NO" to "IE" in CRF table 1.A(a)s3 for the emissions from natural gas combusted in compressor stations for 2002–2007 and explained the use of this notation key in CRF table 9. |
| E.11 | 1.A.3.e.i Pipeline transport – gaseous fuels – $CO_2$, $CH_4$ and $N_2O$ (E.17, 2018) Transparency | Correct the information in the NIR to clarify that there are two compressor stations in Slovenia and to indicate the proper notation keys used across the time series. | Resolved. Slovenia updated the NIR (p.93) with the information that AD for natural gas were obtained directly from the company that owns the two compressor stations in the country. The Party clarified that the natural gas consumed by the compressor stations was reported in category 1.A.3.e (other transportation) for 2008 onward. For 2002–2007, the emissions were included in category 1.A.4.a (commercial/institutional) and reported as "IE" accordingly. Before 2002, no compressor stations were operational and so "NO" was reported. |
| E.12 | 1.A.4 Other sectors – biomass – $CH_4$ (E.18, 2018) Accuracy | Explain in the NIR the reason(s) why a higher-tier method is unable to be implemented to estimate $CH_4$ emissions from biomass combustion in category 1.A.4 (other sectors) in accordance with the decision trees in the 2006 IPCC Guidelines. | Resolved. Slovenia implemented a tier 2 method for calculating $CH_4$ emissions for category 1.A.4.b (residential) for the 2020 submission (see NIR table 3.2.52, p.96). Considering that since 1998 the consumption of biomass under category 1.A.4.b has represented around 97 per cent of biomass consumption under category 1.A.4 (other sectors), the ERT considers the approach taken by the Party to be appropriate. |
| E.13 | 1.A.4 Other sectors – biomass – $CH_4$ (E.18, 2018) Accuracy | When the database is operational for the development of country-specific $CH_4$ EFs, use those $CH_4$ EFs to calculate $CH_4$ emissions from biomass in this category. | Resolved. Slovenia used country-specific $CH_4$ EFs for category 1.A.4.b (residential), as noted in ID# E.12 above. These $CH_4$ EFs were reported in the NIR (table 3.2.58, p.100) for 1986–2018 and presented by different combustion technology (NIR table 3.2.59, p.101). |
| E.14 | 1.A.4.c.i Stationary – liquid fuels and biomass – $CO_2$, $CH_4$ and $N_2O$ (E.19, 2018) Comparability | Correct the notation key from "NO" to "IE" for $CO_2$, $CH_4$ and $N_2O$ emissions from liquid and biomass fuels for the subcategory 1.A.4.c.i (stationary), and explain in CRF table 9 where in the inventory these emissions are reported. | Addressing. Slovenia corrected the notation key by reporting "IE" in CRF table 1.A(a)s4 for AD and emissions for liquid fuels under subcategory 1.A.4.c.i (stationary combustion for agriculture/forestry/fishing). The Party clarified in the NIR (p.103) that not enough data on consumption of liquid fuels in stationary sources were available for this category and, therefore, emissions were included under subcategory 1.A.4.a.i (stationary combustion for commercial/institutional). In CRF table 9, the Party reported where these emissions were included. However, for biomass, AD and emissions were still reported as "NO". |
| IPPU | | | |
| I.1 | 2.A.2 Lime production – $CO_2$ (I.8, 2018) Transparency | Describe in the NIR the research undertaken to confirm the completeness of AD, that is to confirm that the estimates include all marketed and non-marketed lime production in the country. | Resolved. Slovenia included in the NIR (section 4.2.2.4, pp.133–134) information on how it ensured completeness of the AD for lime production. By examining all potential sources and communicating with authorities involved in issuing environmental permits, the Party confirmed that no other lime production activity occurred in the country. |

| ID# | Issue/problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| I.2 | 2.A.2 Lime production – $CO_2$ (I.9, 2018) Accuracy | Use the revised $CO_2$ IEF of 0.728 t $CO_2$/t applied for 2005–2012 to estimate $CO_2$ emissions for 1986–2004. | Resolved. Slovenia estimated $CO_2$ emissions for 1986–2004 using the revised $CO_2$ IEF (0.728 t $CO_2$/t lime) applied for 2005–2012 (see NIR table 4.2.6, p.132, and CRF table 2(I).A-Hs1). |
| I.3 | 2.A.4 Other process uses of carbonates – $CO_2$ (I.2, 2018) (I.8, 2016) (I.8, 2015) Consistency | Estimate the emission levels for bricks and ceramics production for 1990–1994 using a robust extrapolation method relevant to the country's circumstances, taking into account factors such as the peaking of the country's construction industry in 2006 and the 2008 economic crisis. | Not resolved. Slovenia did not recalculate the $CO_2$ emissions from bricks and ceramics production for 1990–1994. During the review, the Party informed the ERT that this recommendation will be implemented for future submissions. |
| I.4 | 2.B.5 Carbide production – $CO_2$ (I.10, 2018) Transparency | Clarify in the NIR that the petroleum coke used for carbide production was excluded from the energy sector. | Resolved. Slovenia included the required information in the NIR (section 4.3.2.2, p.141), explaining that all petroleum coke used for carbide production was excluded from the energy sector. |
| I.5 | 2.C.1 Iron and steel production – $CH_4$ (I.11, 2018) Transparency | Describe in the NIR the production process for the pig iron produced from iron ore in 1986–1987. | Resolved. Slovenia included in the NIR (section 4.4.1.1, p.146) a description of the production process for the pig iron produced from iron ore in 1986–1987. |
| I.6 | 2.C.1 Iron and steel production – $CO_2$ (I.12, 2018) Accuracy | Estimate $CO_2$ emissions from pig iron production based on a basic carbon balance method considering the inputs (e.g. iron ore, coke) and outputs (e.g. pig iron) in the process and update the methodological description in the NIR. | Not resolved. Slovenia did not estimate $CO_2$ emissions from pig iron production using a basic carbon balance method. During the review, the Party informed the ERT that this recommendation will be implemented for future submissions. |
| I.7 | 2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.14, 2018) Completeness | Estimate HFC emissions for 1993 and 1994, or if data are not available, apply an extrapolation method in accordance with the 2006 IPCC Guidelines, assuming that HFC use did not occur in 1992 and before, and explain the assumptions for the extrapolation in the NIR. | Resolved. Slovenia reported HFC emissions for 1993–1994 for commercial, domestic and transport refrigeration and mobile air conditioning in CRF table 2(II)B-Hs2. In the NIR (section 4.6) the Party explained that in 1993–1994 only HFC-134a was used in the country. To estimate emissions for those years, Slovenia used the number of cars in the national registered vehicles database, and assumed that 1 per cent of them had air-conditioning systems using HFC-134a in 1993. This share had increased to 100 per cent by 2008. |
| I.8 | 2.F.1 Refrigeration and air conditioning – HFCs (I.15, 2018) Completeness | Provide in the NIR evidence that all transport equipment is exported before decommissioning. | Addressing. Slovenia clarified in the NIR (p.165) that to determine the amount of refrigerant used in this category the data from the official database of registered vehicles were used. The Party explained in the NIR that some 80–200 trucks and trailers with cooling units have been deleted from that database in recent years and there is no evidence that these vehicles were disposed of in Slovenia (there is no centre for decommissioning trucks and buses in the country). The Party further explained that, according to evidence on disposed vehicles, they were sold abroad, mostly in North Macedonia. However, the ERT considers that the recommendation has not been fully addressed because |

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| | | | the Party did not provide documentation showing that all the trucks and trailers deleted from the registered vehicles database were sold abroad. |
| I.9 | 2.F.1 Refrigeration and air conditioning – HFCs (I.15, 2018) Completeness | Investigate whether part of the transport refrigeration equipment is disposed of on the national market without recovery (e.g. broken equipment but with a working refrigeration system, equipment containing less than 50 per cent fill-in and not efficiently cooling, leakage during accidents). | Addressing. Slovenia did not provide in the NIR the results of its investigation to determine whether some transport refrigeration equipment is disposed of on the national market without recovery. During the review, the Party explained that emissions from transport refrigeration equipment accidents are not included in the inventory because exact data on the amount of refrigerant lost during accidents are not available. The Party provided the ERT with a rough estimate of emissions using data on the total number of trucks and trailers and the total number of trucks and trailers involved in accidents in 2015–2019: the resulting emissions were 1.3–1.9 kt $CO_2$ eq, which is below the threshold of significance. The ERT recognizes that emissions from this source could be insignificant; however, justification for exclusion based on the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines should be provided at the category level and not at source level within a category. The ERT notes that the resulting emissions are below the threshold for the application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11. The ERT considers that the issue will be resolved if the Party includes relevant background information and emissions from transport refrigeration equipment disposed of without recovery in its submission. |
| I.10 | 2.F.1 Refrigeration and air conditioning – HFCs (I.16, 2018) Accuracy | Revise the assumption of a 12-year average lifespan of cars and consider using a 15-year average lifespan for cars when estimating emissions, and justify its choice in the NIR, and recalculate the emissions if needed. | Resolved. Slovenia revised its assumption of the average lifespan of cars and applied a lifespan of 15 years for estimating HFC emissions for category 2.F.1.e (mobile air conditioning). The methodology used for the recalculation is described in the NIR (p.166). |
| I.11 | 2.F.1 Refrigeration and air conditioning – HFCs (I.17, 2018) Completeness | Calculate and report disposal emissions for HFCs used in stationary air conditioning, and document in the NIR the methods, AD, EFs and assumptions used. | Resolved. Slovenia estimated emissions from disposal for category 2.F.1.f (stationary air conditioning) using an equipment lifespan of 15 years (NIR table 4.6.2). Emissions from disposal were estimated for HFC-125 and HFC-32 for 2011 onward and for HFC-134a and HFC-143a for 2015 onward. The Party documented in the NIR (sections 4.6.1–4.6.2) the method, AD, EFs and assumptions used. |
| Agriculture | | | |
| A.1 | 3.A Enteric fermentation – $CH_4$ (A.1, 2018) (A.6, 2016) (A.6, 2015) Transparency | Include animal performance data in the NIR, such as milk production, feeding situation, work hours, pregnancy rate and digestibility rate. | Resolved. Slovenia reported in the NIR (p.182) that cattle are not used for work in the country. The Party had already reported animal performance data, including feeding situation, pregnancy rate and digestibility rate, in the 2018 NIR. |

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| A.2 | 3.B Manure management – CH$_4$ and N$_2$O (A.2, 2018) (A.8, 2016) (A.8, 2015) Transparency | Report the usage percentage data for the percentage of manure treated under anaerobic digesters under the digester column in CRF table 3.B(a)s2. | Resolved. Slovenia included in CRF table 3.B(a)s2 the correct percentage use of anaerobic digesters for cattle manure in accordance with the information provided in the NIR (p.194). |
| A.3 | 3.B Manure management – N$_2$O (A.3, 2018) (A.11, 2016) (A.11, 2015) Accuracy | Provide additional information in the NIR on Nex rates for livestock other than dairy cattle and demonstrate that those parameters are appropriate in the specific national circumstances and more accurate than the default data provided in the 2006 IPCC Guidelines. | Addressing. Slovenia reported Nex rates in the NIR (table 5.4.2, p.203). Five different sources were used depending on the animal species: Menzi et al. (1997), EMEP/CORINAIR (2002), EMEP/EEA (2016), Döhler et al. (2002) and the 2006 IPCC Guidelines. During the review, Slovenia explained that it used the 2002 EMEP/CORINAIR emission inventory guidebook for Nex rates for swine because the swine subcategorization in later versions of the EMEP/EEA emission inventory guidebook does not reflect the national statistics. The ERT accepts this explanation and notes that it is well documented in the NIR (p.203). For other animal categories (suckling cows, other cattle and various poultry species/categories), the Party acknowledged that the references used were older and not necessarily more accurate than more up-to-date sources, such as the 2019 EMEP/EEA emission inventory guidebook. The ERT considers that Slovenia should evaluate the Nex rates for suckling cows, other cattle (calves, fattening cattle, heifers), laying hens, broilers, turkeys, geese and ducks with a view to selecting values appropriate to the national circumstances, and document this in the NIR. |
| A.4 | 3.B.1 Cattle – CH$_4$ and N$_2$O (A.10, 2018) Transparency | Report in the NIR on the possibility of initiating an effort to collect and publish the data on allocation of manure into MMS from SORS. | Resolved. Slovenia reported in its NIR (section 5.3.6, p.200) that data on MMS distribution will be collected as part of the implementation of EU regulation 2018/1091. The data will be collected for 2020 and should be reported within 15 months (i.e. updated data for 2020 will be available in early 2022). |
| A.5 | 3.B.3 Swine – N$_2$O (A.6, 2018) (A.3, 2016) (A.3, 2015) (54, 2014) (52, 2013) (77, 2012) Transparency | Improve the transparency of the information provided for this category and provide a description of the development of the average Nex rate for swine. | Resolved. Slovenia included in the NIR (pp.203–204) a description of the development of the average Nex rate for swine. The Party included a table with information on population, Nex rates and total nitrogen excreted for each swine subcategory and the resulting average Nex for 2017 (12.2 kg/head/year) (NIR table 5.4.3, p.203). In addition, the Party explained that it used the 2002 EMEP/CORINAIR emission inventory guidebook to determine the Nex rates for swine because in later versions of the guidebook the subcategories of swine are not harmonized with those used in Slovenia. The Party also explained that it compared its Nex rates with those in the 2006 IPCC Guidelines and decided to continue using the 2002 guidebook, which was generally used for reporting emissions of nitrogen compounds in Slovenia. The ERT accepts this explanation and notes that it is well documented in the NIR. |
| A.6 | 3.B.3 Swine – CH$_4$ and N$_2$O (A.7, 2018) (A.4, 2016) | Conduct an investigation and update the animal waste management system matrix for swine because | Resolved. Slovenia reported in the NIR (section 5.3.2.2, p.196) that it conducted an investigation on the extent of organic swine production in the country. The Party included in the NIR (table 5.3.2) the proportion of total |

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| | (A.4, 2015) (52, 2014) Accuracy | the practice of organic farming may include deep litter MMS or pasture and paddock. | swine in the country kept at organic farms (0.6–1.5 per cent) and explained that the extent of organic swine production is not sufficient to justify initiating specific surveys on organic farming practices (such as deep litter MMS or pasture and paddock). The ERT agrees with this assessment. |
| A.7 | 3.B.3 Swine – $CH_4$ (A.11, 2018) Convention reporting adherence | Correct the errors in NIR table 5.3.3 to report the same $CH_4$ EFs for manure management from swine for 2014–2016 as in CRF table 3.B(a)s1. | Resolved. Slovenia corrected the $CH_4$ EFs for manure management for swine in the NIR (table 5.3.4, p.198) for 2014–2016 to reflect the correct values, as reported in CRF table 3.B(a)s1. |
| A.8 | 3.B.5 Indirect $N_2O$ emissions – $N_2O$ (A.12, 2018) Transparency | Provide data in the NIR on the extent of field heaps that have been reduced by way of being replaced by watertight stores. | Resolved. Slovenia explained in its NIR (p.210) that storage of animal manure is regulated by a decree on the protection of waters against pollution caused by nitrates from agricultural sources. The capacities of watertight stores are prescribed for liquid and solid manure. The first requirements regarding the size and watertightness of animal manure stores were published in 1986 and they have since been updated many times. The storage of farmyard manure in field heaps has been prohibited since 2015. Inspectors supervise the implementation of the decree on individual farms. Penalties for non-compliance with the regulation are also prescribed. There are no data on the extent of the reduction of field heaps resulting from the ban on field heap storage of farmyard manure. Owing to the fact that manure storage capacities were prescribed many years before the ban, the Party assumes that the situation is more or less the same over the entire reporting period. The ERT agrees with the assessment by Slovenia that, since manure stores were first regulated in 1986, it is unlikely that significant changes occurred during the time series. Furthermore, it is unlikely that improved data for early years of the time series would be available. |
| A.9 | 3.G Liming – $CO_2$ (A.9, 2018) (A.15, 2016) (A.15, 2015) Consistency | Make every effort to justify the AD used to estimate emissions from lime application to agricultural soils and recalculate emissions for 1992–2013. | Resolved. Slovenia recalculated the amounts of limestone for 1995–2018 using data on limestone production for 2015 and used the surrogate method, in accordance with the 2006 IPCC Guidelines, for the earlier years of the time series. In the NIR (p.224), the Party documented and explained the trend development for lime use in agriculture, the lack of data for the early years of the time series (1986–1994) and the AD assumed on the basis of expert judgment for those years. The ERT agrees with the explanation provided by the Party in the NIR, noting that, as data are not available for 1986–1994, the best option is to apply expert judgment, as Slovenia did. Further, the ERT notes that any changes in expert judgment will have a very small influence on the estimated total emissions for this non-key category and hence resources should be prioritized for use elsewhere. |

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| **LULUCF** | | | |
| L.1 | 4. General (LULUCF) – $CO_2$ (L.2, 2018) (L.11, 2016) (L.11, 2015) Transparency | Make efforts to complete the uncertainty assessment of all carbon pools and gases in the LULUCF sector. | Addressing. Slovenia provided in NIR table 6.3.7 (p.238) uncertainty estimates for AD (area of land). In NIR tables 6.3.9–6.3.11 (pp.240–241) and 6.4.7 (p.256) the Party provided uncertainty estimates for EFs for category 4.A (forest land); however, no uncertainties for deadwood were reported in NIR table 6.4.7. Uncertainty estimates for categories 4.B (cropland) and 4.C (grassland) were provided in the NIR (section 6.5.5, p.269, and section 6.5.6, p.278, respectively), except for loss of biomass for both categories. Uncertainty estimates were not provided for category 4.D (wetlands), 4.E (settlements) or 4.F (other land) in the NIR (pp.284, 290 and 296). During the review, the Party stated that it will make further efforts to collect uncertainty values for the missing pools and categories and include this information in its next submission. |
| L.2 | Land representation (L.31, 2018) Comparability | With respect to the criteria for forest land, use either crown coverage or number of trees, but not both. | Resolved. Slovenia used crown coverage as the basis for its forest definition, replacing the previous definition, which was based on number of trees (NIR sections 6.2.2–6.2.5, p.233). However, a transparency issue remains (see ID# L.17 in table 5). |
| L.3 | 4.A Forest land – $CO_2$ (L.32, 2018) Accuracy | Consider the choice of biomass expansion factor for the conversion of annual net increment (including bark) to above-ground tree biomass increment when estimating emissions and removals in forest land, and apply appropriate factors in accordance with the 2006 IPCC Guidelines in the calculations described in equations 6 and 12 of the NIR. | Not resolved. Slovenia did not change its calculation of above-ground tree biomass increment in this submission (NIR p.246). During the review, the Party clarified that for its next submission it will apply an updated method based on the 2006 IPCC Guidelines (vol. 4, chap. 4, box 4.2, p.4.13). The updated method consists of using the appropriate BCEF values to convert growing stock volume to above-ground biomass (i.e. BCEF for stocks ($BCEF_S$), increments ($BCEF_I$) and removals ($BCEF_R$)) as provided in the 2006 IPCC Guidelines (vol. 4, chap. 4, table 4.5). The Party explained that it will use the BCEF values at the plot level, taking into account the appropriate class of forest type and growing stock level. |
| L.4 | 4.A.1 Forest land remaining forest land – $CO_2$ (L.3, 2018) (L.5, 2016) (L.5, 2015) (63, 2014) Accuracy | Search for additional data on deadwood stocks collected from observations for some of the years prior to and after 2007 in order to improve the estimates based on interpolation/extrapolation. | Resolved. Slovenia estimated carbon stock changes in deadwood using FECS data for 2000, 2007, 2012 and 2018, and improved the estimation based on interpolation and extrapolation (NIR p.249). For 2000, data were available only for dead standing and lying trees; therefore, the total deadwood stock in 2000 was estimated on the basis of the linear trend between 2007 and 2012 data for other types of deadwood in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 2.2.1, p.2.6). |
| L.5 | 4.A.1 Forest land remaining forest land – $CO_2$ (L.4, 2018) (L.12, 2016) | Make efforts to improve the estimation of net removals in forest land and eliminate trend gaps caused by methodologies as much as possible (trend of net removals in forest land remaining forest land | Resolved. Slovenia eliminated the trend gaps caused by methodological differences for 1995–1996 and 2006–2007, and reduced the gap as much as possible for 2000–2001. There are still some marked inter-annual differences for some years (e.g. for 2007–2008 and 2012–2013), which can be explained by new national forest inventory data becoming available for those years. |

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| | (L.12, 2015) Accuracy | shows relatively large jumps between 1995–1996, 2000–2001 and 2006–2007). | |
| L.6 | 4.B Cropland – $CO_2$ (L.33, 2018) Accuracy | Add samples from the study currently under way to update the growing stock and biomass values for perennial cropland as they are collected, and report the resulting EFs for this category as soon as they are available. | Resolved. Slovenia used the results of the 2017 monitoring study (Mali et al., 2017) and updated the carbon stock values for living biomass for perennial cropland. The Party explained in the NIR (p.263) that a country-specific value of 10.45 t C/ha was calculated as the weighted average for the prevailing perennial crops: vineyards (1.90 t C/ha, n = 16), intensive orchards (8.92 t C/ha, n = 6) and extensive orchards, (16.32 t C/ha, n = 42). The Party also reported in the NIR (p.263) that the results of another monitoring study of above-ground biomass on agricultural land (Mali et al., 2018) will be used for the next inventory submission. |
| L.7 | 4.B.2 Land converted to cropland – $CO_2$ (L.8, 2018) (L.7, 2016) (L.7, 2015) (68, 2014) (61, 2013) Accuracy | Determine and use country-specific parameters such as the changes in carbon stocks from one year of cropland growth for perennial and annual cropland. | Addressing. Slovenia applied country-specific parameters for perennial cropland (see ID# L.6 above), but not for annual cropland. During the review, the Party explained that, to apply equation 2.15 from the 2006 IPCC Guidelines (vol. 4, chap. 2.3.1.2) for annual cropland, the areas under annual cropland need to be stratified in order to accurately determine annual carbon stock changes in biomass due to growth and harvesting in these areas. The structure of the main crop types also needs to be considered, as it changes from year to year. The Party indicated that it plans to assess crop residues using the scientific literature or develop national estimates in cooperation with the Agricultural Institute of Slovenia and use the new values for its next inventory submission. |
| L.8 | 4.B.2 Land converted to cropland – $CO_2$ (L.9, 2018) (L.16, 2016) (L.16, 2015) Completeness | Provide information on the assumption used for the amount of living biomass carbon stock in other perennial cropland for the estimation of land conversion from perennial cropland. | Resolved. Slovenia provided in the NIR (p.263) information on the assumption used for carbon stocks in other perennial cropland (vineyards and orchards). The Party estimated the carbon stock values for living biomass for perennial cropland (see ID# L.6 above). |
| L.9 | 4.B.2 Land converted to cropland – $CO_2$ (L.10, 2018) (L.17, 2016) (L.17, 2015) Accuracy | Make efforts to improve the completeness of reporting of carbon stock changes in land conversions to other perennial cropland for carbon gains that occurred after two years or more. | Addressing. The carbon gains in land conversions to other perennial cropland were considered in the estimation in terms of $\Delta C_G$ (NIR equation 16). However, a default accumulation rate of 2.1 t C/ha was used regardless of crop type. During the review, the Party clarified that updated accumulation rates from the 2019 Refinement to the 2006 IPCC Guidelines (vol. 4, table 5.2, p.5.12) will be used for improving the reporting of carbon stock changes in land conversions to other perennial cropland. |
| L.10 | 4.C Grassland – $CO_2$ (L.12, 2018) (L.18, 2016) (L.18, 2015) Accuracy | Apply methodologies for woody grassland for the woody grassland subcategory (as opposed to applying methodologies for annual grassland). | Resolved. Slovenia applied a specific methodology for perennial grassland (woody). Category 4.C.1 (grassland remaining grassland) was divided into four subcategories to improve estimations of carbon stock changes in living biomass: annual grassland remaining annual grassland, perennial grassland remaining perennial grassland, perennial grassland converted to annual grassland, and annual grassland converted to perennial grassland. For perennial |

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| | | | grassland, the Party applied country-specific parameters, which were based on a national monitoring study (Mali et al., 2017). The Party reported information on the methods and assumptions applied in the NIR (pp.273–274). |
| L.11 | 4.E.1 Settlements remaining settlements – $CO_2$ (L.17, 2018) (L.21, 2016) (L.21, 2015) Transparency | Provide in the NIR information on the methodology used for estimating carbon stock change in living biomass in settlements remaining settlements, taking into consideration whether carbon stock in the settlements area is increasing or expected to be maturing in the future, and examine the application of actual growing period if necessary. | Addressing. Slovenia provided in the NIR (p.288) additional information on the assumption and EF used for calculating carbon stock changes in living biomass for category 4.E.1 (settlements remaining settlements). However, the ERT notes that the information provided is still not clear, for example whether the crown cover of 11.1 per cent was applied for all Slovenian territory. During the review, the Party clarified that the crown cover of 11.1 per cent refers to settlements only and is not a national value for the whole territory. The Party explained that the country-specific value of 11.1 per cent was derived from a study (Wisdom Slovenia, 2006) whose sample size was 33 points out of 68 on a grid of 4 km by 4 km. The ERT considers that including this information in the NIR would resolve this issue. |
| L.12 | 4.F.2 Land converted to other land – $CO_2$ (L.19, 2018) (L.23, 2016) (L.23, 2015) Transparency | Provide in the NIR all necessary information to explain the methodologies and assumptions applied for land converted to other land. | Resolved. Slovenia included in the NIR (section 6.9.4.2, p.296) additional information on the methodologies used for estimating carbon stock changes in living biomass, DOM and soils for land converted to other land. |
| L.13 | 4(V) Biomass burning – $CO_2$, $CH_4$ and $N_2O$ (L.24, 2018) (L.28, 2016) (L.28, 2015) Completeness | Further examine whether, where forest wildfires occur in Slovenia, these affect the DOM pool and, if appropriate, add the DOM to mass of fuel available for combustion. | Addressing. Slovenia examined the occurrence of wildfires in the country's forests (NIR p.251), but a description of how these fires affect the DOM pool was not included in the information reported. During the review, the Party described a method by which it will include DOM and litter in the mass of fuel available for combustion for its next submission. In brief, the grid of the FECS will be intersected with the FM unit of Sežana (the municipality where the majority of forest fires occur), and carbon stocks in deadwood and litter will be estimated using data from sample plots. |
| L.14 | 4(V) Biomass burning – $CO_2$, $CH_4$ and $N_2O$ (L.35, 2018) Transparency | Clarify that the area affected by forest fires reported in the NIR is a function of total forest land in Slovenia. | Resolved. Slovenia included in the NIR (section 6.4.4.2, pp.251–252) information on the area affected by forest fires. Instead of reporting this area as a function of total forest land as done in the previous submission, in the current submission the Party used AD for forest fires from the Slovenian forest fire risk map. All wildfires affected productive forests and were reported under category 4.A.1 (forest land remaining forest land). |
| L.15 | 4.G HWP – $CO_2$ (L.26, 2018) (L.30, 2016) (L.30, 2015) Transparency | Fully revise the NIR (section 6.9) on the basis of the latest methodologies applied and provide all necessary information on AD, parameters and equations applied. | Addressing. Slovenia provided more information in the NIR (section 6.10, p.297) on the methodologies and assumptions applied in estimating HWP in line with the 2006 IPCC Guidelines (vol. 4, chap. 12). However, information on AD and parameters is still missing. During the review, the Party stated that it will include in the next submission the AD by main HWP category as well as |

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| | | | other required data, for example, tables or figures showing the time series of AD. |

**Waste**

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| W.1 | 5. General (waste) – $CO_2$, $CH_4$ and $N_2O$ (W.10, 2018) Transparency | Include in the NIR information about how expert judgment on uncertainty for AD and EFs was obtained for each category in the waste sector. | Not resolved. Slovenia did not include in the NIR information on how expert judgment on uncertainties for AD and EFs was obtained. During the review, the Party explained that this recommendation is included in the improvement plan and will be addressed for future submissions. |
| W.2 | 5.A Solid waste disposal on land – $CH_4$ (W.2, 2018) (W.2, 2016) (W.2, 2015) (75, 2014) (69, 2013) Consistency | Ensure that the use of multiple sources of data for municipal solid waste disposal for different periods is in accordance with chapter 7 of the IPCC good practice guidance. | Addressing. Slovenia recalculated AD for 1964–1994 using the surrogate method in accordance with the IPCC good practice guidance (chap. 7) (see ID# W.3 below). In the NIR (pp.309–310) the Party explained that, for 1995–2001, data from SORS are based on the assumption that all collected municipal waste was landfilled in 1995 and that the landfilled fraction was 0.89 in 2001, and the coverage increased from 84 per cent in 1995 to 90 per cent in 2001; for 2002–2018, data from waste collection systems are very detailed and were collected by means of forms as required by law and are also provided by SORS. However, the Party did not clarify in the NIR how the consistency of AD for 1995–2001 and 2002–2018 was ensured. The ERT notes that, while the Party included some information in the 2019 NIR (p.308) on the consistency of the AD for these two periods, an explanation of how time-series consistency is ensured for AD from multiple sources is part of the reporting and should be included in every NIR. |
| W.3 | 5.A.1 Managed waste disposal sites – $CH_4$ (W.3, 2018) (W.9, 2016) (W.9, 2015) Consistency | Recalculate the population data and waste generation rate used for 1964–1994 to ensure consistency with actual data for 1995–2014. | Resolved. Slovenia recalculated the amount of waste generated per capita and the amount of industrial waste for 1964–1994 using gross domestic product per capita as the key driver (NIR section 7.2.2, p.308, and NIR table 7.2.1, p.309). The recalculation led to a decrease in the estimated amount of waste from 633.04 to 620.64 kt for 1986 and from 702.11 to 543.90 kt for 1994. |
| W.4 | 5.A.1 Managed waste disposal sites – $CH_4$ (W.11, 2018) Accuracy | Separate industrial solid waste from municipal waste and estimate $CH_4$ emissions from municipal waste and industrial solid waste separately, and explain the methodology used to estimate these emissions separately in the NIR. | Resolved. Slovenia reported in the NIR (section 7.2.2, pp.308–310) the amount of industrial waste separately from the amount of municipal solid waste and included an explanation of the methodology used to estimate the $CH_4$ emissions in each case. |
| W.5 | 5.B.1 Composting – $CH_4$ and $N_2O$ (W.6, 2018) (W.13, 2016) (W.13, 2015) Transparency | Provide AD for this category in the NIR. | Resolved. Slovenia provided the AD (amount of composting) in the NIR (figure 7.3.1, p.321) and CRF table 5.B. |
| W.6 | 5.D.2 Industrial wastewater – $CH_4$ | Provide in the NIR a detailed description of and justification for the total amount of industrial | Addressing. Slovenia included in the NIR (table 7.5.5, p.337) the volumes of wastewater output generated from various industries and included a description |

| ID# | Issue/problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
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| | (W.13, 2018)<br>Transparency | wastewater produced, the fraction of the wastewater undergoing various treatment methods (treated (e.g. well managed and not well managed) and untreated discharge to rivers, lakes and sea, if any) and the corresponding methane correction factor applied to the various fractions. In the case that any of the applied methane correction factors depart from the default methane correction factor values in table 6.8 of the 2006 IPCC Guidelines (vol. 5, chap. 6), include a justification for the country-specific value in the NIR. | in the NIR (p.338) of how methane correction factor values were chosen for the various treatment pathways for industrial wastewater (i.e. 0 for well-managed and 0.3 for not well-managed aerobic treatment plants in accordance with the 2006 IPCC Guidelines (vol. 5, table 6.8, p.6.21)). However, the Party did not provide the fraction of wastewater undergoing various treatment methods; that is, a characterization of all industrial wastewater according to the percentages flowing to different treatment systems and the percentage of untreated wastewater flowing into rivers, lakes or the sea, with the corresponding methane correction factor applied. |
| W.7 | 5.D.2 Industrial wastewater – $CH_4$ (W.14, 2018) Completeness | Determine whether emissions from organic chemical industries other than the pharmaceutical industry also occurred in 1986–2003, and include the amount of wastewater output from 1986 to 2016 in NIR table 7.5.6 and update the whole time series of total organics in wastewater in industrial wastewater in NIR table 7.5.5 to ensure completeness, transparency and time-series consistency. | Resolved. Slovenia included AD for the production of organic chemical industry for the entire time series (1986–2018) in the NIR (table 7.5.5, p.337). However, a new issue was raised by the ERT (see ID# W.10 in table 5). |
| W.8 | 5.D.2 Industrial wastewater – $CH_4$ (W.15, 2018) Transparency | Provide in the NIR a detailed description about the inlet COD concentration used for calculating AD in each industry. | Resolved. Slovenia included in the NIR (tables 7.5.6–7.5.7, p.338) data on COD parameters used for the various types of industry and the TOW in industrial wastewater treated in the centralized wastewater treatment plant. The Party applied the default COD values from the 2006 IPCC Guidelines (vol. 5, table 6.9, p.6.22). |

KP-LULUCF

| ID# | Issue/problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| KL.1 | General (KP-LULUCF) (KL.1, 2018) (KL.2, 2016) (KL.2, 2015) KP reporting adherence | Update chapter 11 of the NIR so that it is entirely in line with the elements specified in annex II to decision 2/CMP.8, including the update of descriptions about the methodologies and the underlying assumptions used. | Resolved. Slovenia updated NIR chapter 11 entirely in line with the elements specified in annex II to decision 2/CMP.8, including descriptions of methodologies and assumptions. The Party clearly described in the NIR (section 11.3.1.1.1, p.366) how carbon stock changes in areas under FM were calculated. The method for calculating deforestation and the underlying assumptions used were described in the relevant sections (6.5.4.2, 6.6.4.2, 6.7.4.2, 6.8.4.2 and 6.9.4.2) under the LULUCF sector for conversions from forest land to non-forest land. Emissions and removals from AR were not reported because in Slovenia conversions from land to forest land are not considered human induced (NIR p.363). |
| KL.2 | Deforestation – $CO_2$ (KL.4, 2018) (KL.5, 2016) (KL.5, 2015) Accuracy | Assess whether the natural disturbance area of forest land in Slovenia satisfies the guidance regarding direct human-induced deforestation, taking into account the relevant guidance in the Kyoto Protocol | Resolved. Slovenia explained in the NIR (section 11.4.1, p.370) that human-induced deforestation has to be permitted by legal entities, and the Slovenia Forest Service must agree to any permit for deforestation. During the review, the Party explained that data on land-use conversions to and from forest land |

| ID# | Issue/problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | Supplement, revise the data for deforestation area where applicable, and provide additional information on the results of this assessment in the submission. | are identified from digital orthophotos for both reporting under the Convention and accounting under the Kyoto Protocol. However, to identify only human-induced deforestation (for accounting under the Kyoto Protocol) additional data on deforestation from the Slovenia Forest Service are used to verify deforestation by means of point sampling. This verification process ensures that only human-induced conversions to non-forest land are reported under deforestation. The ERT noted that Slovenia corrected its deforestation area for 2013–2016 by ensuring that only human-induced deforestation was accounted for and that conversions attributable to natural disturbances were not covered under deforestation. The deforestation area for 2016 was reported as 27.97 kha in the 2018 submission and revised to 25.96 kha in the 2019 and 2020 submissions. |
| KL.3 | Deforestation – $CO_2$ (KL.5, 2018) (KL.6, 2016) (KL.6, 2015) Accuracy | Ensure that the reporting of deforestation emissions is consistent between the NIR and the CRF tables (natural disturbance emissions were excluded from deforestation emissions in the NIR). | Resolved. Slovenia excluded natural disturbance emissions from deforestation emissions in the NIR. The same value for emissions from deforestation (236.91 Gg $CO_2$ eq) was reported in the NIR (section 11, p.363) and in CRF table 4(KP). The corresponding net $CO_2$ emissions and removals were reported in CRF table 4(KP-I)A.2. |
| KL.4 | FM – $CO_2$, $CH_4$ and $N_2O$ (KL.14, 2018) Comparability | Work further on harmonization of the forest definition and its implementation to classify the same patches of land as forest under both the Convention and the Kyoto Protocol. | Not resolved. Slovenia has not yet harmonized the forest definitions applied for its reporting under the Convention and under the Kyoto Protocol. The Party reported different parameters for the forest definition under the Convention (crown cover of more than 10 per cent (NIR p.233)) and under the Kyoto Protocol (crown cover of more than 30 per cent (NIR p.363)). During the review, the Party clarified that the methodological approach to the next national forest inventory (2020, currently being implemented) will enable correct classification of forest land in the future (see also ID# L.2 above). |
| KL.5 | FM – $CO_2$, $CH_4$ and $N_2O$ (KL.15, 2018) Accuracy | Update the FM cap, reporting the value of 5,691.720 t $CO_2$ eq in the CRF accounting table, as contained in the report on the review of the report to facilitate the calculation of the assigned amount for the Party. | Addressing. Slovenia reported in the CRF accounting table an updated value of 5,693.72 kt $CO_2$ eq for the FM cap. According to its second report to facilitate the calculation of the assigned amount, the value is 5,691.720 kt $CO_2$ eq. During the review, the Party clarified that 5,693.72 kt $CO_2$ eq is a typographical error for the inventory years 2017–2018 and that the correct value will be reported in its next submission. |
| KL.6 | HWP – $CO_2$ (KL.10, 2018) (KL.10, 2016) (KL.10, 2015) Accuracy | Exclude HWP already accounted as emissions during the first commitment period from the HWP estimation under KP-LULUCF activities. | Resolved. Slovenia excluded HWP accounted for in the first commitment period of the Kyoto Protocol from HWP estimated for the second commitment period. The Party explained in the NIR (section 11.3.1.1.5, p.369) that for the first commitment period emissions and removals from the HWP pool were taken into account on the basis of instantaneous oxidation, meaning that the contribution to emissions and removals from the HWP pool was neither reported nor accounted for, which is in line with decision 2/CMP.7, annex, paragraph 16. Since carbon stock changes in HWP were zero (due to the application of instantaneous oxidation), there is in fact no need to exclude any |

| ID# | Issue/problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | | emissions and removals from the HWP pool for the first commitment period. The ERT found the information provided in the NIR to be sufficient. |
| KL.7 | HWP – $CO_2$ (KL.11, 2018) (KL.11, 2016) (KL.11, 2015) Accuracy | Estimate the volume of HWP resulting from deforestation on the basis of instantaneous oxidation under KP-LULUCF. | Resolved. Slovenia estimated the volume of HWP resulting from deforestation on the basis of instantaneous oxidation (NIR section 11.3.1.1.5, p.368). This is also reflected in the values reported in the CRF tables: CRF table 4.Gs1 shows net removals from HWP for the total LULUCF sector of $-125.92$ kt $CO_2$ eq, and CRF table 4(KP-I)C shows slightly lower net removals from HWP for FM of $-121.85$ kt $CO_2$ eq. The difference is due to instantaneous oxidation of harvesting amounts of deforestation. |
| KL.8 | HWP – $CO_2$ (KL.12, 2018) (KL.12, 2016) (KL.12, 2015) Transparency | Report appropriate data in CRF table 4(KP-I)C (namely harvest amounts from AR, deforestation and FM, and the half-life parameters and initial stock of HWP in each HWP type). | Resolved. Slovenia reported the appropriate data in CRF table 4(KP-I)C as requested. There is no HWP resulting from afforestation or reforestation. Carbon stock changes in HWP resulting from deforestation were accounted for on the basis of instantaneous oxidation. Values for carbon stock change in HWP resulting from FM were reported accordingly (see ID# KL.7 above). |

[a] References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) in which the issue or problem was raised. Issues are identified in accordance with paras. 80–83 of the UNFCCC review guidelines and classified as per para. 81 of the same guidelines. Problems are identified and classified as problems of transparency, accuracy, consistency, completeness or comparability in accordance with para. 69 of the Article 8 review guidelines in conjunction with decision 4/CMP.11.

[b] The report on the review of the 2019 annual submission of Slovenia was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2018 annual review report. For the same reason, 2019 and 2017 are excluded from the list of review years in which issues could have been identified.

## IV. Issues and problems identified in three or more 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 and/or problems included in table 4 have been identified in three or more successive reviews, including the review of the 2020 annual submission of Slovenia, and had not been addressed by the Party at the time of publication of this review report.

Table 4
**Issues and/or problems identified in three or more successive reviews and not addressed by Slovenia**

| ID# | Previous recommendation for the issue | Number of successive reviews issue not addressed[a] |
|---|---|---|
| General | No issues identified. | |
| Energy | | |
| E.3 | Develop country-specific $CO_2$ EFs for all fuels that have a significant share in the fuel mix for each category. | 8 (2010–2020) |
| E.4 | Include in the submission the results of discussions with SORS regarding the use of constant NCVs for liquid fuels for most of the time series (1986–2013). | 3 (2015/2016–2020) |
| E.5 | Report in the submission how Slovenia intends to periodically monitor NCVs for liquid fuels. | 3 (2015/2016–2020) |

| ID# | Previous recommendation for the issue | Number of successive reviews issue not addressed[a] |
|---|---|---|
| E.6 | Make all possible efforts to obtain the missing composition data for natural gas after 1996 and recalculate the emissions. | 3 (2015/2016–2020) |
| E.9 | Continue to improve the characterization of the physical and chemical properties of gasoline and diesel fuel for road transportation and report on the results achieved. | 5 (2013–2020) |
| *IPPU* | | |
| I.3 | Estimate the emission levels for bricks and ceramics production for 1990–1994 using a robust extrapolation method relevant to the country's circumstances, taking into account factors such as the peaking of the country's construction industry in 2006 and the 2008 economic crisis. | 3 (2015/2016–2020) |
| *Agriculture* | | |
| A.3 | Provide additional information in the NIR on Nex rates for livestock other than dairy cattle and demonstrate that those parameters are appropriate in the specific national circumstances and more accurate than the default data provided in the 2006 IPCC Guidelines. | 3 (2015/2016–2020) |
| *LULUCF* | | |
| L.1 | Make efforts to complete the uncertainty assessment of all carbon pools and gases in the LULUCF sector. | 3 (2015/2016–2020) |
| L.7 | Determine and use country-specific parameters such as the changes in carbon stocks from one year of cropland growth for perennial and annual cropland. | 5 (2013–2020) |
| L.9 | Make efforts to improve the completeness of reporting of carbon stock changes in land conversions to other perennial cropland for carbon gains that occurred after two years or more. | 3 (2015/2015–2020) |
| L.11 | Provide in the NIR information on the methodology used for estimating carbon stock change in living biomass in settlements remaining settlements, taking into consideration whether carbon stock in the settlements area is increasing or expected to be maturing in the future, and examine the application of actual growing period if necessary. | 3 (2015/2016–2020) |
| L.13 | Further examine whether, where forest wildfires occur in Slovenia, these affect the DOM pool and, if appropriate, add the DOM to mass of fuel available for combustion. | 3 (2015/2016–2020) |
| L.15 | Fully revise the NIR (section 6.9) on the basis of the latest methodologies applied and provide all necessary information on AD, parameters and equations applied. | 3 (2015/2016–2020) |
| Waste | No issues identified. | |
| KP-LULUCF | No issues identified. | |

[a] Reports on the reviews of the 2017 and 2019 annual submissions of Slovenia have not yet been published. Therefore 2017 and 2019 were not included when counting the number of successive years for this table. In addition, as the reviews of the Party's 2015 and 2016 annual submissions were conducted together, they are not considered successive reviews and 2015/2016 is counted as one year.

## V. Additional findings made during the individual review of the Party's 2020 annual submission

10.     Table 5 presents findings made by the ERT during the individual review of the 2020 annual submission of Slovenia that are additional to those identified in table 3.

Table 5
**Additional findings made during the individual review of the 2020 annual submission of Slovenia**

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue/problem?[a] |
|---|---|---|---|
| General | | | |
| G.3 | CPR | According to decision 15/CMP.1, annex, paragraph 18, Parties shall report the calculation of their CPR by comparing 100 per cent of eight times the total GHG emissions without LULUCF of its most recently reviewed inventory with 90 per cent of the assigned amount and maintain in their registry whichever is lowest. Slovenia reported its calculation of the CPR in the NIR (p.377) but used the total GHG emission data for 2014 (2016 submission). According to the Party's 2020 submission, total GHG emissions without LULUCF for 2018 (the most recently reviewed inventory) are 17,502,138 t $CO_2$ eq, which multiplied by eight is 140,017,101 t $CO_2$ eq. The correct CPR of Slovenia is 89,483,204 t $CO_2$ eq (90 per cent of the assigned amount, which is the lowest value) as reported in the NIR (section 12.4). | Yes. KP reporting adherence |
| | | The ERT recommends that Slovenia report the calculation of its CPR in accordance with decision 15/CMP.1, annex, paragraph 18. | |
| G.4 | QA/QC and verification | Slovenia reported a summary of its uncertainty analysis in the NIR (section 1.7) and further details in annex 2 to the NIR. The ERT noted inconsistencies in the reporting of uncertainties associated with AD and EFs between the category-specific discussions in the NIR and the information in annex 2 to the NIR for a number of categories (e.g. 3.D, 3.G, 4.A, 4.B, 4.C, 4.D, 4.E, 4.F, 4.G and 5.A). During the review, the Party clarified that each year it makes improvements to the uncertainty analysis, which are presented in annex 2 to the NIR; but information on uncertainties is not always updated in the relevant chapters of the NIR. The Party explained that the majority of the inconsistencies relate the agriculture and LULUCF sectors because the NIR is prepared by other institutions while annex 2 is prepared by the inventory compiler. The Party indicated that the inconsistencies between the NIR and annex 2 will be addressed for its next submission. | Yes. Convention reporting adherence |
| | | The ERT recommends that Slovenia implement additional general QA/QC procedures to ensure the uncertainty analysis is correctly documented and consistently reported throughout the NIR, including annex 2, and the uncertainty information required pursuant to the 2006 IPCC Guidelines (vol. 2, chaps. 3.2.3.1 and 3.5) is reported when using approach 1 to assess uncertainties. | |
| G.5 | Uncertainty analysis | Slovenia reported insufficient information on the underlying assumptions used in the uncertainty analysis for the LULUCF sector (see ID# L.1 in table 3), and the assumptions were not clearly enough described to enable understanding of the category-level uncertainty estimates presented in the NIR and annex 2 to the NIR for categories 4.A, 4.B, 4.C, 4.D, 4.E, 4.F and 4.G. Further, there are inconsistencies between the information reported in the NIR and annex 2 to the NIR (see ID# G.4 above). Insufficient information was also reported on the quantitative combined uncertainty estimates for the same LULUCF categories. The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 3.5) or paragraph 42 of the UNFCCC Annex I inventory | Yes. Transparency |

reporting guidelines. During the review, the Party clarified that the reported combined uncertainties are based on EF uncertainty values and that uncertainty estimates for EFs reported in the NIR refer to a 95 per cent confidence interval. Slovenia indicated that it will improve the transparency of the combined uncertainty estimates by taking into account AD and EFs, and that these revised estimates will be included in its next annual submission.

The ERT recommends that Slovenia improve the transparency of the uncertainty analysis by including, in both the NIR and its annex 2, comprehensive information on the underlying assumptions of the source- and sink-level quantitative uncertainty estimates.

| G.6 | Recalculations | Slovenia improved its inventory and implemented recalculations for the IPPU and waste sectors in its most recent submission. However, the recalculations were either not or insufficiently explained in the NIR (see ID#s I.12, W.10, W.11 and W.12 below). The ERT noted that this is not in accordance with paragraphs 43–45 and 50(h) of the UNFCCC Annex I inventory reporting guidelines. Recalculations should be reported in the NIR for all applicable years with explanatory information and justification. | Yes. Transparency |
| | | The ERT recommends that Slovenia provide in the NIR a discussion of the impact of any recalculations as well as explanatory information on and justification for the recalculations in accordance with paragraphs 43–45 and 50(h) of the UNFCCC Annex I inventory reporting guidelines. | |

**Energy**

| E.15 | Fuel combustion – reference approach – other fossil fuels – $CO_2$ | Slovenia reported in the NIR (tables 3.2.3–3.2.4, p.46) and CRF table 1.A(c) on the differences between the sectoral and the reference approach. The differences reported in CRF table 1.A(c) are below 2 per cent for most years when considering total energy consumption and total $CO_2$ emissions; however, for some years, especially before 2000, there are larger differences (e.g. for $CO_2$ emissions for 1995, the difference is 2.98 per cent). When considering the differences for individual fuel types, there are differences of more than 2 per cent for some years. The differences are particularly large for other fossil fuels in CRF table 1.A(c) (which are reported in the reference approach (CRF table 1.A(b)) under waste (non-biomass fraction) and in the sectoral approach (CRF table 1.A(a)s1) under other fossil fuels). For example, the difference in $CO_2$ emissions for other fossil fuels, between the reference and the sectoral approach, for 2000 (CRF table 1.A(c)) is –84.22 per cent and for 2018, 52.65 per cent. The Party explained in the NIR (p.46) that the differences in AD and $CO_2$ emissions for other fossil fuels in CRF table 1.A(c) arose because in the reference approach the amount of fuel (i.e. 2,529.75 TJ) does not exclude the biogenic fraction of biomass, while in the sectoral approach only the non-biomass fraction is reported under other fossil fuels (i.e. 2,392.40 TJ). The ERT noted that the non-biomass fraction of waste was reported for 2000 onward in the reference approach, but in the sectoral approach numerical values were reported under other fossil fuels also for 1986–1999. During the review, the Party clarified that SORS did not collect data on other fossil fuels until 1999, and that data collected from 2000 onward initially only covered waste oils and waste tyres. The ERT found that, despite this additional information, it remained difficult to reconcile the differences in estimated energy consumption and $CO_2$ emissions for other fossil fuels between the reference and the sectoral approach. | Yes. Convention reporting adherence |
| | | The ERT recommends that Slovenia investigate and document the reasons for the differences in other fossil fuel consumption and provide explanations for the observed significant differences in the estimated $CO_2$ emissions from other fossil fuels between the reference and the sectoral approach. | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue/problem?[a] |
|---|---|---|---|
| E.16 | 1.A.1.a Public electricity and heat production – other fossil fuels – $CO_2$ and $CH_4$ | Slovenia reported in the NIR (p.58) that emissions from other fossil fuels originate from the only waste incineration thermal plant in the country, which commenced operations in 2009. These emissions were reported under subcategory 1.A.1.a.i (electricity generation) in CRF table 1.A(a). The Party reported in the NIR that the non-biogenic fraction of waste consisted mainly of plastics. The $CO_2$ EF of 20 t C/TJ (73.3 t $CO_2$/TJ) is based on a literature review because there is no $CO_2$ EF provided for plastics in the 2006 IPCC Guidelines. The $CO_2$ EF used corresponds to the lower end of the range of values provided in the 2006 IPCC Guidelines (vol. 2, chap. 2.3, table 2.2) for the non-biogenic fraction of municipal waste. | Yes. Accuracy |
| | | The ERT noted that the $CH_4$ EF (0.01 t $CH_4$/TJ) for industrial waste applied by the Party also corresponds to the lower end of the range provided in the 2006 IPCC Guidelines. However, there is no explanation in the NIR as to why the $CO_2$ EF used is considered more appropriate than the default value in the 2006 IPCC Guidelines for municipal waste (non-biogenic fraction) (91.7 t $CO_2$/TJ) and why the lowest value in the range was applied for the $CH_4$ EF rather than the default value (0.03 t $CH_4$/TJ). During the review, the Party explained that about half of the incinerated waste in the country is biomass and the non-biogenic fraction is plastics; therefore, it considered the lower end of the range of EFs provided in the 2006 IPCC Guidelines to be the most appropriate for plastics. | |
| | | The ERT recommends that Slovenia apply the default values for the $CO_2$ EF (91.7 t $CO_2$/TJ) and $CH_4$ EF (0.03 t $CH_4$/TJ) from the 2006 IPCC Guidelines (vol. 2, chap. 2.3, table 2.2) for the non-biogenic fraction of municipal waste or provide a justification for the choice of the $CO_2$ EF (73.3 t $CO_2$/TJ) and $CH_4$ EF (0.01 t $CH_4$/TJ) used. | |
| E.17 | 1.A.2.d Pulp, paper and print – biomass – $CO_2$, $CH_4$ and $N_2O$ | In response to a recommendation made in the previous review report (see ID# E.8 in table 3), Slovenia included AD for black liquor for 1986–2003 in the reporting of biomass under category 1.A.2.d (AD for black liquor for 2004–2006 were already included in the previous submission). In addition to black liquor, the Party also reported wood, fibrous sludge and biogas under biomass for this category (NIR annex 3, p.9). The ERT noted an outlier in the AD for biomass for 2007 (87.22 TJ) (when the use of black liquor ceased) and tried to reproduce the Party's calculation for 2007 using the amount of wood reported in the NIR (annex 3, p.9) (13,408 t) and the NCV for wood reported in the NIR (table 3.2.31) (12.17 TJ/kt). The result obtained by the ERT was 163 TJ for the AD rather than the 87.22 TJ reported in CRF table 1.A(a)s2. Because information in the NIR on AD, NCVs and EFs for category 1.A.2.d is not disaggregated by individual biomass fuel, it was not clear to the ERT how the AD and emissions for the different types of biomass were derived. | Yes. Transparency |
| | | During the review, the Party explained that the NCVs for wood in the NIR (table 3.2.31) are average NCVs for all activities under category 1.A.2 (manufacturing industries and construction) and that the NCVs reported in that table for 2007–2009 are not correct. The Party further explained that, for category 1.A.2.d, category-specific NCVs were used to calculate AD and emissions, so the average values provided in the NIR (table 3.2.31) for 2007 onward are not applicable to category 1.A.2.d. Slovenia provided the ERT with a spreadsheet containing disaggregated AD and NCVs for all biomass types under category 1.A.2.d. Based on the values therein, the AD for this category for 2007, as reported in CRF table 1.A(a)s2, seem correct to the ERT, given that the category-specific NCV for wood applied was 6.50 TJ/kt, which is significantly lower than the average NCV for wood reported in the NIR (table 3.2.31). | |
| | | The ERT recommends that Slovenia include in the NIR for this category the NCVs and EFs applied for all biomass types (black liquor, wood, fibrous sludge and biogas) and a description of the data sources used for the AD, NCVs and EFs. The ERT also recommends that the Party correct the NCVs for 2007–2009 reported in the NIR (table 3.2.31) to reflect the correct values applied for wood. | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue/problem?[a] |
|---|---|---|---|
| E.18 | 1.A.3.b Road transportation – liquid fuels – $CO_2$ | The ERT noted significant differences in the $CO_2$ IEF for diesel oil between subcategory 1.A.3.b.i (cars) and subcategories 1.A.3.b.ii (light-duty trucks) and 1.A.3.b.iii (heavy-duty trucks and buses) for 2006–2018. For example, for 2018, the $CO_2$ IEF for cars was 77.88 t $CO_2$/TJ, while for light-duty trucks and heavy-duty trucks and buses it was 70.07 t $CO_2$/TJ. In addition, while the $CO_2$ IEF for 1990–2005 (73.80 t $CO_2$/TJ) was identical for these three categories, for 2006 onward (when biodiesel was introduced in Slovenia) the $CO_2$ IEF increased for cars (77.88 t $CO_2$/TJ in 2018) and decreased for light-duty trucks and heavy-duty trucks and buses (70.07 t $CO_2$/TJ in 2018). | Yes. Comparability |
| | | During the review, the Party explained that the model used for calculating emissions from road transport (COPERT 4) does not provide the distribution of biomass (biodiesel) use among different vehicle types; therefore, AD are not disaggregated between biodiesel and diesel oil at the subcategory level (cars, light-duty trucks, and heavy-duty trucks and buses) for calculating emissions using COPERT 4. The Party also explained that only aggregate data on biomass consumption are available, not data by vehicle type. Therefore, in order to report the correct AD for diesel consumption under category 1.A.3.b (road transportation) in CRF table 1.A(a)s3, the Party subtracted the amount of biodiesel from the diesel consumed under subcategory 1.A.3.b.i (cars). | |
| | | The ERT noted that by doing so, the $CO_2$ IEF for 2018 (73.78 t $CO_2$/TJ) at the aggregated level (category 1.A.3.b) falls within the IPCC default range and also corresponds to the underlying $CO_2$ EF for fossil diesel in COPERT 4. However, at the disaggregated level (i.e. subcategory 1.A.3.b.i (cars)) the $CO_2$ IEF (77.88 t $CO_2$/TJ) is higher than the $CO_2$ IEF used in COPERT 4 for fossil diesel (73.80 t $CO_2$/TJ). As the Party did not subtract the amount of biodiesel from the diesel under subcategories 1.A.3.b.ii (light-duty trucks) and 1.A.3.b.iii (heavy-duty trucks and buses), the $CO_2$ IEF for those subcategories (70.07 t $CO_2$/TJ) is lower than the $CO_2$ IEF used in COPERT 4 for fossil diesel (73.80 t $CO_2$/TJ). The Party further explained that the amount of biodiesel subtracted from the diesel under subcategory 1.A.3.b.i (cars) was reported under biomass in the same subcategory. The Party indicated that it will use a newer version of the model (COPERT 5) for its next submission and hence the difficulty with reporting AD for diesel and biodiesel disaggregated by vehicle type should be resolved. | |
| | | The ERT recommends that Slovenia correctly report AD for biodiesel and fossil diesel under subcategories 1.A.3.b.i (cars), 1.A.3.b.ii (light-duty trucks) and 1.A.3.b.iii (heavy-duty trucks and buses) so that the $CO_2$ IEF for diesel reflects the $CO_2$ EF of the COPERT model used for all vehicle categories. | |
| E.19 | 1.A.3.b Road transportation – liquid fuels – $CO_2$ | The ERT noted inconsistencies in the gasoline consumption data between annex 3 to the NIR and CRF table 1.A(a)s3. For example, for 2018, the total gasoline consumption reported in annex 3 (section 1.8, p.102) is 17,814 TJ, leading to emissions of 1,262 kt $CO_2$ (with an IEF of 70.82 t $CO_2$/TJ), while in CRF table 1.A(a)s3 gasoline consumption was reported as 18,269.66 TJ but the same amount of $CO_2$ emissions was reported (1,262 kt $CO_2$, with an IEF of 69.05 t $CO_2$/TJ). | Yes. Comparability |
| | | During the review, the Party clarified that in annex 3 (section 1.8) only the fossil part of gasoline consumption was reported (17,814 TJ), while in CRF table 1.A(a)s3, the amount reported as AD (18,269.66 TJ) includes the biogenic quantity (bioethanol), as provided by the model used for calculating the AD and emissions (COPERT 4). The Party explained that COPERT 4 does not disaggregate between biogenic (bioethanol) and fossil gasoline; however, the emissions reported under category 1.A.3.b for gasoline correspond to the fossil part only. In addition, the Party clarified that AD for bioethanol were also reported under biomass in subcategory 1.A.3.b.i (cars), together with AD for biodiesel ("IE" was reported for biomass under subcategories 1.A.3.b.ii (light-duty trucks) and 1.A.3.b.iii | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue/problem?[a] |
|---|---|---|---|
| | | (heavy-duty trucks and buses)). The ERT considers that there is a comparability issue because reporting the AD for gasoline including the bioethanol amount under category 1.A.3.b impacts the $CO_2$ IEF reported in CRF table 1.A(a)s3. In addition, there is a duplication in the reporting of the AD, as the amount of bioethanol was also reported under biomass in subcategory 1.A.3.b.i (cars). | |
| | | The ERT recommends that Slovenia report the correct amount of (fossil) gasoline consumption (i.e. without the amount of bioethanol) under category 1.A.3.b (road transportation) in CRF table 1.A(a)s3 and correctly allocate bioethanol to biomass under this category to avoid the $CO_2$ IEF reported in CRF table 1.A(a)s3 being impacted by the amount of bioethanol blended into gasoline. | |
| E.20 | 1.A.3.b Road transportation – liquid fuels – $CO_2$ | The ERT noted that the trend in the $CO_2$ IEF for gasoline between 1990 (73.23 t/TJ) and 2018 (69.05 t/TJ) is significant (5.7 per cent). The IEF showed a slight decreasing trend from 1990 (73.23 t/TJ) to 2001 (72.11 t/TJ); remained constant from 2002 to 2007 (at 72.09 t/TJ); dropped by approximately 2 per cent from 2007 (72.09 t/TJ) to 2008 (70.41 t/TJ); and then showed a further decreasing trend from 2008 to 2018 (69.05 t/TJ), with inter-annual fluctuations and in particular an outlier value in 2016 (69.83 t/TJ). | Yes. Transparency |
| | | During the review, the Party explained that the trend from 1990 to 2001 was caused by the phase-out of leaded gasoline, as leaded gasoline has a slightly higher carbon content than unleaded. The trend from 2008 to 2018 can be explained by the introduction of bioethanol, and the increase in the $CO_2$ IEF in 2016 compared with the 2015 and 2017 values corresponds to the fact that less bioethanol was consumed in 2016 than in 2015 and 2017. The ERT noted that the NCV for gasoline (NIR annex 3, section 1.8, p.102) increased by almost 2 per cent between 2007 (43.1 TJ/kt) and 2008 (43.9 TJ/kt); therefore, the drop in the $CO_2$ IEF from 2007 to 2008 was apparently caused by the change in the NCV. In response, the Party explained that the NCV data used by SORS until 2007 was provided by fuel distributers, but it is unclear how the NCV was derived. In 2008, SORS obtained an NCV based on analyses of the biggest fuel distributor in Slovenia and it has used this value since then. | |
| | | The ERT recommends that Slovenia include in the NIR the reasons for the observed variation in the $CO_2$ IEF for gasoline throughout the time series. | |
| E.21 | 1.A.4.b Residential – biomass – $CH_4$ | Slovenia reported in the NIR (table 3.2.58, p.100) the country-specific $CH_4$ EFs developed for wood biomass combustion in the residential sector for 1986–2018. According to the Party, these EFs were calculated using specific $CH_4$ EFs for different wood combustion technologies developed by experts at the Energy Efficiency Centre of the Jozef Stefan Institute (Česen, 2020), but from the description in the NIR it was unclear to the ERT how the country-specific EFs had been derived. | Yes. Transparency |
| | | During the review, the Party provided the ERT with a copy of the aforementioned study (Česen, 2020) that was undertaken following a recommendation in the previous review report (see ID# E.12 in table 3). For this study, two literature sources were selected, one from Sweden (Kindbom et al., 2017) and one from Italy (Ozgen and Caserini, 2018). According to the study, $CH_4$ EFs for all residential wood combustion installations (except open fireplaces) were calculated on the basis of data in Kindbom et al. (2017) but considering Slovenian conditions, that is country-specific assumptions regarding the moisture content of the fuel and the operation of the installations with partial loads. For open fireplaces, the $CH_4$ EF from Ozgen and Caserini (2018) was used. The derived $CH_4$ EFs were compared with values used by other countries and were considered suitable for use in Slovenian conditions by the experts from the Energy Efficiency Centre. The ERT considers the methodological approach used to derive | |

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| | | country-specific $CH_4$ EFs for wood combustion for category 1.A.4.b (residential) to be appropriate, particularly because the $CH_4$ EFs correspond with those used by other countries, as shown in the study. | |
| | | The ERT recommends that Slovenia include in the NIR a brief description of the methodological approach used to derive country-specific $CH_4$ EFs for residential wood combustion installations, including the information that the $CH_4$ EFs applied by the Party are based on a literature review of $CH_4$ EFs for residential wood combustion installations and that two publications (from Sweden and Italy) were selected, and include references to those two publications in the NIR. | |
| IPPU | | | |
| I.12 | 2.B.10 Other (chemical industry) – $CO_2$ | Slovenia reported in the 2019 NIR (p.143) that it had performed a recalculation for hydrogen production owing to the availability of new data on natural gas for years prior to 2011 and small corrections to the data for 2011–2016. The ERT noted that hydrogen production under this category was reported as "NO" for 1986–2009 in CRF table 2(I).A-Hs2 in the previous submission. The ERT further noted that the information on recalculations provided in the NIR is not sufficiently transparent (e.g. does not specify whether AD and emissions reported for hydrogen production for 1986–2010 had been reported previously in another category, whether errors had been corrected or whether there were any changes to the methods or EFs). | Yes. Transparency |
| | | During the review, the Party explained that in the 2018 submission, for 1986–2010, all non-energy use of natural gas was considered to be methanol production and therefore no emissions were reported for hydrogen production. For the 2019 submission, Slovenia estimated the amount of natural gas for hydrogen production and reported the corresponding emissions for 1986–2010 for the first time. The Party also explained that minor corrections to the AD for 2011–2016 had been made to harmonize them with the AD for non-energy use of natural gas; however, an apparent error in the conversion from TJ to t for the current AD used for 2011–2016 had been noted. The Party indicated that AD for hydrogen production will be recalculated again for the next submission. | |
| | | The ERT recommends that Slovenia improve the description in the NIR of how AD on natural gas for hydrogen production were obtained, with reference to the data sources and including the assumptions and values of the $CO_2$ EF applied for calculating emissions from hydrogen production. The ERT also recommends that, if recalculations are performed for this category for the next submission, the Party report in the NIR information on the recalculations in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines. | |
| I.13 | 2.F.1 Refrigeration and air conditioning – HFCs | The ERT noted that emissions from transport refrigeration decreased between 2017 and 2018 from 19.54 to 15.66 kt $CO_2$ eq as reported in CRF table 2(II).B-Hs2. The ERT also noted that the Party explained in the NIR (p.170) that the number of refrigerated transport vehicles in 2018 was misrepresented owing to an error in the database, which was identified after the CRF tables were submitted, and actually the number of vehicles in 2018 should have been similar to that in 2017. During the review, the Party confirmed that emissions for 2018 were underestimated as a result of the error and informed the ERT that, using the correct number of vehicles for 2018 (3,943), they correspond to 19.93 kt $CO_2$ eq. The ERT noted that this change in emission estimates for 2018 from 15.66 to 19.93 kt $CO_2$ eq is below the threshold of significance according to paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. | Yes. Accuracy |
| | | The ERT recommends that Slovenia correct the number of vehicles used in estimating emissions from transport refrigeration for 2018 and report the corresponding revised emissions in CRF table 2(II)B-Hs2. | |

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| I.14 | 2.G.1 Electrical equipment – SF$_6$ | Slovenia reported SF$_6$ emissions from disposal of electrical equipment in CRF table 2(II)B-Hs2 using a disposal loss factor of 0.10 per cent, which is based on expert judgment. Emissions from equipment disposal were reported for 2012 onward, which is correct considering the IPCC default lifetime of this equipment of 35 years (2006 IPCC Guidelines, vol. 3, tables 8.2–8.3). The ERT noted that the disposal loss factor (0.10 per cent) is lower than that of other countries (the EU average is 2.83 per cent) and that SF$_6$ emissions from disposal were reported as "NO" for 2014 and 2018. | Yes. Accuracy |
| | | During the review, the Party clarified that the disposal loss factor of 0.10 per cent, based on expert judgment, can be justified by the high price of the gas. Further, the Party explained that data on equipment disposal are provided in verified operator reports and "NO" is reported for those years of the time series for which there is no information available on whether equipment was replaced or removed. The ERT accepts that in some years of the time series no equipment was replaced or removed; however, it considers that the use of a disposal loss factor of 0.10 per cent could lead to an underestimation of emissions. | |
| | | The ERT recommends that Slovenia reassess the value of the disposal loss factor applied to estimate SF$_6$ emissions from the disposal of electrical equipment and, on the basis of that analysis, provide documentation and references that justify the value of 0.10 per cent, or revise it accordingly. | |
| Agriculture | | | |
| A.10 | 3.A.1 Cattle – CH$_4$ | Slovenia reported in CRF table 3.As1 the CH$_4$ IEFs for non-dairy cattle. The ERT noted that the values for 2009 (53.10 kg CH$_4$/head/year) and 2010 (52.49 kg CH$_4$/head/year) are markedly lower than those for the preceding and succeeding years (around 54.55–54.79 CH$_4$/head/year). During the review, the Party explained that the lower CH$_4$ IEFs for 2009–2010 resulted from changes in the structure of the population of the non-dairy cattle category when the poor economic situation, in particular low milk prices, led to a high rate of slaughter. The ERT accepts this explanation. | Yes. Transparency |
| | | The ERT recommends that Slovenia include in the NIR an explanation of the inter-annual variation in the CH$_4$ IEFs for non-dairy cattle for 2009–2010 to clarify the trend in the time series for those years. | |
| A.11 | 3.B Manure management – CH$_4$ | Slovenia reported in its NIR (p.193) that an average annual temperature of 12 °C was used when selecting MCF values. The ERT noted, however, that data from the Slovenian Environment Agency indicate that the average annual temperature in the country is about 10 °C (see https://www.arso.gov.si/en/Weather/climate/climate_of_slovenia.html), which aligns with other online climate data sources (e.g. https://en.climate-data.org/europe/slovenia-7/). | Yes. Accuracy |
| | | During the review, the Party clarified that, when deciding on the average annual temperature, it relied mainly on data for 1971–2000 shown in the temperature map in the NIR (figure 5.3.2, p.192), but also considered that temperatures have been increasing over the past few decades. Slovenia provided the ERT a link to an updated temperature map (which will replace figure 5.3.2 in the next NIR) that shows an average annual temperature range between 10 and 11 °C for the 30-year period 1981–2010. Further, the Party noted that the references mentioned by the ERT provide average annual temperatures for 1971–2000, and informed the ERT that a new temperature map for 1991–2020 will be available within a couple of years. Slovenia suggested that the average annual temperature should be set at 11 °C. The ERT agrees with Slovenia that temperatures have been increasing in the last few | |

decades but notes that using an average annual temperature of 12 °C results in an overestimation of emissions, certainly for the first part of the time series and possibly for the entire time series.

The ERT recommends that Slovenia change its assumption on the average annual temperature used to select MCF values to reflect the data available, that is, to use an average annual temperature of 10 °C for the early part of the time series, increasing to 11 °C during the time series and possibly increasing further for later and future years.

| A.12 | 3.B Manure management – $CH_4$ | Slovenia reported in CRF table 3.B(a)s2 that part of cattle and swine manure is handled in anaerobic digesters. In the NIR (pp.193 and 197), the Party reported that an MCF of zero was used for this MMS. The ERT noted that, depending on the amount of time the manure is in the digester (residence time) or stored prior to transport to the digester, some or most of the $CH_4$ will have been emitted, and that an MCF of zero is considered unlikely because for most animal housing systems it is not possible for manure to be removed as frequently as daily. | Yes. Accuracy |

During the review, the Party explained that anaerobic digesters in Slovenia are single-farm plants and that, to optimize $CH_4$ yield in biogas production, there is an incentive to keep the residence time low. The ERT agrees that there is an incentive to reduce residence time in anaerobic digesters, but notes that there are practical implications of removing manure on a daily basis, and hence is of the view that an MCF of zero could lead to an underestimation of emissions. The ERT notes that the use of digesters is negligible for cattle manure management (0.36 per cent in 2018), and while digesters are more often used for swine manure management (12.2 per cent in 2018), emissions from their use would not be significant. However, this could change if this MMS gains popularity.

The ERT recommends that Slovenia reassess the MCF value applied (which is currently zero) for anaerobic digestion of cattle and swine manure to ensure that $CH_4$ emissions are not underestimated for this MMS.

| A.13 | 3.B Manure management – $N_2O$ | Slovenia reported in NIR tables 5.4.4, 5.4.5 and 5.4.6 (pp.204, 206 and 207) the parameters used in estimating $N_2O$ emissions from manure management of cattle, swine and poultry, respectively. The ERT noted that for cattle (NIR table 5.4.4) and swine (NIR table 5.4.5) multiple references were provided (e.g. for cattle, EMEP/EEA (2016) and Menzi et al. (1997), and for swine, EMEP/EEA (2016) and United States Environmental Protection Agency (2004)), but without a clear indication of which parameters come from which source. | Yes. Transparency |

During the review, the Party provided information on which reference was used for the individual parameters for cattle and swine. For poultry (NIR table 5.4.6), Slovenia used only one source of data, the 2016 EMEP/EEA air pollutant emission inventory guidebook. The ERT noted that some of the values of the parameters are different in the 2019 EMEP/EEA air pollutant emission inventory guidebook. In response, Slovenia indicated that such values will be updated to those in the 2019 guidebook for the next submission.

The ERT recommends that Slovenia specify the source for each parameter used in estimating $N_2O$ emissions from manure management of cattle (in NIR table 5.4.4) and swine (in NIR table 5.4.5). Furthermore, the ERT also recommends that Slovenia verify whether the latest version of the EMEP/EEA air pollutant emission inventory guidebook contains updated guidance compared with the currently used values from the 2016 version, assess their applicability to its national circumstances and report on any resulting changes made in the next submission.

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| LULUCF | | | |
| L.16 | 4. General (LULUCF) – CO$_2$ | Slovenia reported information on carbon stocks, gains and losses for living biomass applied for various land-use types in the NIR (e.g. data from Mali et al. (2017) were mentioned on p.263). These values were used in several equations in the NIR (e.g. equations 15 and 16), but the specific values applied were not always transparently referred to or presented in the NIR. Therefore, the ERT could not check the calculations of carbon stocks presented in the inventory. During the review, the Party provided an overview table showing carbon stocks in living biomass by carbon pool (above-ground biomass, below-ground biomass, deadwood, litter and soils) and land use (forest land remaining forest land, cropland annual, cropland perennial, grassland annual, grassland perennial, wetlands, settlements and other land). The ERT welcomes this overview table and confirmed with the Party that similar information on gains and losses by carbon pool and land category (separated by subcategories) will be included in the next submission. | Yes. Transparency |
| | | The ERT recommends that Slovenia improve the transparency of its reporting on the LULUCF sector by completing the table provided during the review (which shows carbon stocks for each carbon pool by land-use type, further separated by subcategory) with values for gains and losses for living biomass and including the table in its next NIR. | |
| L.17 | Land representation – CO$_2$ | In response to a previous recommendation, Slovenia applied crown coverage as the basis for its forest definition, replacing the previous definition that was based on number of trees (NIR sections 6.2.2–6.2.5, p.233) (see ID# L.2 in table 3). However, the description of the forest definition in the NIR does not include the parameters applied for crown cover (which are for forest land and grassland >10 per cent). During the review, the Party clarified that the current text in the NIR does not include the crown cover classification parameters, but this will be corrected in the next submission. | Yes. Transparency |
| | | The ERT recommends that Slovenia include in the NIR the crown cover classification parameters applied for different land uses. | |
| L.18 | 4.A.1 Forest land remaining forest land – CO$_2$ | Slovenia reported in its NIR (section 6.4.4.2, p.251) that nitrogen fertilization and drainage and rewetting of forests are not common practices in Slovenia and therefore the corresponding emissions were not reported in CRF tables 4(I) and 4(II). The ERT noted that the Party did not include in the NIR any reference to national documents or legal instruments indicating that these are not common practices or are prohibited by law. During the review, the Party clarified that there is a national legal act prohibiting the fertilization of forest land, namely the decree on the protection of waters against pollution caused by nitrates from agricultural sources (available at http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED5124), which in its article 11 also prohibits the fertilization of overgrown agricultural land and infertile and inland water land. The Party indicated that it will investigate whether there is a national legal instrument prohibiting the drainage of forest soils. | Yes. Transparency |
| | | The ERT recommends that Slovenia include in its next NIR the information provided during the review concerning the prohibition of the fertilization of forest land and also documentation (i.e. reference to a legal document, if possible) of the non-occurrence of drainage and rewetting of forest land in the country to justify the assumptions made. | |

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| L.19 | 4.A.1 Forest land remaining forest land – $CO_2$ | Slovenia reported net emissions and removals for forest land remaining forest land in the NIR (table 6.4.2, p.244). The ERT noted a significant difference between the values for 2013 (–6,367.51 Gg $CO_2$) and 2014 (1,028.35 Gg $CO_2$), which has an impact on the estimated net emissions and removals from the LULUCF sector, as shown in the NIR (figure 6.1.1, p.229). | Yes. Transparency |
| | | During the review, the Party clarified that the difference in emissions and removals between 2013 and 2014 is attributable to the occurrence of several natural disturbances in 2014–2018. The disturbance with the most damaging effect on Slovenian forests was the ice storm that occurred from the end of January until the beginning of February 2014 (Nagel et al., 2016), followed by the extensive bark beetle outbreak in the years after (de Groot et al., 2018). Moreover, there were windthrow events in December 2017 and October 2018 in the regions of Kočevje, Notranjska and Koroška, causing total wood damage to an area of around 1.6 million m$^3$ as reported by the Slovenia Forest Service. As a result of these disturbances in 2014–2018, sanitary felling increased by more than 50 per cent and tree mortality by almost 200 per cent, as indicated in the fourth national forest inventory, which is based on 2018 FECS data. The ERT is of the view that this information is crucial to understanding the time series of emissions and removals for forest land remaining forest land. | |
| | | The ERT recommends that Slovenia include in its NIR the information provided during the review concerning natural disturbances, which explains the reasons for the difference in net emissions and removals for forest land remaining forest land between 2013 and 2014. | |
| L.20 | 4.A.2 Land converted to forest land – $CO_2$ | Slovenia reported in its NIR (p.255) that it applied a tier 2 approach (stock difference method) for calculating carbon stock changes in soils and a tier 1 approach (zero changes in carbon stocks) for calculating carbon stock changes in deadwood and litter. However, the ERT noted that the Party has data available on carbon stocks to apply a tier 2 method for carbon stock changes in deadwood and litter. During the review, the Party clarified that it did apply the tier 2 approach (stock difference method) using equation 2.23 from the 2006 IPCC Guidelines (vol. 4, chap. 2) to estimate carbon stock changes in deadwood and litter. However, it did not update the description of the methodology in the NIR. | Yes. Convention reporting adherence |
| | | The ERT recommends that Slovenia update the description in the NIR of the methodology applied for this category to reflect the use of the stock difference method (tier 2) and equation 2.23 from the 2006 IPCC Guidelines (vol. 4, chap. 2) for calculating carbon stock changes in deadwood and litter. | |
| L.21 | 4.B.1 Cropland remaining cropland 4.C.1 Grassland remaining grassland – $CO_2$ | Slovenia applied a tier 1 approach to calculating carbon stock changes in mineral soils for the subcategories under cropland remaining cropland (category 4.B.1) and grassland remaining grassland (category 4.C.1) (NIR pp.264 and 275), although these categories are key categories. | Yes. Accuracy |
| | | During the review, the Party clarified that carbon stock changes in mineral soils were estimated using the tier 1 approach only for the subcategories annual grassland remaining annual grassland and annual cropland remaining annual cropland, and only for 2007–2018. The main reason for applying the tier 1 approach for these subcategories was that, in order to produce vector maps to compare SOC stocks in 2007 and 2016, input data (i.e. vector layers) – a land-use map (obtained from the Integrated Administration and Control System/Land Parcel Identification System), a map of requirements for agri-environment-climate payments (main crop, all crops), a map of gross nitrogen input from livestock manure and a soil map (mineral, organic) – were obtained from various sources. Four vector layers – land use, management, input and reference stock – were thus produced for 2007 and 2016. These input data have only been available since 2007. In addition, there is no permanent soil monitoring system in place | |

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| | | for agricultural areas that would enable the application of a higher-tier method. On the request of the ERT, the Party provided estimates of the contribution of the SOC pool in mineral soils to overall emissions and removals. The soil pool contributed 48 per cent to overall net emissions in annual grassland remaining annual grassland and 27 per cent in annual cropland remaining annual cropland. Since both land-use types are key categories (see NIR table 1.5.1) and the SOC pool accounts for 25–30 per cent or more of emissions and removals for the category, a higher-tier method should be applied for that pool. During the review, the Party explained that permanent soil monitoring on agricultural land is planned, but it is unclear when it will start. | |
| | | The ERT recommends that Slovenia develop a higher-tier method for estimating emissions and removals from the SOC pool in mineral soils for the subcategories annual grassland remaining annual grassland and annual cropland remaining annual cropland, or explain in the NIR the reasons why national circumstances do not allow a higher-tier method to be applied. | |
| L.22 | 4.B.1 Cropland remaining cropland<br><br>4.C.1 Grassland remaining grassland – $CO_2$ | As noted in ID# L.21 above, the tier 1 method is only used for annual grassland remaining annual grassland and annual cropland remaining annual cropland for calculating carbon stock changes in mineral soils per area. However, the ERT could not understand from the information in the NIR the different methods applied for calculating carbon stock changes in mineral soils between annual cropland and grassland, and perennial cropland and grassland. In addition, the ERT noted that Slovenia reported "NE" for carbon stock changes in mineral soils per area in CRF table 4.C for perennial grassland remaining perennial grassland, although the relevant calculation (equation 28) was described in the NIR (p.275) (i.e. the calculation of $\Delta C_{GGmineral}$, the annual change in carbon stocks in mineral soils). | Yes. Transparency |
| | | During the review, the Party confirmed that the calculation method was different for the subcategories annual grassland remaining annual grassland and perennial grassland remaining perennial grassland. For annual grassland remaining annual grassland, the tier 1 method was used because permanent grassland in the country is subject to mowing, grazing and fertilizing, and therefore the country-specific value of SOC for grassland reported in the NIR (table 6.3.10, p.241) could not be used as the reference SOC in combination with the other default carbon stock change factors from the 2006 IPCC Guidelines (vol. 4, chap. 6, table 6.2). For perennial grassland remaining perennial grassland, the Party assumed that the SOC stock is in equilibrium (i.e. that the carbon stock change is zero). To underpin this assumption, the Party explained that this category includes overgrown areas, trees, shrubs and forest trees on agricultural land, all of which are not subject to soil impacts resulting from management and thus SOC is probably increasing over time or in equilibrium. At the moment, Slovenia has no continuous soil monitoring system in place for agricultural land at the country level that would allow the carbon stock changes in mineral soils for perennial grassland to be estimated. For cropland, the Party clarified that the method for calculating carbon stock changes in mineral soils does not differ between annual cropland remaining annual cropland (tier 1 method) and perennial cropland remaining perennial cropland; however, in this case not all land-use classes under perennial cropland (i.e. extensive orchards and forest plantations) were included in the analysis. | |
| | | The ERT commends the Party for the explanation provided and notes that information is still missing in the NIR regarding (1) the difference between the methods applied for calculating carbon stock changes in mineral soils for annual grassland and for perennial grassland; (2) the SOC values applied for annual grassland remaining annual grassland, considering that the Party clarified above that country-specific values from the NIR (table 6.3.10) were not applied; (3) the rationale justifying why the carbon stock change for perennial grassland remaining perennial grassland is considered to be in equilibrium; and (4) clarification that there is no differentiation in the method for | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue/problem?[a] |
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| | | calculating carbon stock change in mineral soils between annual cropland remaining annual cropland and perennial cropland remaining perennial cropland. | |
| | | The ERT recommends that Slovenia improve the transparency of the NIR by clarifying (1) the difference between the methods applied for calculating carbon stock changes in mineral soils for annual and for perennial grassland; (2) the SOC values applied for annual grassland remaining annual grassland; (3) the reasons why carbon stock change for perennial grassland remaining perennial grassland is considered in equilibrium; and (4) that there is no differentiation between the methods used for calculating carbon stock changes in mineral soils for annual cropland remaining annual cropland and for perennial cropland remaining perennial cropland. | |
| L.23 | 4.B.2 Land converted to cropland<br><br>4.C.2 Land converted to grassland – $CO_2$ | Slovenia applied equations 2.15 and 2.16 from the 2006 IPCC Guidelines (vol. 4, chap. 2) to calculate carbon stock changes in living biomass for conversions within cropland or from land to cropland, and conversions within grassland or from land to grassland (see equations 15, 16, 19, 26, 27 and 29 in the NIR). The ERT noted that there is an error in these equations concerning the multiplication of the annual area of land under conversion. The ERT also noted that in these equations the biomass carbon stock after the conversion ("$C_{after}$") was given as zero although national values are available. | Yes. Transparency |
| | | During the review, the Party clarified that it checked that the calculations for estimating carbon stock changes in living biomass are correct. However, equations 15, 16, 19, 26, 27 and 29 in the NIR are not presented correctly: the parameter "A" denotes only the annual area of converted land (i.e. area of land use "i" converted to another land-use category in a certain year, in accordance with equation 2.16 from the 2006 IPCC Guidelines), while the annual change in biomass carbon stocks due to growth ("$\Delta C_G$") and due to losses ("$\Delta C_L$") should be multiplied by the conversion area (parameter "A") for a transition period of 20 years, in accordance with equation 2.15 from the 2006 IPCC Guidelines. | |
| | | Concerning "$C_{after}$", the Party explained that the tier 1 approach was applied in accordance with the 2006 IPCC Guidelines, which assume that biomass carbon stocks immediately after conversion (and not the mean values of a land-use type) are zero as there were no country-specific data available. For conversion within cropland or from land to cropland, the Party justified using a "$C_{after}$" of zero for all conversions to annual cropland and annual grassland because carbon gains in living biomass from annual growth are offset by losses from harvesting; and for conversion within grassland or from land to grassland, the Party justified that living biomass stocks of land immediately after all land conversions to perennial cropland and perennial grassland are still substantially lower than the average carbon stocks, as measured during monitoring. | |
| | | The ERT recommends that Slovenia correct its presentation of equations 15, 16, 19, 26, 27 and 29 to reflect that parameter "A" denotes the correct area of land under conversion, and include the justification provided during the review concerning using zero as the value of carbon stocks in living biomass after land conversion ("$C_{after}$"). | |
| L.24 | 4.B.2 Land converted to cropland<br><br>4.C.2 Land converted to grassland – $CO_2$ | Slovenia applied equations 2.15 and 2.16 from the 2006 IPCC Guidelines (vol. 4, chap. 2) to calculate carbon stock changes in living biomass for conversions within cropland or from land to cropland, and conversions within grassland or from land to grassland land (see equations 15, 16, 19, 26, 27 and 29 in the NIR). The ERT noted that the Party applied a value for growth ($\Delta C_G$) for these conversion types but did not consider the losses ($\Delta C_L$). This could lead to an overestimation of removals or an underestimation of emissions for the land-use categories land | Yes. Accuracy |

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| | | converted to cropland and land converted to grassland. During the review, the Party explained that it is difficult to obtain values for losses but agreed with the ERT that losses must be taken into account. | |
| | | The ERT recommends that Slovenia apply equations 2.15 and 2.16 from the 2006 IPCC Guidelines (vol. 4, chap. 2) correctly by taking into account losses in biomass carbon stocks to avoid any possible overestimation of removals or underestimation of emissions for the land-use categories land converted to cropland and land converted to grassland. If it is not possible to estimate losses in living biomass, the ERT recommends that the Party apply a simple stock change approach (equations 2.4 and 2.5 from the 2006 IPCC Guidelines), thereby taking into account the mean carbon stock values for the land-use types, rather than the biomass carbon stocks immediately after conversion. | |
| L.25 | 4.C.1 Grassland remaining grassland – $CO_2$ | The ERT noted a decreasing trend in the net carbon stock changes in mineral soils per area in the time series. There was a drop between 2006 (0.032 t C/ha) and 2007 (0.006 t C/ha), and a continued decrease thereafter, reaching –0.0093 t C/ha in 2018. During the review, the Party explained that changes in land-use management occurred in 2007, following the introduction of initiatives such as the Rural Development Programme 2007–2013 (which resulted in, for example, different subsidy payment regimes and incentives to change crop types and/or adopt different management technologies) and the introduction of the agri-environment-climate policy measures (which provided for additional activities related to soil management). | Yes. Transparency |
| | | The ERT recommends that Slovenia explain in the NIR the reasons for the drop in the values of net carbon stock changes in mineral soils between 2006 and 2007 and the continuing decrease after 2007. | |
| L.26 | 4.D Wetlands – $CO_2$, $CH_4$ and $N_2O$ | Slovenia did not use the Wetlands Supplement in preparing its 2020 submission. During the review, the Party explained that it will use updated methods and EFs from the Wetlands Supplement as well as from the 2019 Refinement to the 2006 IPCC Guidelines for the next annual submission. In particular, chapters 2 and 5 of the Wetlands Supplement, which refer to drained inland organic soils and inland mineral soils, will be taken into account. The Party stated that improved EFs will be used for estimating emissions from cultivated or drained organic soils and mineral soils in the category cropland remaining cropland, while new estimates of emissions from drained organic and mineral soils will be provided for the category grassland remaining grassland (i.e. areas that are part of the Ljubljana marshes). In addition, $CH_4$ emission estimates will be provided for agricultural land that is seasonally flooded. The ERT welcomes the information provided during the review as well as the Party's intention to use the Wetlands Supplement. | Not an issue/problem |
| | | The ERT reiterates the encouragement from the previous review report for Slovenia to use the Wetlands Supplement in preparing its annual inventory for future annual submissions. | |
| L.27 | 4.E.2 Land converted to settlements – $CO_2$ | Slovenia described in its NIR (p.290) the calculation of carbon stock changes in soils for land converted to settlements. The Party assumed that the carbon stock of soils for settlements is half of the carbon stock value for annual grassland, but did not provide a justification for this assumption. | Yes. Transparency |
| | | During the review, the Party provided some references from the scientific literature (e.g. Edmondson et al., 2014) supporting the assumption, and explained that the assumption is also supported by the carbon stock change estimate derived from a study based on visual interpretation of digital orthophotos for 20 medium-sized cities. The Party also referred to the expert judgment provided in the 2017 NIR (p.440) of its neighbouring country Austria, stating that carbon stocks of unsealed areas of settlements are estimated to be as high as those of intensively managed | |

| | | grassland soils, while carbon stocks of sealed areas are assumed to be zero. Nevertheless, the ERT considers that Slovenia's description in the NIR of the calculation of carbon stock changes in soils and the assumption made is not clear or transparent. | |
| | | The ERT recommends that Slovenia include in the NIR the information underpinning the assumption that the carbon stock of soils for settlements is half of the carbon stock value for annual grassland (e.g. references to the scientific literature and to the study on visual interpretation of digital orthophotos, as well as to the expert judgment described above). | |
| L.28 | 4(V) Biomass burning – $CO_2$ | Slovenia reported $CO_2$ emissions from wildfires on forest land remaining forest land in the NIR (table 6.4.5) and CRF table 4(V). Although they can be reported in CRF table 4(V), the ERT is aware that in many countries carbon losses in living and dead biomass due to forest fires are covered by a forest inventory and are thus reported under category 4.A.1. During the review, the Party clarified that losses in living and dead biomass are not covered by the FECS because its systematic grid of 4 km by 4 km is not dense enough to detect the effects of a wildfire. Slovenia did not clearly describe these considerations in the NIR. | Yes. Transparency |
| | | The ERT recommends that Slovenia include in the next NIR documentation showing that wildfires are not covered by the FECS because its grid size is too large and therefore there is no double counting of $CO_2$ emissions from wildfires in forest land remaining forest land. | |
| Waste | | | |
| W.9 | 5.A Solid waste disposal on land – $CH_4$ | Regarding $CH_4$ recovery, Slovenia reported in the NIR (p.317) that, if the captured landfill gas cannot be used for energy purposes, it must be incinerated in the area of landfill or prevented from being emitted into the air using other methods equivalent to gas incineration. The ERT noted that, according to the 2006 IPCC Guidelines (vol. 5, chap. 3, p.3.19), it is good practice to base the reporting of gas recovery on the metering of all gas recovered for energy and flaring, or on the monitoring of the amount of electricity produced from the gas (considering the availability of load factors, heating value and corresponding heat rate, as well as other factors impacting the amount of gas used to produce the monitored amount of electricity). | Yes. Transparency |
| | | During the review, the Party explained that, according to the national landfill regulation (see http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED6660), landfill gas shall be collected from all landfills receiving biodegradable waste and the landfill gas must be treated and used. If the gas collected cannot be used to produce energy, it must be flared. The inventory team has no technical specifications on the measurements of this gas before flaring. The Party also explained that all landfills have to obtain permits under the EU directive on integrated pollution prevention and control, where all the details on monitoring are described (see https://ec.europa.eu/environment/archives/air/stationary/ippc/summary.htm). Pursuant to the national landfill regulation (article 46, para. 6), operators of installations covered by the EU directive must ensure that estimates are made of the annual amounts of GHG emissions, the $CH_4$ captured (in kg) and the electricity produced from the captured $CH_4$ (in kWh). The landfill operators must submit annual reports on the implementation of operational monitoring to the relevant ministry. The Party further explained that, for inventory purposes, the total amount of captured $CH_4$ reported in the annual reports was used, while, for the disaggregation of electricity production and flaring, the amount of landfilled gas used for electricity production from SORS data was used. The ERT welcomes | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue/problem?[a] |
|---|---|---|---|
| | | the information provided by the Party and notes that CH$_4$ recovery should be reported only when references documenting the amount of CH$_4$ recovery are available (2006 IPCC Guidelines, vol. 5, chap. 3, p.3.19). | |
| | | The ERT recommends that Slovenia ensure that it follows good practice for the reporting of gas recovery (i.e. 2006 IPCC Guidelines, vol. 5, chap. 3, p.3.19) and report in the NIR information from the annual reports prepared by installations operating under the EU directive on integrated pollution prevention and control on monitoring of gas recovery both for flaring and for energy. | |
| W.10 | 5.D.2 Industrial wastewater – CH$_4$ | Slovenia included AD for the organic chemical industry for 2004–2016 in its revised estimates submitted during the 2018 review cycle (on 28 September 2018) and for 1986–2003 in response to a previous recommendation (see ID# W.7 in table 3). The 2019 NIR (section 7.5.5) indicated that CH$_4$ emissions had been recalculated for the entire time series by including in the estimates emissions from the organic chemical industry for 1986–2003 and data on biogas facilities from two pulp and paper producers and one beer producer. However, although the Party added new sources of emissions in the recalculations performed for the 2019 submission, the ERT noted that CH$_4$ emissions for 2004–2016 reduced by 40–60 per cent (compared with the level reported in the 2018 submission), and no clear reason for the reduction was included in the 2019 NIR. | Yes. Convention reporting adherence |
| | | During the review, the Party explained that for the 2019 submission CH$_4$ emissions were recalculated for the entire time series (1986–2016) owing to the inclusion of emissions from the organic chemical industry for 1986–2003, the exclusion of the pharmaceutical industry for 2004 onward and the revision of TOW data for 2004 onward for three industrial plants (for which TOW was considered to be zero). The Party clarified that the revision of the TOW data was the main reason for the reduction in the estimated CH$_4$ emissions for 2004 onward. However, the ERT considers that the explanation of the recalculation in the NIR does not provide clarification on or justification for the pharmaceutical industry being excluded from the calculations (see ID# W.11 below), or the changes of the TOW data and the impact of those changes on the emissions (see ID# W.12 below). | |
| | | The ERT recommends that, if recalculations are performed for this category for the next submission, Slovenia include in the NIR explanatory information on the recalculations in accordance with paragraphs 43–45 and 50(i) of the UNFCCC Annex I inventory reporting guidelines, including on any changes in emission estimates and the reason for the changes compared with the previously submitted inventory, as well as on changes in response to the review process. | |
| W.11 | 5.D.2 Industrial wastewater – CH$_4$ | Slovenia performed recalculations for this category for its 2019 submission, excluding the production of pharmaceutical products from the CH$_4$ emission estimates, without providing clarification in the NIR on the reason for the exclusion (see ID#s W.7 in table 3 and W.10 above). Therefore, it was not clear to the ERT whether the AD for the pharmaceutical industry were included under the production of organic chemical industry, as the wastewater output (in m$^3$) of the organic chemical industry reported in the 2019 and 2020 submissions (NIR table 7.5.5, p.337) is significantly higher than the wastewater output of the pharmaceutical industry reported in the 2018 submission (NIR table 7.5.6, p.320). | Yes. Completeness |
| | | During the review, the Party clarified that the pharmaceutical industry was excluded from the emission calculations because it is not listed in the 2006 IPCC Guidelines (vol. 5, chap. 6, table 6.9, p.6.22), which is the source of the default COD values. The Party also clarified that no plant-specific COD data are available in the country for inlet waters – all measurements are made on outlet waters only. However, the ERT notes that Slovenia has reported emissions from the pharmaceutical industry previously, and considers that excluding AD without justification is a | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue/problem?[a] |
|---|---|---|---|
| | | completeness issue. Moreover, the 2006 IPCC Guidelines (table 6.9) provide only an example of industrial wastewater data – indicative of the industry types that should be considered in the inventory – and should not be seen as preventing the inclusion of other industries that have a significant carbon load in their wastewater flow. If the pharmaceutical industry generates wastewater with significant quantities of organic carbon, its emissions should be included in the inventory. | |
| | | The ERT is of the view that there are three possible ways of estimating COD or justifying the exclusion of COD for the pharmaceutical industry: (1) obtain data from plant operators on outlet water COD and estimate the efficiency of COD removal; (2) use expert judgment (e.g. from industry consultation, or the assumption that the organic load from the pharmaceutical industry is similar to that from the organic chemical industry per unit of production); or (3) obtain COD inlet data directly from measurement and monitoring using on-site systems, or indirectly from relevant literature. In response, Slovenia indicated that it considers the use of expert judgment to be the most likely of these solutions to be applied given its national circumstances. | |
| | | The ERT recommends that Slovenia estimate $CH_4$ emissions from the pharmaceutical industry or provide in the NIR clear justification for their exclusion based on expert judgment (e.g. documentation showing that the pharmaceutical industry does not generate organic carbon). | |
| W.12 | 5.D.2 Industrial wastewater – $CH_4$ | Slovenia performed a recalculation in its 2019 submission that reduced $CH_4$ emissions from industrial wastewater by 40–60 per cent compared with the level reported in the 2018 submission, but did not provide in the NIR explanatory information on the changes in method, assumptions, AD or EFs that caused the reduction in the estimate (see ID# W.10 above). | Yes. Transparency |
| | | During the review, the Party explained that the reduction in the estimated $CH_4$ emissions was mainly due to the revision of the TOW data. The $CH_4$ IEF for 2004–2016 was reduced by 45–65 per cent between the 2018 and 2019/2020 submissions (e.g. from 0.00559 to 0.00199 kg $CH_4$/kg DC for 2016), and the Party reported in the NIR (p.338) that TOW decreased from 55.9 per cent in 2004 to 33–38 per cent in recent years. In response to a question raised by the ERT, Slovenia provided a spreadsheet containing the recalculations and clarifying the changes in the calculation of TOW between the 2018 and 2019/2020 submissions. According to the spreadsheet, the main changes in assumptions or in AD and other parameters were that, for the production of leather, COD values decreased from 5 to 3 kg COD/m³ for the entire time series; and, for the production of soft drinks and alcoholic beverages and the production of pulp and paper, for the 2018 submission the entire amount of TOW was considered to have been treated in centralized wastewater treatment plants, while for the 2019/2020 submission part of the amount of TOW (for 2004 onward) was reallocated and considered under industrial wastewater treatment plants, with a $CH_4$ correction factor of zero. The ERT considers that the explanation in the NIR justifying the decrease in the TOW values across the time series and the assumption regarding the reallocation of part of the TOW amount from centralized to industrial wastewater treatment plants is not well elaborated. | |
| | | The ERT recommends that Slovenia clearly justify in the NIR the decrease in the TOW values across the time series and the assumptions regarding the reallocation of part of the TOW amount from centralized to industrial wastewater treatment plants. | |
| W.13 | 5.D Wastewater treatment and | Slovenia reported $CH_4$ emissions from wastewater treatment and discharge as a key category in the NIR (table 7.1.1, p.301) and CRF table 7, but applied a tier 1 method for estimating $CH_4$ emissions from both domestic and industrial wastewater. During the review, the Party clarified that, although domestic and industrial wastewater | Yes. Accuracy |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue/problem?[a] |
|---|---|---|---|
| | discharge – $CH_4$ | sources are a key category, the data required for applying a higher-tier method are not available. In the case of industrial wastewater, the emission trend is decreasing and the level of emissions is very low (6.6 kt $CO_2$ eq in 2018), so the use of a higher-tier method would not contribute to the improvement of the inventory. While acknowledging that the use of a higher-tier method could be more relevant for domestic wastewater, the Party explained that it is not possible to determine country-specific EFs ($CH_4$ correction factor and $B_o$). However, the ERT notes that for key categories, in accordance with the UNFCCC Annex I inventory reporting guidelines, Parties should make every effort to use a recommended method in accordance with the corresponding decision trees in the 2006 IPCC Guidelines (vol. 5, section 6.2.2.2, and decision tree in figure 6.2). In response, the Party argued that the decision tree in the 2019 Refinement to the 2006 IPCC Guidelines (vol. 5, chap. 6, figure 6.2) allows Parties to calculate emissions using the default methodology and country-specific AD if country-specific EFs are not available, and this method is still in line with the tier 2 approach. However, the ERT notes that the UNFCCC Annex I inventory reporting guidelines refer to the 2006 IPCC Guidelines, not the 2019 Refinement to the 2006 IPCC Guidelines. In addition, it is good practice to use country-specific data for $B_o$, expressed in kg $CH_4$/kg BOD removed. The ERT also notes that $B_o$ is a fundamental parameter used by wastewater treatment plants for the operation of their activities.<br><br>The ERT recommends that Slovenia make every effort to obtain plant-level data (volumes and water characteristics such as BOD-COD) in order to be able to apply a higher-tier method for estimating $CH_4$ emissions from wastewater treatment and discharge in accordance with the 2006 IPCC Guidelines, and report in the NIR the methods and data used, as well as any recalculation performed, in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines. | |
| **KP-LULUCF** | | | |
| KL.9 | Deforestation – $CO_2$ | Slovenia mentioned the data set on deforestation of the Slovenia Forest Service several times in the NIR (e.g. in sections 11.2.3 and 11.4.1); however, from the description in the NIR, it was not clear to the ERT what the data set was used for. During the review, the Party explained that data on land-use conversion to and from forest land were obtained from digital orthophotos so that AD for reporting under the Convention and accounting under the Kyoto Protocol are consistent (e.g. the reported area of forest land remaining forest land equals the forest area reported under FM). The Slovenia Forest Service data on deforestation were used in the past (i.e. for the first commitment period) but are now used only for verification. The ERT found this information to be very useful.<br><br>The ERT recommends that Slovenia explain in its next NIR that the data from the Slovenia Forest Service on deforestation are now used only for verification because data on land-use conversion to and from forest land are obtained from digital orthophotos. | Yes. Transparency |
| KL.10 | FM – $CO_2$ | Slovenia has not yet made a technical correction to the FMRL (NIR section 11.5.7). Because Slovenia has elected commitment period accounting, it can, in accordance with decision 2/CMP.7, report its final technical correction at the end of the second commitment period. However, the ERT noted a lack of consistency between the latest methods applied for estimating $CO_2$ emissions and removals from forest land and the methods used for calculating the FMRL in 2011. According to the Kyoto Protocol Supplement (chap. 2.7.6.3), it is good practice to assess annually the need for a technical correction on the basis of the criteria set out in its table 2.7.1. The ERT noted that no information on such an assessment was provided in the NIR. | Yes. Transparency |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue/problem?[a] |
|---|---|---|---|
| | | During the review, the Party provided a list of elements considered key to making a technical correction to the FMRL. The first element concerns methodological inconsistency: the gain–loss method was used for preparing the FMRL, while the stock difference method was used for estimating GHG emissions and removals for FM in the second commitment period. The second element concerns changes to certain aspects of methodologies, such as (1) the addition of new pools or gases, namely the deadwood pool and emissions from biomass burning, which were not included in the FMRL; (2) the recalculation of historical data on (forest) area owing to the change in data source; and (3) the recalculation of historical data for FM in the GHG inventory (i.e. the recalculation of growing stocks for 2000 and 2007, and the change in parameters used to convert volume to biomass). | |
| | | The ERT recommends that Slovenia include in its next NIR the list of elements identified as key to making a technical correction to the FMRL. | |
| KL.11 | FM – $CO_2$ | Slovenia has not yet made a technical correction to the FMRL (NIR section 11.5.7). However, the Party identified several elements that should lead to the application of a technical correction (see ID# KL.10 above). The ERT notes that the recommendations in the report on the technical assessment of the FMRL submission of Slovenia in 2011 (FCCC/TAR/2011/SVN) should also be considered when calculating a technical correction. In that report, it was recommended that the Party include in the calculation of future submissions the rationale for the assumption provided during the technical assessment of the FMRL (i.e. a significant increase in the harvesting rate of an annual average of 75 per cent of the increment for 2013–2020, compared with historical data). This assumption must remain the same when Slovenia calculates the technical correction to the FMRL. | Yes. Consistency |
| | | The ERT recommends that Slovenia take into account in its calculation of the technical correction to the FMRL all elements identified in ID# KL.10 above as well as the recommendations in the aforementioned report on the technical assessment of the FMRL submission of Slovenia in 2011. Noting the fact that the final accounting of the second commitment period is due in less than two years, the ERT strongly encourages Slovenia to start calculating the technical correction to the FMRL as soon as possible, and provide information on this process in the next annual submission to the extent possible. | |
| KL.12 | HWP – $CO_2$ | Slovenia accounted for HWP from deforestation on the basis of instantaneous oxidation (NIR p.368, and CRF table 4(KP-I)C), in accordance with the Kyoto Protocol Supplement. However, the Party did not provide values for "harvest originating from deforestation events" and "harvest from remaining lands" under information items in CRF table 4(KP-I)C. While the provision of values under information items is not mandatory, their inclusion would make the calculation more transparent. | Not a problem |
| | | The ERT encourages Slovenia to provide values for "harvest originating from deforestation events" and "harvest from remaining lands" under information items in CRF table 4(KP-I)C. | |

[a]  Recommendations made by the ERT during the review are related to issues as defined in para. 81 of the UNFCCC review guidelines or problems as defined in para. 69 of the Article 8 review guidelines.

## VI.  Application of adjustments

11.    The ERT did not identify the need to apply any adjustments for the 2020 annual submission of Slovenia.

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

12.     Slovenia elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF is not applicable to the 2020 review.

## VIII. Questions of implementation

13.     No questions of implementation were identified by the ERT during the individual review of the Party's 2020 annual submission.

## Overview of greenhouse gas emissions and removals and data and information on activities under Article 3, paragraphs 3–4, of the Kyoto Protocol, as submitted by Slovenia in its 2020 annual submission

1.     Tables I.1–I.4 provide an overview of the total GHG emissions and removals as submitted by Slovenia.

Table I.1

**Total greenhouse gas emissions for Slovenia, base year[a]–2018**

(kt $CO_2$ 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 (Article 3.3 of the Kyoto Protocol)[d] | KP-LULUCF (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 | | | | | | | | −3 171.00 |
| Base year | 15 549.43 | 20 296.99 | NA | NA | NA | | NA | |
| 1990 | 14 249.31 | 18 609.59 | NA | NA | | | | |
| 1995 | 15 553.15 | 18 634.26 | NA | NA | | | | |
| 2000 | 14 976.57 | 19 037.60 | NA | NA | | | | |
| 2010 | 13 429.75 | 19 555.22 | NA | NA | | | | |
| 2011 | 13 523.84 | 19 565.61 | NA | NA | | | | |
| 2012 | 13 028.71 | 19 004.84 | NA | NA | | | | |
| 2013 | 10 980.73 | 18 307.64 | NA | NA | | 233.45 | NA | −5 156.99 |
| 2014 | 16 611.92 | 16 575.01 | NA | NA | | 233.47 | NA | 918.17 |
| 2015 | 16 741.62 | 16 750.90 | NA | NA | | 233.89 | NA | 810.43 |
| 2016 | 17 750.33 | 17 607.61 | NA | NA | | 234.84 | NA | 897.56 |
| 2017 | 17 191.66 | 17 366.76 | NA | NA | | 236.31 | NA | 506.76 |
| 2018 | 17 745.28 | 17 502.14 | NA | NA | | 236.91 | NA | 865.92 |

*Note*: Emissions and removals reported in the sector other (sector 6) are not included in the total GHG emissions.

[a]  "Base year" refers to the base year under the Kyoto Protocol, which is 1986 for $CO_2$, $CH_4$ and $N_2O$, and 1995 for HFCs, PFCs, $SF_6$ and $NF_3$. Slovenia has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

[b]  The Party did not report indirect $CO_2$ emissions in CRF table 6.

[c]  The value reported in this column relates to GHG emissions from conversion of forests (deforestation) in 1990 as contained in the report on the review of the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of the Party.

[d]  Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.

Table I.2

**Greenhouse gas emissions by gas for Slovenia, excluding land use, land-use change and forestry, 1986–2018**

(kt $CO_2$ eq)

|  | $CO_2{}^a$ | $CH_4$ | $N_2O$ | HFCs | PFCs | Unspecified mix of HFCs and PFCs | $SF_6$ | $NF_3$ |
|---|---|---|---|---|---|---|---|---|
| 1986 | 16 668.99 | 2 613.59 | 841.25 | NO | 233.19 | NO | 9.77 | NO |
| 1990 | 15 093.84 | 2 543.98 | 754.35 | NO | 207.59 | NO | 9.83 | NO |
| 1995 | 15 254.25 | 2 377.04 | 829.81 | 32.89 | 128.14 | NO | 12.13 | NO |
| 2000 | 15 444.90 | 2 498.41 | 903.36 | 46.17 | 129.75 | NO | 15.01 | NO |
| 2010 | 16 376.44 | 2 157.64 | 735.56 | 257.95 | 9.64 | NO | 17.99 | NO |
| 2011 | 16 360.30 | 2 149.57 | 747.13 | 270.31 | 20.16 | NO | 18.15 | NO |
| 2012 | 15 821.76 | 2 103.53 | 750.22 | 294.88 | 18.11 | NO | 16.34 | NO |
| 2013 | 15 188.91 | 2 047.63 | 722.45 | 316.17 | 15.31 | NO | 17.16 | NO |
| 2014 | 13 531.94 | 1 946.78 | 730.36 | 333.53 | 15.22 | NO | 17.19 | NO |
| 2015 | 13 617.54 | 2 003.60 | 752.78 | 343.75 | 15.74 | NO | 17.49 | NO |
| 2016 | 14 416.66 | 2 041.54 | 760.72 | 351.48 | 19.78 | NO | 17.44 | NO |
| 2017 | 14 264.75 | 1 994.41 | 735.20 | 339.14 | 17.45 | NO | 15.81 | NO |
| 2018 | 14 487.84 | 1 936.16 | 753.48 | 293.23 | 15.59 | NO | 15.83 | NO |
| **Percentage change 1986–2018** | **–13.1** | **–25.9** | **–10.4** | **100.0** | **–93.3** | **NA** | **62.0** | **NA** |

*Note*: Emissions and removals reported in the sector other (sector 6) are not included in this table.

[a] Slovenia did not report indirect $CO_2$ emissions in CRF table 6.

Table I.3

**Greenhouse gas emissions by sector for Slovenia, 1986–2018**

(kt $CO_2$ eq)

|  | Energy | IPPU | Agriculture | LULUCF | Waste | Other |
|---|---|---|---|---|---|---|
| 1986 | 16 397.52 | 1 407.96 | 1 930.56 | –4 747.55 | 630.76 | NO |
| 1990 | 14 664.70 | 1 392.86 | 1 855.44 | –4 360.28 | 696.60 | NO |
| 1995 | 15 140.33 | 1 073.05 | 1 773.52 | –3 081.12 | 647.36 | NO |
| 2000 | 15 281.80 | 1 162.50 | 1 821.70 | –4 061.03 | 771.60 | NO |
| 2010 | 16 310.92 | 1 013.10 | 1 696.40 | –6 125.46 | 534.79 | NO |
| 2011 | 16 318.74 | 1 028.45 | 1 677.43 | –6 041.77 | 540.99 | NO |
| 2012 | 15 757.34 | 1 056.15 | 1 660.92 | –5 976.13 | 530.43 | NO |
| 2013 | 15 025.76 | 1 121.47 | 1 645.65 | –7 326.91 | 514.76 | NO |
| 2014 | 13 236.12 | 1 160.94 | 1 694.01 | 36.91 | 483.94 | NO |

| | Energy | IPPU | Agriculture | LULUCF | Waste | Other |
|---|---|---|---|---|---|---|
| 2015 | 13 380.44 | 1 144.49 | 1 733.08 | −9.28 | 492.89 | NO |
| 2016 | 14 220.59 | 1 143.23 | 1 756.05 | 142.72 | 487.74 | NO |
| 2017 | 13 978.69 | 1 190.11 | 1 720.98 | −175.11 | 476.98 | NO |
| 2018 | 14 152.17 | 1 186.59 | 1 721.71 | 243.14 | 441.66 | NO |
| **Percentage change 1986–2018** | **−13.7** | **−15.7** | **−10.8** | **−105.1** | **−30.0** | **NA** |

*Notes*: (1) Slovenia did not report emissions or removals in the sector other (sector 6); (2) Slovenia did not report indirect $CO_2$ emissions in CRF table 6.

Table I.4

**Greenhouse gas emissions and removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year[a]–2018, for Slovenia**
(kt $CO_2$ eq)

| | Article 3.7 bis as contained in the Doha Amendment[b] | Activities under Article 3.3 of the Kyoto Protocol | | FM and elected activities under Article 3.4 of the Kyoto Protocol | | | | |
|---|---|---|---|---|---|---|---|---|
| | Land-use change | AR | Deforestation | FM | CM | GM | RV | WDR |
| FMRL | | | | −3 171.00 | | | | |
| Technical correction | | | | NE | | | | |
| Base year | NA | | | | NA | NA | NA | NA |
| 2013 | | NA | 233.45 | −5 156.99 | NA | NA | NA | NA |
| 2014 | | NA | 233.47 | 918.17 | NA | NA | NA | NA |
| 2015 | | NO, NA | 233.89 | 810.43 | NA | NA | NA | NA |
| 2016 | | NO, NA | 234.84 | 897.56 | NA | NA | NA | NA |
| 2017 | | NO, NA | 236.31 | 506.76 | NA | NA | NA | NA |
| 2018 | | NO, NA | 236.91 | 865.92 | NA | NA | NA | NA |
| **Percentage change base year–2018** | | | | | **NA** | **NA** | **NA** | **NA** |

*Note*: Values in this table include emissions from land subject to natural disturbances, if applicable.

[a] Slovenia has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol, and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

[b] The value reported in this column relates to 1990.

2.    Table I.5 provides an overview of key relevant data from Slovenia's reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.5
**Key relevant data for Slovenia under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2020 annual submission**

| Parameter | Data values |
|---|---|
| Periodicity of accounting | (a) AR: commitment period accounting |
| | (b) Deforestation: commitment period accounting |
| | (c) FM: commitment period accounting |
| | (d) CM: not elected |
| | (e) GM: not elected |
| | (f) RV: not elected |
| | (g) WDR: not elected |
| Elected activities under Article 3, paragraph 4, of the Kyoto Protocol | None |
| Election of application of provisions for natural disturbances | No |
| 3.5% of total base-year GHG emissions, excluding LULUCF | 711.465 kt $CO_2$ eq (5 691.720 kt $CO_2$ eq for the duration of the commitment period) |
| Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for: | |
| 1. AR | NA |
| 2. Deforestation | NA |
| 3. FM | NA |

# Annex II

## Information to be included in the compilation and accounting database

Tables II.1–II.6 include the information to be included in the compilation and accounting database for Slovenia. Data shown are from the Party's annual submission, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table II.1
**Information to be included in the compilation and accounting database for 2018, including on the commitment period reserve, for Slovenia**
(t CO$_2$ eq)

|  | Original submission | Revised submission | Adjustment | Final value |
|---|---|---|---|---|
| **CPR** | 89 483 204 | – | – | 89 483 204 |
| **Annex A emissions** | | | | |
| CO$_2$ | 14 487 844 | – | – | 14 487 844 |
| CH$_4$ | 1 936 157 | – | – | 1 936 157 |
| N$_2$O | 753 483 | – | – | 753 483 |
| HFCs | 293 234 | – | – | 293 234 |
| PFCs | 15 592 | – | – | 15 592 |
| Unspecified mix of HFCs and PFCs | NO, NA | – | – | NO, NA |
| SF$_6$ | 15 828 | – | – | 15 828 |
| NF$_3$ | NO, NA | – | – | NO, NA |
| **Total Annex A sources** | **17 502 138** | **–** | **–** | **17 502 138** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol** | | | | |
| AR | NO, NA | – | – | NO, NA |
| Deforestation | 236 906 | – | – | 236 906 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol** | | | | |
| FM | 865 921 | – | – | 865 921 |

Table II.2
**Information to be included in the compilation and accounting database for 2017 for Slovenia**
(t CO$_2$ eq)

|  | Original submission | Revised submission | Adjustment | Final value |
|---|---|---|---|---|
| **Annex A emissions** | | | | |
| CO$_2$ | 14 264 753 | – | – | 14 264 753 |
| CH$_4$ | 1 994 410 | – | – | 1 994 410 |
| N$_2$O | 735 198 | – | – | 735 198 |
| HFCs | 339 144 | – | – | 339 144 |
| PFCs | 17 447 | – | – | 17 447 |
| Unspecified mix of HFCs and PFCs | NO, NA | – | – | NO, NA |
| SF$_6$ | 15 812 | – | – | 15 812 |
| NF$_3$ | NO, NA | – | – | NO, NA |
| **Total Annex A sources** | **17 366 764** | **–** | **–** | **17 366 764** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol** | | | | |
| AR | NO, NA | – | – | NO, NA |
| Deforestation | 236 313 | – | – | 236 313 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol** | | | | |
| FM | 506 758 | – | – | 506 758 |

Table II.3
**Information to be included in the compilation and accounting database for 2016 for Slovenia**
(t CO₂ eq)

|  | Original submission | Revised submission | Adjustment | Final value |
|---|---|---|---|---|
| **Annex A emissions** | | | | |
| CO₂ | 14 416 657 | – | – | 14 416 657 |
| CH₄ | 2 041 538 | – | – | 2 041 538 |
| N₂O | 760 721 | – | – | 760 721 |
| HFCs | 351 480 | – | – | 351 480 |
| PFCs | 19 781 | – | – | 19 781 |
| Unspecified mix of HFCs and PFCs | NO, NA | – | – | NO, NA |
| SF₆ | 17 436 | – | – | 17 436 |
| NF₃ | NO, NA | – | – | NO, NA |
| **Total Annex A sources** | **17 607 613** | **–** | **–** | **17 607 613** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol** | | | | |
| AR | NO, NA | – | – | NO, NA |
| Deforestation | 234 836 | – | – | 234 836 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol** | | | | |
| FM | 897 561 | – | – | 897 561 |

Table II.4
**Information to be included in the compilation and accounting database for 2015 for Slovenia**
(t CO₂ eq)

|  | Original submission | Revised submission | Adjustment | Final value |
|---|---|---|---|---|
| **Annex A emissions** | | | | |
| CO₂ | 13 617 543 | – | – | 13 617 543 |
| CH₄ | 2 003 597 | – | – | 2 003 597 |
| N₂O | 752 779 | – | – | 752 779 |
| HFCs | 343 751 | – | – | 343 751 |
| PFCs | 15 740 | – | – | 15 740 |
| Unspecified mix of HFCs and PFCs | NA, NO | – | – | NA, NO |
| SF₆ | 17 493 | – | – | 17 493 |
| NF₃ | NA, NO | – | – | NA, NO |
| **Total Annex A sources** | **16 750 902** | **–** | **–** | **16 750 902** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol** | | | | |
| AR | NO, NA | – | – | NO, NA |
| Deforestation | 233 891 | – | – | 233 891 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol** | | | | |
| FM | 810 432 | – | – | 810 432 |

Table II.5
**Information to be included in the compilation and accounting database for 2014 for Slovenia**
(t CO₂ eq)

|  | Original submission | Revised submission | Adjustment | Final value |
|---|---|---|---|---|
| **Annex A emissions** | | | | |
| CO₂ | 13 531 936 | – | – | 13 531 936 |
| CH₄ | 1 946 782 | – | – | 1 946 782 |
| N₂O | 730 357 | – | – | 730 357 |
| HFCs | 333 527 | – | – | 333 527 |
| PFCs | 15 221 | – | – | 15 221 |
| Unspecified mix of HFCs and PFCs | NA, NO | – | – | NA, NO |
| SF₆ | 17 189 | – | – | 17 189 |

| | Original submission | Revised submission | Adjustment | Final value |
|---|---|---|---|---|
| NF$_3$ | NA, NO | – | – | NA, NO |
| **Total Annex A sources** | **16 575 012** | **–** | **–** | **16 575 012** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol** | | | | |
| AR | NA | – | – | NA |
| Deforestation | 233 473 | – | – | 233 473 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol** | | | | |
| FM | 918 172 | – | – | 918 172 |

Table II.6
**Information to be included in the compilation and accounting database for 2013 for Slovenia**
(t CO$_2$ eq)

| | Original submission | Revised submission | Adjustment | Final value |
|---|---|---|---|---|
| **Annex A emissions** | | | | |
| CO$_2$ | 15 188 914 | – | – | 15 188 914 |
| CH$_4$ | 2 047 634 | – | – | 2 047 634 |
| N$_2$O | 722 452 | – | – | 722 452 |
| HFCs | 316 168 | – | – | 316 168 |
| PFCs | 15 315 | – | – | 15 315 |
| Unspecified mix of HFCs and PFCs | NA, NO | – | – | NA, NO |
| SF$_6$ | 17 162 | – | – | 17 162 |
| NF$_3$ | NA, NO | – | – | NA, NO |
| **Total Annex A sources** | **18 307 644** | **–** | **–** | **18 307 644** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol** | | | | |
| AR | NA | – | – | NA |
| Deforestation | 233 453 | – | – | 233 453 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol** | | | | |
| FM | –5 156 990 | – | – | –5 156 990 |

## Annex III

### Additional information to support findings in table 2

#### Missing categories that may affect completeness

The categories for which estimation methods are included in the 2006 IPCC Guidelines that were reported as "NE" or for which the ERT otherwise determined that there may be an issue with the completeness of the reporting in the Party's inventory are the following:

(a)     2.F.1 refrigeration and air conditioning (HFCs) (see ID# I.8 in table 3);

(b)     2.F.1 refrigeration and air conditioning (HFCs) (see ID# I.9 in table 3);

(c)     4(V) biomass burning ($CO_2$, $CH_4$ and $N_2O$) (see ID# L.13 in table 3);

(d)     5.D.2 industrial wastewater ($CH_4$) (see ID# W.11 in table 5).

# Annex IV

## Reference documents

### A.    Reports of the Intergovernmental Panel on Climate Change

IPCC. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories.* J Penman, D Kruger, I Galbally, et al. (eds.). Hayama: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency/Institute for Global Environmental Strategies. Available at https://www.ipcc.ch/publication/good-practice-guidance-and-uncertainty-management-in-national-greenhouse-gas-inventories/.

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### B.    UNFCCC documents

**Annual review reports**

Reports on the individual reviews of the 2010, 2011, 2012, 2013, 2014, 2015, 2016 and 2018 annual submissions of Slovenia, contained in documents FCCC/ARR/2010/SVN, FCCC/ARR/2011/SVN, FCCC/ARR/2012/SVN, FCCC/ARR/2013/SVN, FCCC/ARR/2014/SVN, FCCC/ARR/2015/SVN, FCCC/ARR/2016/SVN and FCCC/ARR/2018/SVN, respectively.

**Other**

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 https://unfccc.int/sites/default/files/resource/AGI%202020_final.pdf.

Annual status report for Slovenia for 2020. Available at https://unfccc.int/sites/default/files/resource/asr2020_SVN.pdf.

### C.    Other documents used during the review

Responses to questions during the review were received from Tajda Mekinda Majaron (Slovenian Environment Agency), including additional material on the methodology and assumptions used. The following references have been reproduced as received:

Česen M. 2020. Analiza emisijskih faktorjev za zgorevanje lesne biomase (Analysis of emission factors for wood biomass combustion). Final report No. IJS-DP-13075 (in Slovenian). Institut "Jožef Stefan", Energy Efficiency Center, Ljubljana, Slovenija.

de Groot, M., Ogris, N., Kobler, A. 2018. *The effects of a large-scale ice storm event on the drivers of bark beetle outbreaks and associated management practices.* For. Ecol. Manage. 408, 195–201. Available at https://doi.org/10.1016/j.foreco.2017.10.035.

Döhler H., Eurich-Menden B., Dämmgen U., Osterburg B., Lüttich M., Bergschmidt A., Berg W., Brunsch R. 2002. *BMVEL/UBA-Ammoniak-Emissionsinventar der deutschen Landwirtschaft und Minderungsszenarien bis zum Jahre 2010.* Berlin: Umweltbundesamt.

Edmondson, J.L., Davies, Z.G., Gaston, K.J., Leake, J.R. 2014. *Urban cultivation in allotments maintains soil qualities adversely affected by conventional agriculture.* Available at https://doi.org/10.1111/1365-2664.12254.

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Kindbom et al. 2017. *Emission factors for SLCP emissions from residential wood combustion in Nordic countries.* Nordic Council of Ministers. IVL-rapport: C292. Available at https://www.ivl.se/download/18.2aa2697816097278807f986/1526546280552/C292.pdf.

Mali B. et al. 2017. *Vzorčenje in ocena zalog ogljika v nadzemni lesni biomasi na kmetijskih zemljiščih v letu 2017.* Ljubljana, Gozdarski inštitut Slovenije.

Mali B. et al. 2018. *Vzorčenje in ocena zalog ogljika v odmrli organski snovi in nadzemni lesni biomasi na kmetijskih zemljiščih v letu 2018.* Ljubljana, Gozdarski inštitut Slovenije.

Menzi H., Frick R., Kaufmann R. 1997. *Ammoniak-Emissionen in der Schweiz: Ausmass und technische Beurteilung des Reduktionspotentials.* Zürich: FAL.

Nagel, T.A., Firm, D., Rozenbergar, D., Kobal, M. 2016. *Patterns and drivers of ice storm damage in temperate forests of Central Europe.* Eur. J. Forest Res. 135, 519–530. Available at https://doi.org/10.1007/s10342-016-0950-2.

Ozgen, S., Caserini, S. 2018. *Methane emissions from small residential wood combustion appliances: experimental emission factors and warming potential.* Atmospheric Environment, vol. 189, pp.164-173. Available at https://doi.org/10.1016/j.atmosenv.2018.07.006.

United States Environmental Protection Agency. 2004. *National Emission Inventory— Ammonia Emissions from Animal Husbandry Operations*, United States Environmental Protection Agency.

Wisdom Slovenia. 2006. *Spatial woodfuel production and consumption analysis applying the Woodfuel Integrated Supply / Demand Overview Mapping (WISDOM) methodology.* Slovenia Forest Service: FAO.

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