БҰҰ РКИК халықаралық сарапшылар тобының 1990-2021 жылдардағы Ұлттық баяндаманы тексеру (ревю) жөніндегі есебіне

ҚОСЫМША

ПРИЛОЖЕНИЕ
к отчету по проверке (ревью) Национального доклада за 1990-2021 гг.
Международной группой экспертов РКИК ООН

United Nations
Climate Change Secretariat

Nations Unies
Secrétariat sur les changements climatiques

Ms. Ainur Kopbayeva
Director

Date: 31 July 2023
Reference: VG/ST/bc

Ms. Zulfiya Suleimenova
Vice-Minister

Ministry of Ecology, Geology and Natural Resources
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Dear Ms. Kopbayeva,
Dear Ms. Suleimenova,

Please be informed that the "Assessment report on the greenhouse gas inventories of Annex I Parties submitted in 2023" (Assessment Report) of your Party is now available for your consideration.

The questions and issues that are part of the draft Assessment Report have been prepared by the secretariat following the UNFCCC "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" (decision 13/CP.20, annex), containing the elements of the standardized set of data comparisons listed in paragraph 69 of the annex to decision 13/CP.20.

The secretariat is providing the Assessment Report for the consideration of Kazakhstan. The issues and questions that are part of the draft Assessment Report and the comments by your Party were provided in the inventory virtual team room (iVTR). Information presented in the draft assessment report is not intended as a judgment of whether inventory problems exist, but as an indication of potential issues to be considered further during the individual review of inventories by the expert review teams.

The Assessment Report will not be published. The draft Assessment Report and any comments your Party provided by **21 August 2023** will be made available to the expert review team for its consideration during the individual inventory review.

Thank you for your attention to this matter. Should you have any questions regarding this document or the arrangements for the review, please contact the secretariat at GHG-reviews@unfccc.int.

Yours sincerely,

Donald Cooper
Director
Transparency Division

cc: UNFCCC Inventory Focal Point of Kazakhstan
Ms. Aiman Yessekina
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Review of the 2023 submission of Kazakhstan

Centralized review, Bonn, Germany

18-22 September 2023

The provisional main findings of the ERT are included in tables 1 and 2 below, in accordance with paragraph 84 of the annex to decision 13/CP.20. Kazakhstan may provide further clarifications related to the provisional main findings within two weeks (i.e. by 9 October 2023).

The two tables in this document contain the following information:

- Table 1 contains the ERT's provisional views on the issues raised in the previous review report.
- Table 2 contains additional provisional findings made during the 2023 review.

Please note that the findings included below are provisional and as at the end of the review week. They have not been subject to any formal editing, formatting or quality assurance / quality control procedures and are subject to change prior to inclusion in the draft review report that will be sent to the Party for comments.

Note that table 1 below does not include the ERT's final determination of whether the previous recommendation is "resolved", "not resolved" or labelled as "addressing". Further table 2 does not clarify whether the finding will be a recommendation or an encouragement in the final review report. The ERT will include these assessments when the draft ARR is sent to the Party for comment

Kazakhstan is encouraged to provide comments directly on this document. These should be well marked and clearly distinguishable from the ERT text and comments.

Table 1
Status of implementation of recommendations included in the previous review report for Kazakhstan

ID#	*Issue/problem classification*[1, 2]	*Recommendation from previous review report*	*ERT assessment and rationale*	*Party comment*
General				
G.1	National system (G.3, 2021) (G.3, 2019) (G.15, 2017) KP reporting adherence	Provide an action plan and information on its implementation to address the issues identified, in particular on the steps, including those already achieved, and expected time frames for: (b) Identifying roles and responsibilities for QA/QC and data verification for each inventory sector to ensure data quality and reliability; (c) Implementing arrangements for review, approval and sign-off processes to ensure timely annual submission of the NIR by the agreed submission due date.	(b) The Party provided description on roles and responsibilities for QA/QC procedures (subsection 1.2.3, p.24) and chart of the QA/QC system (Fig 2, p.24) which shows the roles and responsibilities for initial verification of data, verification of calculations, final verification and assurance by third-Party organizations. New regulation *Rule for Monitoring the Completeness, Transparency and Reliability of the State Inventory of Greenhouse Gas Emissions and Removals* approved on 22 February 2022 by the Order #46 of the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan sets out provisions for the development and approval of a QA/QC Plan, implementation of QA/QC procedures and verification by third-Party organizations. For this NIR the external verification was provided in energy sector by the experts under the USAID "Energy of Central Asia" project and Copenhagen Climate Centre of UNEP and in LULUCF sector- by UNDP project. (c) The NIR was submitted on time or on 15 April 2023. Working Group has been established as per the Order #46 which consists of state bodies providing initial data and participating in determining emission coefficients and other parameters for inventory. The functioning of the national greenhouse gas inventory facilitated by the Interdepartmental Working Group meetings. It is reported that there have been 4 meetings of the Working Groups. At the first Meeting, representatives of the Working Group approved the dates of subsequent Meetings, reviewed and approved the QA/QC plan. NIR was approved by the fourth meeting.	The Party requests that the status of this recommendation be changed to “Resolved” due to the fact that in the frame of improvement of the national inventory the order was developed. this information was presented in the NIR

[1] 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.

[2] The report on the review of the 2022 inventory submission of Kazakhstan was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2021 annual review report. For the same reason, 2022 is excluded from the list of review years in which issues could have been identified.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
G.2	National system (G.4, 2021) (G.4, 2019) (G.16, 2017) KP reporting adherence	In the NIR, provide information on planned capacity-building steps and report on progress regarding the capacity-building activities in the inventory improvement plan. Specifically, it should include the planned actions, roles and responsibilities for those actions and the time frame for implementation of each action regarding (a) building technical capacity of the personnel participating in the inventory preparation and management and (b) making specific arrangements for data-sharing and data communication to ensure uninterrupted and timely access to AD by the designated inventory agency from other organizations.	(a) The Party reported in its NIR (p.32, section 1.2.4) various ongoing capacity-building activities conducted with the support of a UNDP project in Kazakhstan and other international and national organizations. For example, a training session was conducted on Methodological recommendations on the calculation of greenhouse gas emissions and the preparation of reports for Central Asian countries by the Institute of Ecology and Global Climate with the support of UNDP project. The Party also reported that establishment and meetings of Working group itself is capacity building to strengthen the coordination and interaction between state bodies, improving the quality of the provision of initial data and the functioning of the national systems. However, no clear plan for capacity building was provided in the NIR. During the review the Party clarified that Kazakhstan is constantly making efforts to build the capacity of national experts in the field of greenhouse gas inventories. Until the end of 2023 and in 2024, training sessions are planned within the framework of the Central Asia project, within the framework of cooperation with the Initiative for Climate Action Transparency (ICAT), the Regional Climate Action Transparency Hub in Central Asia (ReCATH) project is being implemented. Also, capacity building trainings are planned during the implementation of the project for the preparation of the 9th National Communication. The ERT considers that the recommendation has been not fully addressed as there is no plan for capacity building reported in the NIR. (b). The Order #46 approved by its Annex 1-5 to the order the list of data required for emission estimates and the list of data providers for each sector. The working group is responsible for data flow. For the preparation of this NIR, the second and third Meetings of the Working group focused on the data collection, review and verification.	The Party requests that the status of this recommendation be changed to “Resolved” due to the measures of improvement of capacity building and presentation of this information in the NIR
G.3	National system (G.5, 2021) (G.5, 2019) (G.17, 2017) Transparency	In the NIR, include details of the national system structure and operation regarding the different stages of inventory data collection and processing.	(a)-(b). The Party reported in its NIR (p.20-22, subsection 1.2.2) updated chart of the national inventory system (Fig 1, p.21), description of the inventory development steps and list of organisations involved in working group set out in Order #46 and role and results of working group meetings (see ID#G.2 and ID#G.3). However, the ERT noted changes	The Party will make efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		Specifically, it should include detailed information on (a) which organizations participate in data collection for each sector and whether those data providers are the same every year, (b) who is responsible for the preliminary (raw data) processing and (c) how the quality and reliability of plant-specific and country-specific EFs are ensured and who is responsible for this.	in the inventory team not reflected in the NIR and lack of communication with former experts when preparing the inventor indicating issues with the institutional memory. c. The NIR main QA procedures reported in the NIR (p.25-27) is still does not provide clear information on specific information on how the quality and reliability of plant- and country-specific EFs are ensured or the ownership of this process. During the review, the Party clarified that *initial data are provided by factories through responding to official requests from the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan. The factories are monopolists in the metallurgical industry of RK and responses to requests are signed by the heads managers of enterprises. In addition, the Party has an internal Emission Trading System, according to which the enterprise submits an annual greenhouse gas inventory report to Zhasyl Damu JSC. These inventory reports have mutual verification of internal bodies of validation and verification. National experts check and compare the data of confirmed inventory reports of enterprises and responses to requests.* The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet included clear information on specific arrangement on how the quality and reliability of plant- and country-specific EFs are ensured or the ownership of this process in the NIR.	
G.4	Inventory management (G.10, 2021) (G.9, 2019) (G.4, 2017) (G.12, 2016) (G.12, 2015) (15, 2013) (24, 2012) Transparency	Provide, in the NIR, more information on: the archiving system, including the responsibilities of different institutions for the flow of data and archiving; whether the archiving system includes information generated through external and internal reviews, documentation on annual key category analysis, key category identification and planned inventory	Please see ID#G.2 for data collection. It is reported in the NIR that the JSC “Zhasyl Damu” archives and stores the inventory related information (subsection 1.3, p. 33-34). As per Order #46 the archive includes AD, emission coefficients, parameters, procedures for calculation, documentation on quality control and quality assurance procedures, digital and textual calculation materials, accepted assumptions, and other internal information necessary for the preparation of individual sections of the national greenhouse gas inventory data on key and non-key categories, planned improvements for the NIR. The Order #46 also includes provision for access of representatives of the authorized organ, national experts, independent experts to the archive.	The Party requests that the status of this recommendation be changed to “Resolved” due to the fact that in the frame of improvement of the national inventory the order was developed. this information was presented in the NIR

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		improvements; and how this system is maintained by the Kazakh Scientific Research Institute of Ecology and Climate.		
G.5	Inventory management (G.11, 2021) (G.22, 2019) Transparency	Make fully functional the inventory management function described in decision 19/CMP.1, annex, paragraph 16(c), in conjunction with decisions 3/CMP.11 and 4/CMP.11.	The functioning of inventory management has been improved much as a result of the approval of "Rule for Monitoring the Completeness, Transparency and Reliability of the State Inventory of Greenhouse Gas Emissions and Removals" or issue of Order #46. The Order #46 sets out the mechanisms for preparation, reviewing, and approving off the GHG inventory (NIR, p.21-22). The article 27-33 of the Order #46 set timeframe of the different steps of the national inventory preparation (see ID#G.2 and ID#G.3) and submission. As per Order #46 the NIR should be approved by the Working group meeting before 10 April of the year of preparation. This NIR and CRF tables have been submitted on time this year. The ERT commends the Party for the timely response to the questions during the various stages of the review process.	The Party requests that the status of this recommendation be changed to "Resolved" due to the fact that in the frame of improvement of the national inventory the order was developed. this information was presented in the NIR
G.6	Inventory management (G.12, 2021) (G.22, 2019) KP reporting adherence	Provide information and a detailed description of a communication plan (or a reference thereto), including specific actions and steps (time frames, deliverables and responsibilities), which ensures that: (a) Requests made by the ERT for clarifying inventory information are actioned and communicated in a timely manner; (b) An approval mechanism for the responses (where required) is clearly described,	a. It was reported in the NIR that the steps of the inventory preparation discussed at the working group meetings. In the first meeting representatives of the Working Group approved the dates of subsequent Meetings, reviewed and approved the QA/QC, at the second- the initial data was reviewed and distributed among the representatives of the Working Group, at third-discussed the results of data received and at fourth-the NIR was approved. b. The article 32 of the Order #46 stated that the NIR should be approved by the Working Group meeting before 10 April every year. It was reported in the NIR (p.22) that the current NIR was approved by the fourth Working group meetings that held on 7 April 2023. c. See the a and b. During the review the Party clarified that "*Information on the communication plan was provided in the Third and Fourth Progress Reports under the Plan of the Enforcement Branch of the Compliance Committee of the Kyoto Protocol*" and provided the communication plan in tabular form.	The Party requests that the status of this recommendation be changed to "Resolved" due to presentation of the RK in the Progress reports of the Compliance Committee of the KP and official decision C-2020-1-10/Kazakhstan/EB from 6 September 2023 on the questions of implementation with respect to Kazakhstan

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		including the associated roles and responsibilities; (c) The timeline for responses is agreed between the approving agencies and organizations involved. Provide an update on progress with regard to the implementation of the communication plan in the NIR of the next annual submission.		
G.7	NIR (G.15, 2021) (G.11, 2019) (G.5, 2017) (G.16, 2016) (G.15, 2015) Transparency	Provide detailed information on the assessment of completeness (e.g. in an annex) in the NIR.	The Party is not reporting subsection "1.7 General assessment of completeness" in its NIR in accordance with the annex to Decision 24/CP.19, UNCCC reporting guidelines. Also there are a number of completeness and transparency issues in reporting/explanation for selecting AD, methodologies, EFs and other that remained still with status addressing (see ID#E.4, E.7, E.9, E.15, E18, E.19, E.39, E.40, E.49, I.7, I.12, I.20, I.21, I.26, L.20, A.1, L.23, W.1, W.4,W.5, W.7,W.13) and unresolved (see ID# A.4, A.5, A.9, A.11, L.3, L.4, L.8, L.18, W.3, W.15, W.18,W.19, W.21, W.24,W.28) in most of the sectors. During the review, the Party clarified that "Detailed information on the assessment of completeness is not presented as a separate chapter or annex, it will be provided in the next NIR".	The Party will make efforts to resolve this issue in the next inventory submission
G.8	CRF tables (G.16, 2021) (G.12, 2019) (G.6, 2017) (G.17, 2016) (G.16, 2015) Comparability	Complete all cells and do not leave blank cells in the CRF tables and ensure the correct use of the notation keys (including "NA") in the CRF tables in line with decision 24/CP.19, annex I, paragraph 37.	The ERT noted that all cells of CRF tables have been filled, but there are some issues found in using correct notation keys (see ID#s E.2, E.59, I.33, L2 and W.24). During the review The Party clarified that internal training conducted for experts involved in the work on the inventory of greenhouse gases and strictly adhered to this recommendation when preparing the NIR 2023. All cells have been filled in and notation keys have been used correctly in the CRF tables in line with decision 24/CP.19, annex I, paragraph 37review	The Party will make efforts to correctly represent notation keys in the CRF in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			The ERT considers that the recommendation has not yet been fully addressed because the Party has made mistakes using correct notations keys	
G.9	Notation keys (G.18, 2021) (G.14, 2019) (G.1, 2017) (G.2, 2016) (G.2, 2015) (table 3, 2013) Convention reporting adherence	Use the notation key "NO" if the activity is not occurring and "IE" if emissions are included elsewhere.	The ERT noted that all cells of CRF tables have been filled, but, there are some issues have been found in most of the sectors in using correct notation keys (see ID#s E.2, E.5, E.6, E.59, I.33, L2 and W.24). During the review The Party responded that internal training have been conducted for experts involved in the work on the inventory of greenhouse gases and strictly adhered to this recommendation when preparing the NIR 2023….. The ERT considers that the recommendation has not yet been fully addressed because the Party has made mistakes using correct notations keys.	The Party will make efforts to correctly represent notation keys in the CRF in the next inventory submission
G.10	Recalculations (G.19, 2021) (G.15, 2019) (G.11, 2017) Transparency	In the NIR of the future annual submissions, include detailed information explaining the reasons for recalculations, the specifics of methods and assumptions, and the impact of recalculations on the emissions for the particular category, on the entire sector and the total emissions (including and excluding LULUCF).	The Party provided subsection on recalculation in NIR (subsection 1.7, p.45) and recalculated emission estimates in CRF tables 8s1–8s4. In the subsection 1.7 it is reported that detailed reasons for recalculations are described in the relevant sectors and categories of the NIR. However, the ERT found that the explanations are not sufficient to understand the reason for recalculations in most of the sectors (see ID #s E.3,E.4, E.10, E45. E.51, I.6, A.3, W.11). The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided clear explanation on recalculation in some sectors.	The Party will make efforts to resolve this issue in the next inventory submission
G.11	QA/QC and verification (G.20, 2021) (G.16, 2019) (G.12, 2017) Convention reporting adherence	In the NIR, include a specific procedure in the QA/QC process to ensure that the number of inconsistencies between the NIR and the CRF tables across all inventory sectors is minimized and report the updated QA/QC plan, and include information on this procedure.	Even though the QC/QA plan was prepared as per Order #46 and approved at the first Working Group meeting, the implementation of QA/QC procedure is lacking. The ERT found quite many inconsistencies between NIR and CRF tables, reporting of estimates within the sectors (see ID#s E.5, E.6, E.7, E.9, E.11, E.12, E.43, I.5, L.16, W.2, W.3, W.4, W18). The ERT also found large number of inaccuracies in selection of AD and IEFs, and estimation of emissions (see Table 5: across the sectors) an addition to completeness and transparency issues (see ID#G.8). The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet	The Party accepts the comment

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			implemented the QA/QC properly in preparing the inventory report.	
G.12	Uncertainty analysis (G.21, 2021) (G.17, 2019) (G.9, 2017) (G.19, 2016) (G.18, 2015) Convention reporting adherence	Improve on the reporting of uncertainty by including information on the quantitative estimates of the uncertainty of data used for all source and sink categories using the 2006 IPCC Guidelines, and report uncertainties for the base year and the latest inventory year, as well as the methods and underlying assumptions used, and how the analysis helps in prioritizing efforts to improve the accuracy of national inventories in the future, in line with decision 24/CP.19, annex I, paragraph 42.	The Party has improved the reporting of uncertainties and reported the uncertainty for the base year and the most recent inventory year in subsection 1.6 (p.44) of the NIR. Kazakhstan also provided the list of the highest contributing categories including and excluding LULUCF. Provided table with qualitative estimates of the uncertainty (annex 2, pp.419–465) as per table 3.3 of the 2006 IPCC Guidelines (vol. 1, chap. 3). However, there are some inconsistencies in qualitative estimates in sectoral sections and Annex 2 (see ID# A.9, W…) The ERT considers that the recommendation has not yet been fully addressed because there are mistakes in reporting the uncertainly estimates.	The Party believes that it has significantly improved the uncertainty report and minor discrepancies do not affect the overall result of the uncertainty assessment. Therefore, the Party kindly requests that this recommendation be withdrawn, since the systematic approach to uncertainty assessment is in strict accordance with the IPCC Guidelines
Energy				
E.1	1. General (energy sector) – other fossil fuels – CO_2, CH_4 and N_2O (E.1, 2021) (E.1, 2019) (E.1, 2017) (E.2, 2016) (E.2, 2015) (22, 2013) Transparency	Use the notation key "IE" instead of "NO" or "NA" in cases in which emissions are included elsewhere, and include appropriate explanations in CRF table 9 and the NIR.	In the NIR (p.111) and during the review the Party noted that additional training has been provided to the experts on the correct use of keys and the necessary steps in case of their use in the CRF tables and the placement of relevant comments in the NIR. The ERT noted improvements in the use of the notation key "IE" in the sector and in the consistency of reporting "IE" estimates in CRF table 9, e.g. for 1. AA Fuel Combustion - Sectoral approach/1. A.5 Other (Not specified elsewhere)/1. A.5.b Mobile. Any pending issues linked to the use of notation keys are covered by ID#E.2 below.	The Party accepts the comment and will further enhance the proper use of notational keys
E.2	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.2, 2021)	Use the notation keys in the next annual submissions in strict accordance with the definitions provided in paragraph 37 of the	The ERT noted that the Party has improved their use of notation keys in the CRF tables, as already indicated in the previous ARR. However, the Party still has used notation key "NA" improperly in some categories for part of the time series: e.g., for AD and emissions of gaseous fuels for 2021 for category 1.A.1.b, or for AD and emission of other fossil	The Party accepts the comment

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(E.57, 2019) Comparability	UNFCCC Annex I inventory reporting guidelines.	fuel for subcategory 1.A.1.a public electricity and heat production for 1992–1998, 2004–2005 and 2009–2019. The Party continues to use notation key "NA" instead of "NO" to report AD and emissions for category 1. C.2 injection and storage that does not occur in the country. Notation key "NO" for reporting the AD and CO_2 and CH_4 emissions from category 1.B.2.c.1.ii gas/venting and 1.B.2.c.1.iii combined under subcategory 1.B.2.c venting and flaring for entire time series instead of "IE". During the review the Party stated that training was conducted for national experts on the use of notation keys, but admitted that some categories are ambiguous and require additional coordination, which the Party is currently working on. For the use of NA for subcategory 1.A.3.b.i, the Party explained that there are no biofuel production facilities in the Republic of Kazakhstan, as they were stopped due to unprofitability and will reconsider the use of notation keys for a number of subcategories and make appropriate comments in the NIR. The ERT considers that the recommendation has not yet been fully addressed because the Party is working on the correction errors relation to notation keys and the ERT noted remaining issues linked to the use of the notation keys in accordance with the definitions provided in paragraph 37 of the UNFCCC Annex I inventory reporting guidelines.	
E.3	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.3, 2021) (E.2, 2019) (E.2, 2017) (E.3, 2016) (E.3, 2015) (23, 2013) (32, 2012) Transparency	Report in the NIR all information regarding the reasons for recalculations and the methodologies used for the recalculated categories.	The Party reported in its NIR 2023 (e.g., sections 3.3.6 (p.69), 3.3.7 (p.70), 3.4.1.5(p.81),3.4.1.6 (p.82), 3.4.2.5 (p.96), 3.4.2.6 (p.97), 3.4.3.5 (p.110),3.4.3.6 (p.111), 3.4.11.1 and 3.4.11.2 (p.143), 3.4.11.3 (p.145), 3.5.2.5 (p.160), 3.5.2.6 (p.161), 3.5.3.5 and3.5.3.6 (p.177), brief information on the reasons for recalculations. However, Kazakhstan has not transparently and systematically reported all the reasons and methodological changes for the recalculated estimates. For example, for category 1.B.1 Solid fuels, the AD for 1.B.1.b has been changed significant in current submission (for instance, in 2023 submissions, the reported AD related to 2020 for coal production is 98.8329 Mt ~~in the CRF tables~~, while in 2022 submission where was 3.9951 Mt ~~in the 2022 CRF tables~~). , but there is no specific explanation in the NIR. For category 1.B.2, recalculation was done for the whole category with relatively clear explanation on the choice of EF, but not explanation on the change of AD, for instance, gas transmission and storage. During the review, the Party clarified that in the NIR 2023	The Party requests that the status of this recommendation be changed to "Resolved" since the chapter on fugitive emissions has been completely prepared anew. The prepared review in the 2023 NDC is much more informative and better than the previous 2021 NDC. There are shortcomings in the chapter, which the Party will work on and will certainly take into account ERT's proposals.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			for all categories, all information on the reasons for the recalculation and methodologies is presented in the "Improvements" or "Category description" section for each of the sectors, as well as sub-sectors. The ERT noted that the recommendation was not fully addressed because there are some detected issues with the presentation of the recalculations in the NIR.	
E.4	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.4, 2021) (E.3, 2019) (E.3, 2017) (E.4, 2016) (E.4, 2015) (28, 2013) (42, 2012) (49, 2011) Transparency	Explain the underlying assumptions and the degree of expert judgment used in the applied interpolation methodology to fill in the time series for AD of national statistics and report it in the NIR.	The ERT noted that the Party reported in its NIR (pp 69, 70, 81, 82, 96, 97, 110, 111, 143, 145, 160, 161, 177) explanations about methodologies approach used for calculations and recalculations and time series consistency. It is noted that expert judgement and interpolation were not mentioned. During the review, the Party clarified that relevant experts were involved in some cases and conclusions are drawn based on expert data in the industry, as also stated in the NIR. The Party further explained that interpolation methodology to fill in the time series for AD of national statistics for the Energy sector, as in other sectors, was applied in strict accordance with the 2006 IPCC Guidelines (vol. 1, chap. 2, section 2.2.3, pp.2.10–2.11) and is described in the NIR. The ERT considers the recommendation has not been fully addressed yet because the information mentioned in the NIR, in the most cases is not specific enough on the used Expert Judgement and interpolations.	Party accepts ERT recommendation
E.5	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.5, 2021) (E.4, 2019) (E.4, 2017) (E.5, 2016) (E.5, 2015) (28, 2013) (42, 2012) Consistency	Ensure the consistency of the entire time series and provide comparisons of AD obtained from different sources.	The Party reported in its NIR (pp. 69,80,154 and 175) about the time series consistency. However, the ERT noted that there is no real section on time-series consistency and the Party has not provided any comparisons between the AD obtained from different national (i.e., data for 1990-1998 when energy balance tables were not available and data for 1999-2021 when the tables are available) and international energy data sources used across the time series in the NIR. During the review, the Party clarified that is constantly working to verify the harmonization of the data series. The Party further noted the country is developing an application to compare data obtained from different national sources with data from international sources for CBIT (The Capacity-building Initiative for Transparency). If the application is approved and the project is implemented, the results of the comparison will be presented in the corresponding NIR. The ERT considers that the	Party accepts ERT recommendation

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			recommendation has not yet been addressed because the Party has not yet indicated information on comparation between different international and national data.	
E.6	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.7, 2021) (E.58, 2019) Convention reporting adherence	Include in the NIR and CRF tables (e.g. CRF tables 1.A(b), 1.B.1 and 1.B.2) correct and consistent values of AD and associated units, including the description of the AD, in particular for crude oil production, natural gas production and coal production, and ensure that the necessary QC activities are implemented for this purpose.	The ERT noted that the Party improved its reporting and the description of the AD is included in the relevant CRF tables along with the associated units. However, there are still inconsistencies in the NIR and CRF tables between the reported AD and the corresponding units in the NIR and CRF tables, for examples in 2021 submissions, the reported AD for natural gas for production in table 1.B.2.b is 54179.00 10^6 m^3 however for natural gas processing in table 1.B.2 is 54179.00 10^6 m^4 and the reported AD for crude oil production in table 1.A(b) is 74733.22 kt, while in table 1.B.2 is 86879.31 kt. During the previous review, the Party noted that the inconsistencies are connected with a technical error in the dataset and its plan to fix them. In the 2023 submission, the ERT noted that there are still errors in reporting the values for oil and gas production. During the review the Party explained that the discrepancies in the initial data for 2021 between CRF tables 1.B.2 and 1.A(b) are the result of addressing of the review comment which was done for some parties of the inventory, but not consistently across all categories. The Party plans to check the latest data from the Bureau of National Statistics, which may also be subject to change, and make appropriate corrections to the tables and include relevant explanations in the NIR. The ERT considers that the recommendation has not yet been addressed because the Party has not yet updated all parts of the inventory.	Party accepts ERT recommendation
E.7	General (energy sector) – gaseous fuels – CO_2, CH_4 and N_2O (E.74, 2021) Convention reporting adherence	Correct the errors detected by the ERT for categories (a) 1.A.1.c (solid fuels), (b) 1.A.2 (liquid fuels), (c) 1.A.2.d (gaseous fuels), (d) 1.A.2.f (liquid fuels) and (e) reference approach (BKB), and strengthen the QA/QC activities to limit the data entry mistakes in the next annual submission.	The ERT noted that the listed errors were addressed as follows: (a) The incorrect 2017 N_2O IEF for 1.A.1.c/solid fuels/N_2O IEF – category 1.A.1.c – manufacture of solid fuels and other energy industries was recalculated and now it is consistent with the rest of the time series and within the IPCC default values (0.1–1.5 kg/TJ). (c) The CO_2 IEF for gaseous fuels of category 1.A.2.d – pulp, paper and print for 1999 was revised from 100 to 58.00 t/TJ.	The Party accepts ERT recommendations. All the recalculations will be held during next NIR

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			(d) The N_2O IEF for category 1.A.2.f non-metallic minerals (liquid fuels) for 2004, 2005 and 2009 were corrected. However, the ERT noted that the Party has not corrected following errors: (b) The 2006 CO_2 IEF for liquid fuels for category 1.A.2 – manufacturing industries and construction: the ERT (42.66 t/TJ) was not corrected and is outside the range of IPCC default values (57.6–97.5 t/TJ), the lowest of all reporting Parties (42.7–86.4 t/TJ) and below the values reported in the time series, with significant inter-annual changes in 2005/2006 (–44.3 per cent) and 2006/2007 (77.7 per cent). During the previous review, the Party clarified that this was caused by a typing error and the liquid fuel consumption for the category should be 51,600.5 TJ, not 91,610.8 TJ, and e) the ERT noted that the carbon EF for BKB and patent fuel for 2017–2019 (20.6 t/TJ) was not corrected and is outside the range of IPCC default values (23.8–29.6 t/TJ) and the lowest of all reporting Parties (20.6–28.9 t/TJ). It replaced the constant value of 26.6 t/TJ used for 1990–2016 and is also used for 2020 and 2021. During the review the Party stated that d data quality control work is carried out within the expert group, and information is also verified by government agencies. The ERT noted that the Party has still to correct some detected to completely resolved the issue.	
E.8	Fuel combustion – reference approach – solid fuels – CO_2 (E.8, 2021) (E.8, 2019) (E.8, 2017) (E.9, 2016) (E.9, 2015) (34, 2013) Comparability	Carry out the planned improvement to separate coking coal consumption from the total other bituminous coal consumption.	The ERT noted coking coal is still reported separately for 2014 onwards but as IE/NA up to 2013 in CRF table 1.A(b), with the Other bituminous and anthracite reporting as NO for 2015 to 2021 and sub-bituminous reporting as NO for entire time series. During the review, the Party clarified that after joint work with government agencies and a number of experts in the study of technical literature, such work was carried out and the information is provided in the NIR 2023. Such information was not found in the NIR. Therefore, the ERT considers that the comment has not yet been addressed.	The Party accepts ERT recommendations. In the next submission The party will make efforts to report the cooking coal separately from 1990.
E.9	Fuel combustion – reference approach – all	Cross-check the AD and provide explanations for the differences in inter-	The ERT noted the differences in estimated CO_2 emissions between the reference and sectoral approaches for 1990–2013 (excl. 2005) range between 1.2 and 28.5 per cent, with	The Party accepts ERT recommendations. The recalculation will be held after receiving updated information from the Bureau of national statistics.

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	fuels – CO_2, CH_4 and N_2O (E.9, 2021) (E.7, 2019) (E.7, 2017) (E.8, 2016) (E.8, 2015) (33, 2013) (46, 2012) (44, 2011) Transparency	annual changes between the reference and sectoral approaches.	higher emissions estimated from the reference approach. For 2014–2018, the differences range between –0.3 and –7.2 per cent, with higher emissions estimated from the sectoral approach. The difference in 2019 and 2020 are 6.5 and 4.8 per cent and the difference in 2021 is -2.0 per cent with higher emissions estimated in the sectoral approach. The Party indicated in the NIR 2023 (section 3.2.2, pp.56 , 57) that the differences are caused by difficulties in collecting AD for the production, export or import of liquid fuels (crude oil) and solid fuels (coking coal and different types of coal), which also explains the inter-annual changes in the values of the differences between the reference and sectoral approaches. 6 items of explanations for the reasons of difference in inter-annual changes between the reference and sectoral approaches are reported in general. However, unless for the last reason (number 6), the rest of the reasons mentioned for the difference between basic approach and sectoral approach are supporting the idea that the fuel supply has been recorded higher than the fuel consumption and therefore are in favour of higher emission values in the reference approach. In 2021, in contrast to the previous years and 2020, total emissions accounted in 2021 is less when using reference approach than sectoral approach. The reason for change in sign of the difference in years and specially in 2021 in comparison to 2020 and to the overall trend is not clarified. The explanation is, therefore, not sufficient to clarify the magnitude and the observed trend in the differences between the approaches. During the review the Party clarified that the difference in inter-annual changes between the reference and sectoral approaches occur due to changes in Fuel-energy balance provided by Bureau of National Statistics of Kazakhstan. The Bureau did not provide the balance in old variant to make a comparison between two balances. The cross-check of AD and the explanations of found mistakes, if it’s occur, will be provided in the next submission of NIR. The ERT considers that the recommendation has not yet been fully addressed.	

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E.10	Fuel combustion – reference approach – all fuels – CO_2 (E.10, 2021) (E.9, 2019) (E.18, 2017) (E.27, 2016) (E.27, 2015) Accuracy	Reconsider the accuracy of the data concerning the combusted fuels and the fuels used as feedstocks in order to further reduce the level of difference between the sectoral and reference approaches across the time series and include additional information in the NIR explaining the observed differences in the CO_2 emissions estimated from the two approaches.	The Party continues to report significant differences between the sectoral and reference approaches across the time series at the fuel level, including up to 66.1 per cent difference for gaseous fuels (2003), up to 74.7 per cent for liquid fuels (1999) and 25.3 per cent for solid fuels (1993). Still, the recalculated emissions show that high differences exist between the results of emission calculation in the two approaches. The Party reported in NIR 2023 (p.66,67) section 3.3.4 explanations about uncertainty in emissions based on the reference approach. However, this is not enough to justify the significant difference between the results of emission calculation in the two approaches. During the review the Party clarified that the cross-check of AD and the explanations of found mistakes, if it's occur, will be provided in the next submission of NIR as the additional information included as the appendix or a separate chapter. The ERT considers that the recommendation has not yet been fully addressed.	The Party accepts ERT recommendations. The recalculation will be held after receiving updated information from the Bureau of national statistics.
E.11	Fuel combustion – reference approach – liquid, solid, gaseous and other fossil fuels – CO_2 (E.12, 2021) (E.11, 2019) (E.47, 2017) Accuracy	In order to improve the alignment between the reference and the sectoral approaches and to increase the transparency of reporting in the energy sector: (a) Strengthen the QC procedures for the AD used for the emission estimates across fuel combustion activities; (b) Disaggregate the AD included in category 1.A.5 other and reallocate emissions to appropriate categories; (c) Estimate carbon excluded from NEU and feedstocks of NGLs and associated petroleum gas	(a) Although further explanations about the QA/QC procedures in the reference approach is presented, there is still persistent inconsistencies between the approaches, suggesting the need for further improvement to the QC procedures; (b) The Party continues to report the consumption and corresponding emissions for category 1.A.5 at an aggregated level under subcategory 1.A.5.a stationary in CRF table 1.A(a)s4. A value equivalent to the difference in consumption of coking coal between the reference and sectoral approaches was also included in the CRF Table 1.A(a)s4 under the category. The Party provides explanation that the difference between the two approaches was reduced by using data on the consumption of coking coal of JSC "ArcelorMittal Temirtau" and the series were recalculated for categories 1.A.5 "other " and 1.A.1b "Petroleum refining". Although the difference between the two is reduced to 2,265.18 kt CO_2 (CRF-2023 Table 1.A(a)s4 cell G62) from 46,667.12 kt CO_2 (CRF-2021 Table 1.A(a)s4 cell G62), still large difference exists between the two approaches. Also, it is not clarified from which year the new data for coking coal is used and the recalculations are made.	The Party accepts ERT recommendations.

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		separately from natural gas; (d) Implement the recommendations provided in ID#s E.51 and E.53 (FCCC/ARR/2017/KAZ); (e) Provide clear and detailed explanations in the NIR for the differences between the CO_2 emissions reported in the reference and sectoral approaches for each fuel type.	(c) Carbon excluded from NEU and feedstocks of NGLs is reported for more years (1990 and 1999–2021) and the notation key "NA" is still used for the rest of the period; (d) The ERT notes that the corresponding issues from FCCC/ARR/2017/KAZ are presented below with status resolved in ID# E.24 and addressing in ID# E.30 below. (e) The ERT notes that the issue is covered by ID# E.10 above. During the review the Party clarified that in the next NIR submission national inventory team will strengthen the cross-check of AD and will provide the explanations of found mistakes, if it's occur.	
E.12	Fuel combustion – reference approach – liquid fuels – CO_2, CH_4 and N_2O (E.13, 2021) (E.59, 2019) Convention reporting adherence	Report in CRF table 1.A(b) correct AD for international bunkers that are consistent with the data reported for the international aviation and international navigation categories in CRF table 1.D.	The ERT noted that the Party reported the consistent AD for jet kerosene under aviation bunkers and AD for gas/diesel oil under marine bunkers in CRF table 1.D and table 1.A(b). Nevertheless, Kazakhstan continues to use the notation key "NO" for reporting the AD for residual fuel oil in CRF table 1.A(b) for both international bunkers. The ERT noted that this inconsistency and incorrect data could contribute to the differences reported by Kazakhstan between the reference and sectoral approaches for liquid fuels. During the review, the Party explained that the recommendation will be taken into consideration in the next annual submission. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet corrected the data input in table 1.A(b) for all the fuels.	The Party accepts ERT recommendations. All the recalculations will be held during next NIR
E.13	Feedstocks, reductants and other NEU of fuels – all fuels – CO_2 (E.15, 2021) (E.12, 2019) (E.21, 2017) (E.30, 2016) Convention	Improve the QA/QC procedures relevant to the estimation of the use of the feedstocks, reductants and NEU of fuels and ensure consistent reporting across CRF table 1.A(b) and table 1.A(d).	The ERT noted that, for crude oil and NGL, the Party continues to report using the notation keys "NE" and "NA" for the carbon excluded in CRF table 1.A(b) respectively, while in CRF table 1.A(d), it reported using the notation key "NO". During the review … The ERT considers that the recommendation has not yet been addressed because some pieces of data provided in CRF table 1.A(b) and table 1.A.(d) are not consistent. In addition, the ERT noted that table 1.A.(d) indicates NEU of	The Party accepts ERT recommendations. In the next submission The Party will ensure that all the categories of the inventory report will be properly calculated and fiiled according to the available data.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	reporting adherence		NG liquid for petrochemical production, but the AD and relevant emissions are reported as NA.	
E.14	International aviation – liquid fuels – CO_2, CH_4 and N_2O (E.16, 2021) (E.13, 2019) (E.45, 2017) (E.59, 2016) Convention reporting adherence	Ensure consistency between CRF table 1.D (fuel consumption of the international aviation/ international bunkers) and CRF table 1.A(b) (reference approach – fuel consumption of the international bunkers).	The ERT noted that the Party reported the consistent (corrected) AD for jet kerosene under aviation bunkers and AD for gas/diesel oil under marine bunkers in CRF table 1.D and table 1.A(b). Nevertheless, Kazakhstan continues to use the notation key "NO" for reporting the AD for residual fuel oil in CRF table 1.A(b) for both international bunkers. The ERT noted that this inconsistency in data could contribute to the differences between the reference and sectoral approaches for liquid fuels. During the review, the Party explained that It is likely that the discrepancies between the categories for 2021 may have arisen due to the data update from the Bureau of National Statistics on the original data in the deadline before submitting the report to the Secretariat. Since the category "Energy" is more complex and has a large number of subsections, due to a not very significant difference, it was decided to leave the data without changes, but with the intention to make appropriate corrections in the future during the systematic preparation of all NIR and CRF tables. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet corrected the data input in table 1.A(b) for residual fuel oil.	The Party asks EPT to give a more precise recommendation to resolve this recommendation, or change the status of the issue to "Resolved"
E.15	International navigation – liquid fuels – CO_2, CH_4 and N_2O (E.19, 2021) (E.61, 2019) Transparency	Provide GHG emission estimates for the use of residual fuel oil under international navigation, or include in the NIR an appropriate explanation for changing the previous reporting of residual fuel oil consumption under international navigation to "NO".	The Party reported in its NIR-2023 section 2.4.11.2 (p.135) that considering the comments of experts on the previous review, recalculations were made for part of the data related to international activities and the use of fuel oil as fuel. The residual fuel oil consumption in the marine bunkers is reported in CRF table 1.D. However, still the residual fuel oil consumption in domestic navigation is not reported under category 1.A.3.d domestic navigation in CRF table 1.A(a) using the notation key "NO". During the review the Party clarified that at present, additional consultations have been held with specialists from the Bureau of National Statistics and the initial data have been checked for comparability. Appropriate comments are made in chapter and 3.4.10 maritime navigation of the NIR 2023.	The Party insists on changing the status of this recommendation to "Resolved" since it explained in the explanations that fuel oil is not used as fuel for inland navigation.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet reported the use of residual fuel oil in domestic navigation.	
E.16	1.A Fuel combustion – sectoral approach – solid fuels – CO_2 (E.20, 2021) (E.16, 2019) (E.10, 2017) (E.14, 2016) (E.17, 2015) (39, 2013) (53, 2012) Accuracy	Investigate the possibility of calculating country-specific CO_2 EFs for lignite and sub-bituminous coal as weighted average values based on information on specific coal production and CO_2 EFs for each mining field, as the majority of coal used in Kazakhstan is from domestic production.	The ERT noted that since the majority of coal used in Kazakhstan is from domestic production, the Party investigate the possibility of calculating country-specific CO_2 EFs for lignite and sub-bituminous coal while the Party has still used default EFs based Table 1.2, 1.3 and 1.4 of volume 2 of 2006 IPCC guideline, for reporting lignite and sub-bituminous coal EFs (Table 3.8, pp. 67 and 68). During the review, the Party has clarified that a part of this work has been done and added to the NIR 2023, but work to improve the approaches continues. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet developed higher tier methodologies and country-specific EF for lignite and sub-bituminous coal and has not included any explanation in the NIR 2023 in this regard.	The Party accepts ERT recommendations. In the next submission The Party will make efforts to calculate country specific EFs for the coal.
E.17	1.A Fuel combustion – sectoral approach – all fuels – CO_2, CH_4 and N_2O (E.21, 2021) (E.17, 2019) (E.11, 2017) (E.16, 2016) (E.15, 2015) (26, 2013) Transparency	Include detailed data on energy consumption by fuel for all subcategories in the energy sector.	The Party reported in its NIR (e.g., Table 3.9 (p.72), Table 3.15 (p.84 and Table 3.21(p.98)) related information on energy consumption data by fuel types for the subcategories under 1.A.	The Party accepts the ERT recommendation.
E.18	1.A Fuel combustion – sectoral approach – all fuels – CO_2 (E.22, 2021) (E.18, 2019) (E.12, 2017) (E.18, 2016) (E.18, 2015)	Investigate the allocation of AD and emissions from the energy sector to the industrial processes sector and correct any misallocations.	The ERT noted that the Party in CRF table 1.A(d), still reported only the ferroalloys industry as NEU of coking coal while in the NIR 2023(section 4.4.1.2.1, p.2014) Kazakhstan explained that coking coal is used as a raw material to produce coke for the iron and steel industry by the major producer in the sector ArcelorMittal Temirtau JSC and also reported notation key “NA” for 2021 NEU of coking coal without any explanation in the 2023 submissions. The ERT also noted that there are still some errors related to the non-energy use of the fuels on the	The Party accepts the ERT recommendation.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(40, 2013) (54, 2012) (47, 2011) Comparability		inconsistency between CRF Table 1. A(d) in the Energy sector and 2(I). A-H in IPPU sector. For examples in the 2023 submissions, in the published CRF tables for 2020, the reported value for NEU of lubricant in the 2(I). A-Hs2 in IPPU is 51.8 (kt) which is equivalent to 2082 TJ, while in the CRF table 1. AD the reported value is 120 (TJ) and also for 2021, the reported value for NEU of lubricants is 633 TJ in the CRF table 1. A(d) but in CRF table 2(I). A-Hs2 in IPPU is reported as 61(kt), which is equivalent to 1,760 TJ. The Party during the review noted that at present is working to improve the NIR, and the data of the CRF tables are being carried out. The team is trained, which reduces the risk of errors.	
E.19	1.A Fuel combustion – sectoral approach – solid fuels – CO_2, CH_4 and N_2O (E.25, 2021) (E.62, 2019) Accuracy	While avoiding double counting, revise and report in the respective CRF tables for the energy and IPPU sectors the CO_2, CH_4 and N_2O emission estimates calculated strictly in accordance with the 2006 IPCC Guidelines, at a minimum for 2013–2017 and subsequent years as a first and immediate step, but with the aim of covering the complete time series, in addition to providing information on the source and method of calculation used for the emission estimates, including the NCVs and EFs for coking coal and other fuels used.	The ERT noted that considering revision has been done for avoiding double counting for the energy and IPPU sectors for 2014–2017 and subsequent years, but there was no recalculation implemented to apply the same approach for the complete time series. There is no provided addition information on the source and method of calculation used for the emission estimates, including the NCVs and EFs for coking coal and other fuels used. During the review the Party has indicated constantly working to avoid double counting of fuel and corresponding work has also been done for coking coal and other used fuels and information is presented in the energy and IPPU sections. The Party further explained the recalculation was not done for 1.A.5 and 1.A.1.b subsectors and for cooking coals due to the fact that the Bureau of National Statistics did not provide the energy balance for the previous years in new manner, or the energy balance for the year 2021 in old manner.	Ehe Зarty reiterates that the recalculation was not done for 1.A.5 and 1.A.1.b subsectors and for cooking coals due to the fact that the Bureau of National Statistics did not provide the energy balance for the previous years in new manner, or the energy balance for the year 2021 in old manner. The Party accepts the ERT recommendation and will make efforts to further enhance the GHG inventory.
E.20	1.A.2.a Iron and steel – solid fuels – CO_2, CH_4 and N_2O (E.26, 2021) (E.21, 2019)	In the NIR, provide information on AD for coking coal combusted for own needs by ArcelorMittal Temirtau JSC for all relevant years of the time series and	The ERT noted that the Party not report AD for coking coal combusted or used for own needs by ArcelorMittal Temirtau JSC from 1990-2013. During the review the Party indicated an additional request was prepared to ArcelorMittal Temirtau JSC for data for the entire period. The result of the recalculations is presented in the CRF tables, and is also described in the "industrial processes"	The Party accepts the ERT recommendation. In the next submission The Party will provide all the relevant information.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(E.50, 2017) Transparency	ensure the consistency of the time series by performing relevant recalculations for 1990–2013, as necessary.	section. The ERT noted that despite the Party explained in the NIR 2023, pages 58 and 59 that the solid fuel was recalculated due to the disaggregation of coking coal, the Party continues to report the consumption and corresponding emissions for category 1.A.5 at an aggregated level under subcategory 1.A.5.a stationary in CRF table 1.A(a)s4. The Party further indicated category 1.A.5 was recalculated due to provision of data on the consumption of coking coal by ArcelorMittal Temirtau JSC for own needs and an additional request was prepared to ArcelorMittal Temirtau JSC for data for the entire. However, the ERT noted that the recommendation was not been addressed because the information in the NIR and CRFs is not sufficient for defining coking coal combusted or used for own needs by ArcelorMittal Temirtau JSC and also the portion of the consumed coking coal by ArcelorMittal Temirtau JSC under energy and IPPU sectors were not determined.	
E.21	1.A.2.a Iron and steel – gaseous fuels – CO_2, CH_4 and N_2O (E.75, 2021) Accuracy	Revise the AD for the entire time series for gaseous fuels under category 1.A.2.a iron and steel using a consistent approach and data source and recalculate the CO_2, CH_4 and N_2O emissions for the entire period, clearly explaining the recalculation in the NIR in accordance with the UNFCCC Annex I inventory reporting guidelines, paragraphs 43–45.	The ERT noted that the Party has revised the AD for the time series for gaseous fuels /category 1.A.2.a using a consistent approach and statistical data and recalculate the CO2, CH4 and N2O emissions for the entire period with clear explanation the recalculation in the NIR (pp. 80-81, 89-91),	The Party accepts the ERT recommendation.
E.22	1.A Fuel combustion – sectoral approach – other fossil fuels – CO_2, CH_4 and N_2O (E.27, 2021)	In the NIR, include detailed information on the allocation of other fossil fuels to ensure transparency of reporting emissions from these fuels and use appropriate	The ERT noted that the Party in the NIR (section 3.2.2, p.58) the Party clarified that, since 2009, the national statistics do not separate consumption of other fossil fuels from liquid, solid or gaseous fuels owing to the lack of a separate code for industrial products, but fuels and emissions are included in the consumption of the corresponding type of fuel (liquid, solid or gaseous).	The statement is true. In the next submission The Party will make efforts to enhance the national inventory report.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(E.20, 2019) (E.49, 2017) Comparability	notation keys, where necessary.		
E.23	1.A.2.d Pulp, paper and print – all fuels – CH_4 and N_2O (E.28, 2021) (E.22, 2019) (E.23, 2017) (E.32, 2016) (E.31, 2015) Comparability	Include emissions of CH_4 and N_2O for the subcategory 1.A.2.d pulp, paper and print or provide justification to support that these emissions are insignificant and use a notation key in accordance with decision 24/CP.19, annex I, paragraph 37.	As already noted in the previous ARR, the Party has included estimates for the CH_4 and N_2O emissions for liquid and solid fuels and, for part of the time series, for biomass and gaseous fuels, despite their insignificance. The previous ERT noted, however, that for some fuels the time series is not complete and notation key NA are reported for some years. The current ERT noted that the Party had improvement regarding reported values in subcategory 1.A.2.D (Pulp and paper industry), for example for reporting gaseous fuel consumption and emissions of CO2, CH4 and N2O for 1990–1998 that notation key "NO" is used instead "NA" and clarification in the NIR 2023, page 91. However, the ERT noted the Party has not addressed the recommendation completely because the Party still has used "NA" instead of "NO" for reporting CH4 and N2O emissions from biomass in the subcategory 1.A.2.D (Pulp and paper industry), for 1990-1991, 2009-2016 and 2019-2021.	The Party accepts the ERT recommendation.
E.24	1.A.3.a Domestic aviation – liquid fuels – CO_2 (E.29, 2021) (E.25, 2019) (E.51, 2017) Transparency	In the NIR, report correct CO_2 EFs and provide a detailed explanation on the methodological approaches used for the emission estimates for the category, as well as on selection of the AD.	The ERT noted that the Party has reported in section 3.4.8.2 of its NIR2023 (p.129) that tier 2 is used for estimation of emissions in this sector. Also, the Party stated in CRF table summary 3 that the method used for the sector is tier 2 with "D" (default) EFs. The ERT noted that the CO2 EFs are reported in CRF Table1.A(a)s3 to be 74.10 and 69.30 for Gas/diesel oil and Gasoline which is in line with IPCC default factors. Also, the Party provides explanation on the methodological approaches used for the emission estimates for the category, as well as on selection of the AD in its NIR section 3.4.8.1 (p. 127-129). During the review, the Party explained that all EFs for domestic aviation were used in accordance with the methodological recommendations of the 2006 IPCC Guidelines. However, as far as the data in the CRF tables are aggregated, it may appear that the applied EFs are not used correctly. Before calculation, all flight data is checked and divided by types of aircraft used, number of flights, cruise time and take-off time to landing. And only after such	The Party requests that the status of this recommendation be changed to "Resolved" since, in general, the Party uses the coefficients correctly and has prepared a detailed review. At the same time, Strona will strengthen the methodological part, and within the framework of improving the chapter on domestic aviation.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			calculations, the data was added up and presented in the CRF tables 1.A.3.A - Domestic Aviation.	
E.25	1.A.3.b Road transportation – liquid fuels – CO_2, CH_4 and N_2O (E.30, 2021) (E.26, 2019) (E.13, 2017) (E.21, 2016) (E.21, 2015) (42, 2013) Comparability	Reallocate AD and emissions from transportation in agriculture/forestry/fisheries to the subcategory agriculture/forestry/fishing and emissions from industrial and construction off-road transport to the category manufacturing industries and construction.	The ERT found that the Party NIR (section 3.4.6.1, p.124), subcategory 1.A.3.e.ii includes vehicles used in agriculture, industry (including construction and maintenance), the residential sector, as well as ground support facilities at airports, agricultural machinery (tractors, combines, loaders, etc.) and construction. In addition, the Party reported in the NIR (section 3.4.2.2, p.89) that GHG emissions from off-road transport in industry and construction (gasoline, kerosene and diesel fuel, without specifying the type of fuel used) were included under subcategory 1.A.3.e.ii other in order to eliminate double counting in the subcategories under category 1.A.2 manufacturing industries and construction. During the review, the Party clarified that the Party has made reallocations and recalculations using a more accurate AD in agriculture, industry (including construction and maintenance), housing, as well as ground support facilities at airports, agricultural machinery (tractors, combines, loaders, etc.) and construction. The Party will take into account the requested improvement of ERT and set out in detail the mechanism for the redistribution of transport between subcategories. However, the ERT considers that the recommendation has not yet been fully addressed because the explanation about the reallocation is not provided.	The Party requests that the recommendation be rephrased. Since the Party has redistributed its existing fuel between categories 1.A.3.e.ii and category 1.A.2. and, in the opinion of the Party, resolved the issue. However, since the ERT considers that there are shortcomings, the Party needs a more precise wording of the recommendation for its successful implementation or change the status to "Resolved"
E.26	1.A.3.b Road transportation – liquid fuels – N_2O (E.32, 2021) (E.27, 2019) (E.14, 2017) (E.22, 2016) (E.22, 2015) (43, 2013) (60, 2012) Accuracy	Improve the accuracy of the N_2O emission estimates for gasoline consumption, taking into account the pollution control technologies introduced over time in the vehicle fleet.	The Party stated in its NIR (p.117 and 136) that for more accurate estimation of the emission, the entire series for road transport in Kazakhstan has been recalculated for the first time in the COPERT model, and the data as a whole have not a bad coordination with the first half of the series and some differences for recent years (due to the influence of cars with technological improvements). However, since significant discrepancies have been identified for several years, which is apparently due to technical errors in modelling, the results of calculations in 2021 from using the COPERT model have so far been considered as an independent data verification and for comparing the entire series. Also, during the review, the Party clarified that partially, the results are reflected in the NIR 2023, but not in the national totals. Although the Party has included the timeline of the	Party accepts ERT recommendation

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			adoption of EURO standards in Kazakhstan and have mentioned data limitations in categorization of the cars by age, the use of catalytic converters in gasoline engines are not yet taken into account in the N2O emission inventory. Therefore, the ERT considers that the issue has not yet been fully addressed.	
E.27	1.A.3.b Road transportation – liquid fuels – N_2O (E.34, 2021) (E.63, 2019) Transparency	Provide in the NIR information on the composition of the vehicle fleet, including the number of cars with pollution control technologies, and justify the share of 5–6 per cent of these vehicle types in the fleet, as indicated by the Party, and the evolution of the share over the years, taking into account the fact that these data are very important for the accurate estimation of N_2O (and CH_4) emissions for this subcategory.	The Party provided in its NIR sections 3.4.5.2, 3.4.5.3, and 3.4.11.1 (p.116-123) data collection procedure and the result of the categorization of the cars by age and standard are provided. In addition to the description provided in the previous submission, the Party stated in the NIR2023 (p. 117) that it is planned to use the COPERT model for more precise estimation of N2O and CH4 emissions from the road transport. However, the ERT noted that Kazakhstan still did not report in the NIR specific information on the consumption of fuels by vehicle category, and provided limited information on the number of vehicles with oxidation catalysts (figure 3.23, p.120) in the country and the evolution of the share over the time series. During the review, the Party clarified that at present, the proportion of new cars is somewhat increasing and it is likely that the estimates of recent years will be changed. This will show the next GHG inventory. Therefore, the ERT considers that the recommendation has not yet been fully addressed.	The Party requests that the status of this recommendation be changed to “Resolved”, since NIR 2023 provides objective information about the Republic’s vehicle fleet, its age and determines the number of vehicles equipped with pollution control technologies. The question of using the COPERT pronamma will only clarify these data, but such work has been done at the moment
E.28	1.A.3.b Road transportation – liquid fuels – N_2O (E.76, 2021) Accuracy	Correct the EF applied for the estimates of N_2O emissions from diesel fuel in road transportation across the time series and provide revised estimates of N_2O emissions.	The Party corrected EF applied for the estimates of N2O emissions from diesel fuel in road transportation from 5.7 kg/TJ to 3.9 kg/TJ across the time series and provide revised estimates of N2O emissions. The updated value is the IPCC default value.	The Party requests that the status of this issue be assigned to “Resolved”
E.29	1.A.3.b.i Cars – liquid fuels – CH_4 (E.36, 2021) (E.31, 2019) (E.52, 2017) Accuracy	Finalize the investigation of the technologies used in the country, provide more detailed background information about road transportation and, with this information, justify the relatively high CH_4 EF used for gasoline, in particular for the latest	The Party continued to report a CH4 IEF value (33.00 kg/TJ) for gasoline cars, which is the IPCC default value for uncontrolled gasoline cars (2006 IPCC Guidelines, vol. 2, chap. 3, table 3.2.2, p.3.21). The Party has added in NIR 2023 (p120) that the Euro 5 standard was introduced in 2016. Also, the Party has clarified in section 3.4.11.3 of the NIR (p.136) that the experts plan to use the COPERT model for better estimation of the N2O and CH4 emissions. Also, during the review, the Party clarified that this issue is in the process of being resolved. However, preliminary results	The Party requests to change the status of this recommendation to “Resolved”. The party clearly explained the approach to assessing the country's auto industry, and drew ERT's attention to the fact that more than 60% of all vehicles are more than 10 years old (vehicles that are 20 years old or more are active), which is what determines the use of high coefficients for vehicles. The intention to use COPERT is all just an attempt to make the calculation more correct. But this should not change the essence.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		years of the time series, or revise the estimates using corresponding more appropriate IPCC default values.	showed that additional data are required for its successful use. Such data is currently being processed. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided more detailed background information about road transportation and the results of the improved emission accounting method.	
E.30	1.A.3.d Domestic navigation – liquid fuels – CO_2, CH_4 and N_2O (E.37, 2021) (E.32, 2019) (E.53, 2017) Transparency	Estimate emissions for subcategory 1.A.3.d domestic navigation in accordance with the 2006 IPCC Guidelines by collecting relevant data on fuel consumption by type of fuel, separately for domestic and international navigation, or use appropriate interpolation/extrapolation techniques based on existing indicators or expert judgment to allow this disaggregation, and documenting comprehensively these data in the NIR;	The Party reported in its NIR 2023 section 3.4.10 (p.131 and 133) that division into domestic and international transportation is made considering the period of implementation of such detail and technical capabilities and the Party has separated the domestic and international emissions from each other. The calculation method is based on the Tier 1 method and the Party clarified some assumptions used: e.g. that gasoline is not taken into account for international activities, while fuel oil is not considered for domestic navigation. During the review, the Party clarified that, the use of residual fuel oil in domestic transportation is not needed and accounted as the types of ships used, where fuel oil was used as fuel, were significantly outdated. In addition, river transport requires good infrastructure in river ports. Support for such an economy did not justify itself for a long time, and many ports on the rivers were closed due to inactivity, thereby reducing the opportunities for river transportation. The third important reason is that not all rivers are suitable for navigation. Moreover, at present, part of the rivers on which navigation was carried out has become shallow and has become unsuitable for the passage of medium-sized ships. Therefore, fuel oil-powered ships have already been disposed of, and diesel-powered ships are being used to replace them. Also, during the review, the Party stated that the main data source for Domestic Navigation and International Navigation is the Bureau of National Statistics. A fairly large list of data is used, on the basis of which a conclusion is made about the fuel balance for the needs of the fleet. One of the criteria is the type of ships and the type of fuel used, as well as the volume of cargo transported on domestic and international navigation lines. The conclusions obtained by the experts coincide with the data of the analytics made by independent authors. Currently, official	The Party requests to change the status of this recommendation to “Resolved”, or to give more specific wording. Currently, the Party has revised its approaches for inland navigation - liquid fuel. The findings are presented in detail in the NIR. For this reason, you need more precise tasks to complete them or change the status to “Solved” to focus on other tasks.

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			data is requested from KazMorflot, the only company in Kazakhstan that carries out international transportation. The ERT notes that the Party has clarified why fuel oil consumption in not occurring in the domestic navigation and how the gas/diesel oil consumption in the sector is split among the domestic and international navigation in CRF Table 1.A(a)s3 and CRF Table 1.D. The ERT considers that the recommendation has not yet been fully addressed because no appropriate interpolation/extrapolation techniques based on existing indicators or expert judgment is performed and the Party clarifications are not presented in the NIR.	
E.31	1.A.3.d Domestic navigation – liquid fuels – CO_2, CH_4 and N_2O (E.38, 2021) (E.64, 2019) Transparency	Include in the NIR a well-documented justification for the decrease in the gas/diesel oil consumption in subcategory 1.A.3.d domestic navigation since the 2017 submission and ensure the consistency of the emission estimates for the complete time series.	The Party has provided the same explanation on the trend of fuel use in domestic navigation in Chapter 3.4.10 of NIR 2023 as in the previous submission and no well-documented justification for the decrease in the gas/diesel oil consumption in subcategory 1.A.3.d domestic navigation is reported. However, the Party provided in section 3.4.11.3 (Planned improvements for transport) of the NIR 2023 an explanation about recalculations made in the sector. The Party has clarified in its NIR (p136) that a revaluation of the fuel used for domestic and international navigation carried out by Kazakh vessels was carried out. The calculations are based on the balance of transported goods for domestic and international transportation. Also, during the review, the Party clarified that possible significant changes in fuel consumption by river navigation can be explained by the wear and tear of the main means of transportation, as well as the significant shallowing of some rivers in the north of the Republic of Kazakhstan, which did not allow economic activity. Also, the Party clarified that distribution of fuel between domestic and international shipping is carried out on the basis of data on the volume of transported goods. As a rule, this ratio is 60% of all fuel consumed for domestic transportation and 40% for international. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet reported in its NIR a well-documented justification for the decrease in the gas/diesel oil consumption in subcategory 1.A.3.d domestic navigation and the provided explanation during	Party accepts ERT recommendation

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			the review and the consistency of the emission estimates for the complete time series is no ensured.	
E.32	1.A.3.d Domestic navigation – liquid fuels – CO_2, CH_4 and N_2O (E.39, 2021) (E.65, 2019) Transparency	Include in the NIR a well-documented justification for the decrease in gasoline consumption in subcategory 1.A.3.d domestic navigation and ensure the consistency of the emission estimates for the complete time series.	There is no additional information on gasoline compared to the information provided for diesel use as specified for E.31.	Party accepts ERT recommendation
E.33	1.A.4.c Agriculture/forestry/ fishing – liquid fuels – CO_2, CH_4 and N_2O (E.40, 2021) (E.33, 2019) (E.54, 2017) Comparability	Disaggregate CO_2, CH_4 and N_2O emissions for subcategory 1.A.4.c by type of fuel under the correct subcategories (i.e. 1.A.4.c.ii off-road vehicles and other machinery and 1.A.4.c.iii fishing) for the entire time series and, in the NIR, provide detailed explanations on the methods used to allow such reallocation.	The Party has disaggregated CO2, CH4 and N2O emissions for subcategory 1. A.4.c by type of fuel under the correct subcategories (i.e. (1. A.4. c. i stationary, 1.A.4.c.ii off-road vehicles and other machinery and 1.A.4.c.iii fishing)) and the results were presented in CRF table 1.A(a). The Also detailed comments were indicated in chapter 3.4.6 (P.132) of the NIR 2023. The Party stated during the review experts are constantly working on the separation of fuel types for off-road vehicles, taking into account its quantity in the Republic of Kazakhstan and the results are presented in sub-category 1.A.4.C - Agriculture/Forestry/Fishing. More detailed comments can be found in chapter 3.4.6 (P.132) of the NIR 2023. However, the ERT noted that the recommendation has not fully addressed because the Party still has not any detailed explanation on the methods used to allow such reallocation in the NIR.	Party accepts ERT recommendation
E.34	1.A.5 Other (fuel combustion activities) – all fuels – CO_2, CH_4 and N_2O (E.41, 2021) (E.34, 2019) (E.55, 2017) Comparability	Revise the AD and emission allocations to ensure that they are included in the appropriate categories in the CRF tables according to the UNFCCC Annex I inventory reporting guidelines and, in the NIR of the next annual submission, include information on the revised allocations, provide detailed explanations on all	The ERT noted that In the NIR (section 3.4.3.1, p.97), the Party reported that this category included the emissions of public administration, defence and social security, while it should be included in subcategory 1.A.5.b mobile based on the 2006 IPCC Guidelines (vol. 2, chap. 2, table 2.1, p.2.10) and also the recalculation was done for category 1.A.5 Other after 2013 but category 1.A.5.b is still reported as NO, IE. During the review the Party has indicated regularly updates all information in the NIR for all sections and for the NIR 2023, this work has been strengthened to ensure that the information provided is as complete and understandable as possible and further explained regarding the ERT follow-up question about reporting the mobile public administration, defence and social security under 1.A.5.a stationary that	The Party requests that the status of this recommendation be changed to “Resolved”, since the CRF tables refer to the fact that all fuels for 1.A.5.b in the field of public administration, defence and social security are taken into account in other transport sectors.

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		reallocations and provide revised emission estimates.	believes that emissions from the use of military equipment are taken into account in the NIR, since all fuel purchases (for all types) occur through open tenders but the Party has difficulty separating military fuel from civilian fuel. The ERT noted that the recommendation has not fully addressed because the Party has not reported the emissions of public administration, defence and social security activities under both the mobile and stationary.	
E.35	1.A.5.a Stationary – all fuels – CO_2, CH_4 and N_2O (E.42, 2021) (E.66, 2019) Comparability	Report in CRF table 1.A(a) (sheet 4) the fuel consumption and corresponding GHG emissions for subcategory 1.A.5.a stationary by type of fuel.	The Party reported in the Table 3.2.1 in its NIR (p.104) data on consumption of fuels and CO2 emissions by fuel type for category 1.A.5 other. However, in CRF table 1.A(a)s4, the AD and GHG emissions for category 1.A.5 other were reported aggregated under subcategory 1.A.5.a stationary, without specifying the type of fuel. During the review, the Party stated that in CRF table 1.A(a), the fuel consumption and associated GHG emissions for sub-category 1.A.5.a stationary by fuel have been updated and corresponding comments are placed in the chapter "Improvements in the NIR 2023 The Party further noted was not able to provide disaggregated AD in the CRF tables due to technical issues with the tables and will provide the disaggregated AD in the next NIR submission. The ERT noted that the Party has not fully addressed the recommendation because still has not disaggregated AD and GHG emissions by type of fuels under category 1.A.5 other in the CRF table1.A(a)s4.	The Party accepts the ERT recommendation.
E.36	1.B.1 Solid fuels – solid fuels – CO_2 and CH_4, 2021 (E.77, 2021) Accuracy	Include detailed information on the newly added estimates for subcategory 1.B.1.a.i abandoned underground mines and subcategory 1.B.1.b solid fuel transformation, including specific information on the methodologies used for estimating CO_2 and CH_4 emissions.	For CH_4 emission from abandoned underground mines, the Party reported in its NIR (p.146e) that Tier 1 was used and the CH_4 emission factor is from table 4.1.6 of IPCC 2006 GLs (Volume 2, p. 4.25), but still did not provide more detailed information on which specific parameters were used or transparently documented in its NIR the calculation procedure, as table 4.1.6 provides sets of default data by different time intervals. For CO_2 and CH_4 emission from solid fuel transformation which is reported in CRF table 1.B.1, no information is provided for background data and methods (formulae, assumptions or parameters) used yet in NIR. During the review, no future information is provided by the Party regarding CH_4 emissions from abandoned underground mines. For 1.B.1.b (solid fuel transformation), the Party clarified that the scope of this sub-category is	The Party requests that the status of this recommendation be changed to “Resolved”, as it has done a lot of preparatory work and assessed emissions from abandoned underground mines. The review provides commentary on the use of IPCC factors. CO 2 and CH 4 emissions as a result of the conversion of solid fuels have nothing to do with the issue of assessing emissions from underground mines! Give a separate recommendation for this category.

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			transformation of waste heaps locating near the extraction site which is introduced on p. 147, NIRe. And the Party also provided the country-specific parameters to estimate the emissions from these waste heaps (see E.1 below).	
E.37	1.B.1.a Coal mining and handling – solid fuels – CO_2 and CH_4 (E.44, 2021) (E.67, 2019) Accuracy	Provide in the next annual submission consistent and accurate information on the quantity of coal produced in the country in CRF table 1.B.1 and the NIR, estimate CO_2 and CH_4 fugitive emissions from this activity accordingly and report the corresponding AD used for the emission estimates for the entire time series consistently across the sectoral and reference approaches.	The Party reported production of coal for 2021 is 106.65 Mt in CRF table 1.B.1 (which corresponds with figure shown in Figure 3.37 on p.139, NIRe) but as 107.50 in CRF table 1.A(b), which is the sum-up of all primary coal production, i.e. 4143.70 kt for coking coal, 4861.28 for lignite, 98494.50 kt for energy coal. There are inconsistencies of this type across the entire time series with different extent where discrepancy in 2019 is the highest, -14.7%, i.e., it is 98.83 Mt in CRF table 1.B.1, but as 113.40 Mt in CRF table 1.A(b). And the Party reports the coal production in NIR by providing a figure (Figure 3.37), instead of a table which was provide in 2021 submissions. In additional, the location of the fugitive emission from lignite production is not clear as for year of 2019, the production of lignite (5928.90 kt) recorded in CRF table 1A(b) is still not transparently accounted in table 1.B.1. During the review, the Party clarified that the inconsistency is likely due to data updates from the Bureau of National Statistics during the last review of the NIR before publication, and further cross-checking will be included in future improvement plans. The Party also provided sheets including quantitative information of coal production by underground and surface mining for the entire time series. Regarding lignite, the Party clarified that the all the lignite is produced in surface mining activities and the emissions has been included in 1B.1.a.ii (surface mines)	Party accepts ERT recommendation
E.38	1.B.1.a Coal mining and handling – solid fuels – CH_4 (E.45, 2021) (E.35, 2019) (E.15, 2017) (E.23, 2016) (E.23, 2015) (44, 2013) (56,	Include the background information about the measurements made and time series of the CH_4 concentration in the NIR (underground mines).	The Party reported in its CRF table 1.B.1 that the CH_4 EFs for underground mining is 16.75k g/t constantly across the time series, equivalent to the higher default value of 25 m^3/t when a conversation factor of 0.67 kg/m^3 is used, as given by the 2006 IPCC Guidelines (vol.2, chap.4 section 4.1.3.2, p.4.12).	The Party requests to change the status of this recommendation to “Resolved”. The party explained that coal mining is carried out at a depth of more than 400 metres. According to the Guidelines, for such a depth it is possible to use a coefficient of 25 m^3/t.

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	2012) Transparency			
E.39	1.B.1.a Coal mining and handling – solid fuels – CH_4 (E.46, 2021) (E.37, 2019) (E.28, 2017) (E.38, 2016) (E.35, 2015) Accuracy	Report the recovery/flaring of CH_4 from underground mines in CRF table 1.B.1 or use the relevant notation key in accordance with decision 24/CP.19, annex I, paragraph 37.	The Party reported "NE" for CH_4 recovery/flaring for underground mines – mining activities and "NO" for the other subcategories in CRF table 1.B.1 for the entire time series. However, the Party still did not provide further explanation or justification in CRF table 9 for the inclusion of 'NE' for CH_4 recovery/flaring for underground mines – mining activities. And the Party provide limited information in its NIR on recovery/flaring for underground mines – miming activities, by mentioning on p.145e of NIR that no information is available now about the amount of burnt gas in flares from well drainage, and it is believed that all extracted gas is consumed for its own needs and is accounted for in the energy sector. In this case, the ERT suppose there might be accuracy issues related to double accounting since the CH_4 recovered for energy purpose is not subtracted from this sub-category. During the review, the Party clarified that the Party hope to receive information from related companies and more information, if available, will be included in future submissions.	The Party requests to change the status of this recommendation to "Resolved" or clarify the recommendation. Storna pointed out that all the gas removed as a result of degassing of coal seams is used for its own needs, and is not taken into account anywhere else. There can be no double counting. Storna held additional discussions with company employees who confirmed this conclusion.
E.40	1.B.1.a Coal mining and handling – solid fuels – CO_2 (E.50, 2021) (E.40, 2019) (E.31, 2017) (E.41, 2016) (E.38, 2015) Transparency	Transparently document in each NIR the methodology and the background information used for the estimation of the CO_2 EF for surface mining activities.	The Party reported in its NIR (p.145-146) that the parameters used to calculated CO_2 emission from surfacing mining activities are from direct measurements contented in the Methodological Guidelines of the Ministry of Environment of the Republic of Kazakhstan (Order No. 280 of 2010), and no further information on the way the measurements were done or on their scope is provided in NIR. During the review, the Party clarified that one of the largest companies has an automated system for continuous monitoring of the presence of gases from operated mines and the information were verified by independent company, though the data could not be open now.	The Party requests to change the status of this recommendation to "Resolved", since it has provided all the documents that are used to guide the calculations. All stages are reflected in the comments to NIR 2023, including information about the automated system.
E.41	1.B.1.a Coal mining and	Verify the applicability of the average default value	The Party reported in its NIR (p.145e) and CRF table 1.B.1 that high IPCC default value (vol. 2, chap. 4.1.4.2, p.4.18) is	The Party requests to change the status of this recommendation to "Resolved", since it has submitted all

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	handling – solid fuels – CH_4 (E.78, 2021) Accuracy	for the CH_4 EF of 0.8 kg/t reported for mining activities and either justify its use in the NIR or revise it in line with the characteristics of the mine fields in the country.	used to estimate CH_4 emissions from surface-mining activities across the whole time series, i.e. 1.34 kg/t, correspondent to 2 m^3/t converted by methane density of 0.67 kg/m^3. During the review, however, the Party clarified that the EF (2 m^3/t) is a country-specific one, recommended by Ministry of Ecology of the Republic of Kazakhstan. And the Party also provided the electrically technical document in Russian to ERT (Kazakhstan, 2010).	the documents on the source of the coefficients and described the methodological part in NIR 2023.
E.42	1.B.2 Oil, natural gas and other emissions from energy production – liquid and gaseous fuels – CO_2, CH_4 and N_2O (E.53, 2021) (E.44, 2019) (E.33, 2017) (E.44, 2016) (E.41, 2015) Transparency	Ensure that the description and units regarding the AD for the calculation of fugitive CO_2 and CH_4 emissions are provided in a consistent and complete manner in CRF table 1.B.2.	For crude oil production, the data presented in 1.B.2 keeps consistent with that presented in 1.A(b) across the whole time series, except that for 2021, where it is 86879.31 kt in 1.B.2, but as 74733.22 in 1.A(b). In addition, the Party reports in its NIR (p.151e) that the amount of oil produced in 2021 is 85,879 kt, different from either data presented in 1.B.2 or 1.A(b). For natural gas production, similarly, the data presented in 1.B.2 keeps consistent with that presented in 1.A(b) across the whole time series, except that for 2021, where it is 54,179 Mm^3 in 1.B.2, but as 26746.57 Mm^3 in 1.A(b). In addition, there are minor discrepancy for year 1990, for which the information is 7114 Mm^3 and 7123 Mm^3 in 1.B.2 and 1.A(b), respectively. During the review, the Party clarified that the possible reason for these data discrepancies is the verification done by the Bureau of National Statistics during the period of submission preparation, and this issue will be addressed in next submissions.	Party accepts ERT recommendation
E.43	1.B.2 Oil, natural gas and other emissions from energy production – liquid and gaseous fuels – CO_2, CH_4 and N_2O (E.54, 2021) (E.68, 2019) Transparency	Include in the NIR detailed information on the regulatory acts certifying the introduction of new technologies and the modernization of oil and natural gas operations and infrastructure, including clear information on the timeline for the introduction of these new technologies and intended changes, and on the target	For oil system, the Party reported in its NIR (p.159-160e) that three timelines were used to transit the application of default EFs for developing countries listed in table 4.2.5 of 2006 IPCC Guidelines to that for developed countries listed in table 4.2.4: 1990-1997, 1998-2010, 2011-2021. For the period 1990-1997, data from table 4.2.5 is used (if there is upper and lower threshold, then the average data is used); for the period 2011-2021, data from table 4.2.4 is used; for the transition period 1998-2010, the EF data is determined by assuming the share of updated equipment growing by 8 per cent point each year between 1997 to 2011. For gas system, the Party reported in its NIR (p.162e) that the same transition approach is used to choose emission factors used	The Party requests to change the status of this recommendation to “Resolved”. All approaches are described in detail. In the comments to NIR 2023. Documents are presented on the adoption of relevant Government resolutions on updating the equipment fleet. The dynamics of this process are reflected with reference to the primary sources of information.

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		year for finalizing the modernization of oil and natural gas operations, together with documented information on the status of progress towards the modernization of the oil and natural gas industry in the country and an analysis of the similarity of such operations with those in developed countries.	to calculate CH_4 and CO_2 emissions from gas production, processing, transmission and distribution. The Party also includes information on legislation adopted for oil and gas system to improve the technology level and to regulate emissions on p. 155-157, NIRe and further indicate on p.159e that this approach to identify there three timelines has been justified from the standpoint of updating equipment.	
E.44	1.B.2 Oil, natural gas and other emissions from energy production – liquid and gaseous fuels – CO_2, CH_4 and N_2O (E.55, 2021) (E.68, 2019) Accuracy	Taking into account the information collected on the status of progress towards the modernization of the oil and natural gas industry in the country, and if it is not possible to use a tier 2 method for the estimates, provide revised CO_2, CH_4 and N_2O emission estimates using a gradual linear introduction across the time series, starting in 2001 or later, of the default CO_2, CH_4 and N_2O EFs for developing countries provided in table 4.2.5 of the 2006 IPCC Guidelines (vol. 2, chap. 4, p.4.55).	Although the Party has not moved to Tier 2 method and default emission factors from 2006 IPCC Guidelines are used across the oil and gas system, the Party did provide revised CO_2, CH_4 and N_2O emission estimates using a gradual linear introduction of default data for developing and developed countries provided in table 4.2.5 and table 4.2.4 of the 2006 IPCC Guidelines (vol. 2, chap. 4), respectively, by identifying three timelines (see E.43 above), namely 1990-1997, 1998-2010 and 2011-2021.	The Party requests to change the status of this recommendation to "Resolved". All approaches are described in detail. In the comments to NIR 2023. Documents are presented on the adoption of relevant Government resolutions on updating the equipment fleet. The reasons for the linear transition are detailed and documented. Next year's NIR will add language on interpolation methods to fully understand the process.
E.45	1.B.2.a Oil – liquid fuels – CH_4 (E.57, 2021) (E.47, 2019) (E.36, 2017) (E.47, 2016) Consistency	Improve the QA/QC procedures to verify the CH_4 EF for oil production and ensure the time-series consistency for the IEF for the whole time series.	The Party reported in its CRF table 1B2 the gradually declining CH_4 IEF of 1.B.2.a.2 oil production, moving from table 4.2.5 to table 4.2.4 by three timelines (see E.43 above) using linear extrapolation approach, taking consideration of technology modernization. It shows, for the period of 1990-1997, the EF of CH_4 and CO_2 are 34925.20 kg/kt and 2502.97 kg/kt, respectively, correspond to 3.00E-2 Gg/1000m^{3}and 2.15E-3 Gg/1000m^3 (assuming the density is 859kg/m^3, which was provide by the Party during the review), keeping consistency with the data in table 4.2.5	The Party requests to change the status of this recommendation to "Resolved". All approaches are described in detail. In the comments to NIR 2023, the Party will post data on oil density in addition to the existing comments.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			(the average of the given range). For the period of 2010-2021, consistency between Party's data and IPCC data is also observed. However, these data are not presented in NIR and the information about oil density which is crucial to conduct unit conversion is not provided in NIR. In additional, the start year of the third period reported in NIR (i.e.2011 as presented on p.159e) is not consistent with that shows in CRF tables (i.e. 2010), seeing also E.2 in table 5. During the review, the Party provide clarified that the start of the third period using data in table 4.2.4 is 2010, not 2011, and provide the oil density information.	
E.46	1.B.2.a Oil – liquid fuels – CO_2 and CH_4 (E.58, 2021) (E.69, 2019) Accuracy	Report and use well-documented and revised AD for crude oil production that are consistent with the values reported in CRF table 1.A(b) and the NIR to calculate emissions of CO_2 and CH_4 for subcategory 1.B.2.a.2 oil – production for 2013–2017 and subsequent years, using the appropriate default CO_2 and CH_4 EFs provided in tables 4.2.4–4.2.5 of the 2006 IPCC Guidelines (vol. 2, chap. 4, pp.4.48 and 4.55, respectively).	The Party reported in general on p.163, NIRe that homogeneous and consistent series of initial data obtained from official sources were used to calculate the emissions from fugitive emission category, and the CO_2 and CH_4 EFs used are from Table 4.2.5 and Table 4.2.4 of the 2006 IPCC Guidelines. The ERT noted the data inconsistency between 1.A(b) and 1.B.2.a.oil.ii (production) and NIR and discussed this issue in E.43 above. In addition, the ERT noted EFs used of CO_2 and CH_4 estimation keeps consistency with data in table 4.2.4 and 4.2.5 in 2006 IPCC GLs, seeing E.45 above.	The Party requests to change the status of this recommendation to "Resolved". As noted by ERT, all approaches and coefficients comply with the IPCC approaches.
E.47	1.B.2.a Oil – liquid fuels – CO_2 and CH_4 (E.59, 2021) (E.69, 2019) Accuracy	Following the principle of consistency, check the correctness, accuracy and consistency of the crude oil production value reported in CRF table 1.B.2 for the entire time series and report revised CO_2 and CH_4 emission estimates for subcategory 1.B.2.a.2 oil – production accordingly, using the corresponding default EFs from tables	The Party reported revised and consistent crude oil production for 1990-2014 in CEF table 1.B.2 in 2023 submissions compared with that in 2021, and confirmed the data is from official sources (see E.46 above). Together with the revised and correspondent EFs transiting by three timelines(see E.43 above), the revised CO_2 and CH_4 emissions for this subcategory (1.B.2.a.2_oil production) are determined and reported in CRF table 1.B.2. (The remaining in consistency of oil production in 2021 between CRF table 1.B.2 and 1.A(b) is discussed in other part)	The Party requests to change the status of this recommendation to "Resolved" based on the totality of ERT findings

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		4.2.4–4.2.5 of the 2006 IPCC Guidelines (vol. 2, chap. 4, pp.4.48 and 4.55, respectively).		
E.48	1.B.2.a Oil – liquid fuels – CH_4 (E.60, 2021) (E.49, 2019) (E.38, 2017) (E.49, 2016) Accuracy	Ensure consistency in the estimation of the CH_4 emissions from transport (1.B.2.a.3), fill the gaps for 1990–1996, verify the CH_4 IEF for 2014, and ensure consistency in the IEF for the entire time series.	The Party reported the AD and estimated CH_4 emissions for the entire time series, including 1990-1996, and as reported in the NIR (p.162e), it uses default EF data (i.e. for pipeline, tanker trucks and rail cars) from 2006 IPCC Guidelines where the data for developed and developing parties are the same, and the internal variation of the IEF was caused the changing structure of oil transport mode. The ERT noted the CH_4 IEFs for this category vary between 20.18 kg/kt for 1990 and 7.92 kg/kt for 2020, following a continuous downward trend, except for 1996-1999 (increasing from 12.75 kg/kt to 16.67kg/kt) and 2021(increasing by 6.17% compared with that in 2020). The similar trend also is noted for CO_2 IEF. As the EF trend is still not justified in NIR (i.e. there is no specific explanation for the trend or detailed information on the share of each transport mode in current NIR, as what provided in 2021 NIR(section 3.5.4.3, table 3.30, p.157)), the ERT could not confirm that there is no accuracy issues for this subcategory. During the review, the Party clarified that the development of different transport mode in the time series which was affected by economic situations, oil trade with neighbouring countries and infrastructure construction, and the Party also provided a table including the quality of oil transported by pipelines, rail/truck and shipping for 1990 and 2021, not for the whole time-series.	The Party requests that the status of this recommendation be changed to “Resolved” since the Party has provided all data for the entire time series by type of transportation from 1990 to 2021.
E.49	1.B.2.a Oil – liquid fuels – CH_4 (E.61, 2021) (E.50, 2019) (E.57, 2017) Transparency	Validate the AD for the subcategory and strengthen QC procedures to ensure that AD for 1990–1996 for the subcategory oil transport are correct; include the AD description and units in the CRF tables; and use an appropriate and consistent CH_4 EF to estimate emissions for the	The ERT noted that a consistent time series for 1990–1996 was provided in the 2019 submission and the CH_4 emissions from oil transport were reported for the entire time series. Default EFs from 2006 IPCC Guidelines are used (see E.48 above). However, the Party still reported in CEF table 1.B.2 the AD as oil produced not oil transported. In additional it reports the AD is 132600 kt in 2021, different with that used for oil exploration and oil production (86879.31kt) where the AD is also oil production. This inconsistency occurs across the whole time-series. As the Party did not provide detailed information for the amount of oil transported, the	Party accepts ERT recommendation

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		subcategory for 1990–1996.	ERT can't conclude if the AD is actually oil transported (not oil produced) and if QC has strengthened. During the review, the Party clarified the AD used to calculate the emissions from subcategory 1.B.2.a.oil.3_transport is oil transported which is the sum of oil transported by pipeline, rail, road and ship, not oil produced.	
E.50	1.B.2.a Oil – liquid fuels – CO_2, CH_4 and N_2O (E.62, 2021) (E.70, 2019) Transparency	Report in the NIR and CRF table 1.B.2 accurate, consistent and documented AD from the national energy balance or from recognized international sources, including units and a description of the AD for subcategory 1.B.2.a.4 oil – refining/storage for the entire time series, particularly for 2013–2017 and subsequent years of the second commitment period of the Kyoto Protocol.	The Party did report in NIR (table 3.27, p.164e) and CRF table 1.B.2 documented AD for subcategory 1.B.2.a.4 oil-refining/storage for the whole time-series for the first time, however, the two data sets are not consistent with each other. In table 3.27, it reports the "initial data on oil refining volumes" for 2021, which is taken from the official data of the Bureau of National Statistics of the Party, is 19493.5 kt, however, it reports as 17590.46 kt in CRF table 1.B.2, captioned as oil produced. This discrepancy is observed across the whole time series. In addition, this value (17590.46 kt) in CRF table 1.B.2 for 2021 used as AD for this subcategory is indicated as oil produced, when other values for oil produced in CRF table 1.B.2 are reported as 86879.31kt for subcategory 1.B.2.a.1 oil – exploration and subcategory 1.B.2.a.2 oil – production, 132600.00 kt for subcategory 1.B.2.a.3 oil – transport. During the review, the Party clarified that technical error made when importing the data set for subcategory 1.B.2.a.4 oil refining/storage and it will be corrected in 2024 submissions. For the description of AD for this subcategory seeing E.49 above.	The Party requests to change the status of this recommendation to "Resolved" based on the totality of ERT findings
E.51	1.B.2.a Oil – liquid fuels – CO_2, CH_4 and N_2O (E.63, 2021) (E.70, 2019) Accuracy	Revise, as necessary, the estimates of CO_2, CH_4 and N_2O emissions for subcategory 1.B.2.a.4 oil – refining/storage using the identified accurate AD and appropriate default EFs from tables 4.2.4–4.2.5 of the 2006 IPCC Guidelines (vol. 2, chap. 4, pp.4.48 and 4.55, respectively) or recognized international methodological sources for	The Party made recalculation for this sub-category for the whole time-series, and reported the revised AD and CH_4 emissions from this subcategory (1.B.2.b.4_oil refining/storage) for the whole time series for the first time. The emissions for CO_2 and N_2O in the CRF tables are reported by NO, whereas the emissions were reported for the period of 2010-2019 in 2021 submissions. The Party also reported in its NIR (p.161e) that the default EF from Table 4.2.4, 2006 IPCC GLs (2.6E-6 ~ 41.0E-6 $Gg/10^3m^3$ oil refined, with average of 2.18E-5 $Gg/10^3m^3$) is used to estimate the CH_4 emission. However, the ERT noted, in fact, the IEF of CH_4 from this sub-category (1.B.2.a.4 oil refinery/storage) fluctuates significantly across the whole	Party accepts ERT recommendation

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		the entire time series, particularly for 2013–2017 and subsequent years of the second commitment period of the Kyoto Protocol, and document the EFs and method used in the NIR.	time-series, for example, it changes between 51236.53 kg/kt in 1993 to 4468.96 kg/kt in 1998 (equivalent to 3.84E-3 to 4.40E-2 Gg/10^3m^3, assuming the density of oil is 859kg/m^3), significantly different from IPCC default value. During the review, regarding CH_4 IEF, the Party clarified that a technical error was occurred when importing the data set and the presented data series for sub-category 1.B.2.a.4 refinery/storage will be revised in 2024 submissions; for CO_2 emission once reported for period of 2010-2019 in 2021 submissions, but reported as NO in current ones, the Party confirmed again that there is no emissions reported for 2010-2019 and no further response received.	
E.52	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4 (E.64, 2021) (E.71, 2019) Transparency	Report CO_2 and CH_4 emission estimates for subcategory 1.B.2.b.1 natural gas – exploration using, if available, a well-documented method and country-specific EFs, together with accurate, complete and documented AD obtained from national companies, and document in detail in the NIR the AD, method and parameters used in the estimates and explain how the double counting of emissions was avoided for subcategory 1.B.2.a.1 oil – exploration. If this is not possible, and if emissions are estimated for subcategory 1.B.2.a.1 oil – exploration using the default EFs provided in tables 4.2.4–4.2.5 of the 2006 IPCC Guidelines for well drilling, testing and servicing (vol. 2, chap. 4, pp.4.48 and 4.55, respectively) and the	The Party reported the CH_4 and CO_2 emissions from subcategory 1.B.2.b.1 natural gas-exploration as IE and states in its NIR (p.158e and p.161e-162e) the emission is included in sub-category 1.B.2.a.1-oil exploration. It is explained that most gas production in the Party is associated with crude oil production, and emissions are estimated for subcategory 1.B.2.a.1 oil – exploration using the default EFs provided in tables 4.2.4–4.2.5 of the 2006 IPCC Guidelines for well drilling, testing and servicing (vol. 2, chap. 4, pp.4.48 and 4.55, respectively), as recommended by previous review cycle.	The Party requests to change the status of this recommendation to “Resolved” based on the totality of ERT findings

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		corresponding AD required, report emissions for subcategory 1.B.2.b.1 natural gas – exploration using the notation key "IE" and include relevant explanations in the NIR and CRF tables.		
E.53	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4 (E.65, 2021) (E.72, 2019) Accuracy	Report and use well-documented and revised AD for the volume of natural gas production that are consistent with the reported values in CRF table 1.A(b) and the NIR to calculate emissions of CH_4 and CO_2 from subcategory 1.B.2.b.2 natural gas – production for 2013–2017 and subsequent years, using the appropriate default CH_4 and CO_2 EFs provided in tables 4.2.4–4.2.5 of the 2006 IPCC Guidelines (vol. 2, chap. 4, pp.4.48 and 4.55, respectively).	As mentioned in E.42 above, the Party reports the AD for the volume of gas production, which is from Bureau of National Statistics, is consistent with the reported values in CRF table 1.A(b) across the whole time-series, except for the year of 2021. In addition, there are more than one subcategory whose AD is defined as gas produced but with different inputs: 1.B.2.b.2 production and 1.B.2.b.3 processing– 54179.00 million m^3, 1.B.2.b.5 distribution – 4774.84 million m^3 and 1.B.2.b.6 Other – NO for 2021, and this inconsistency is observed across the time series. The Party reported CH_4 and CO_2 emissions for this subcategory for the whole time series. However, the ERT noted that the IEF of CH_4 from gas production (1.B.2.b.2) increased gradually from 31.70 kg/Mm^3 in 1990 kg/Mm^3 to 49.47 kg/Mm^3 in 2021, opposite from the declining direction indicating in NIR where it highlights the EF transits from table 4-2-5 to table 4-2-4, and also much lower than the IPCC default data listed in table 4.2.4 (3.8E-04 to 2.3E-03 Gg/Mm^3, correspond to 380-2300 kg/Mm^3, with average of 1340 kg/ Mm^3); for CO_2 emissions, the IEF increase from 21302.59kg/ Mm^3 in 1990 to 32134.03 kg/Mm^3 in 2021, also opposite from the declining direction indicating in NIR, and much higher than the IPCC default data listed in table 4.2.4 (1.40E-05 to 8.20E-05 Gg/Mm^3, correspond to 14-82 kg/Mm^3, with average of 48 kg/ Mm^3). During the review, the Party clarified that the CH_4 and CO_2 EFs will be further checked and incorporate checking result and possibles changes into in next submissions. For the inconsistency of AD defined as gas produced, please refer to E.57 and E.58 below	Party accepts ERT recommendation
E.54	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4	Following the principle of consistency, check the correctness, accuracy and consistency of the natural	The Party reported the revised natural gas production in CRF table 1.B.2 for the whole time-series, using data from Bureau of National Statistics, and explained on p.151, NIRe that the fluctuation of gas production volumes in different	The party requests to change the status of this recommendation to "Resolved" based on the totality of ERT findings

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(E.66, 2021) (E.72, 2019) Accuracy	gas production volume reported in CRF table 1.B.2 for 1990–2012, and report revised CH_4 and CO_2 emission estimates for subcategory 1.B.2.b.2 natural gas – production, accordingly, using the corresponding default EFs from tables 4.2.4–4.2.5 of the 2006 IPCC Guidelines (vol. 2, chap. 4, pp.4.48 and 4.55, respectively).	periods are mainly due to the change of cost of fuel which has significant impact on small and medium-sized companies. The issues relevant to EF using is discussed in E. 53 above.	
E.55	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4 (E.67, 2021) (E.51, 2019) (E.39, 2017) (E.52, 2016) (E.46, 2015) Transparency	(b) Ensure time-series consistency of the EFs; (c) describe the emission trends of natural gas production in the NIR.	(b) The ERT closed this issue since the CH4 EFs has been discussed in E.53 above; (c) The Party explained the generally increased natural gas production, the fluctuation in different period and the implementation of new technologies in gas production sector (see p.151 and p.155-157, NIRe); present and explain the changes in emissions over the entire time period from gas production which is associated with changes in production volumes, as well as changes in coefficients used to calculate of these emissions (see p.153-154, NIRe).	The party thanks ERT for the work done
E.56	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4 (E.69, 2021) (E.53, 2019) (E.41, 2017) (E.54, 2016) Accuracy	Verify the CH_4 emission estimates for 2014 for the transmission and storage of natural gas, provide a consistent time series for 1990–2014, estimate the CO_2 emissions for the same subcategory for 1990–2013 and provide a consistent time series for the CO_2 emissions.	The error in data entry for 2014 was corrected and revised estimates for this sub-category (1.B.2.b.4_gas transmission and storage) provided in the 2018 submission. The Party provided CH_4 and CO_2 emission estimates for the complete time series, using the corresponding default EFs from the 2006 IPCC Guidelines (vol. 2, chap. 4, table 4.2.4–4.2.5, pp.4.48–4.63) by three timelines as introduced in E.43 above. The type of AD reported in CRF table has changed from gas produced in 2021 submissions to gas transmission in current submissions.	The party requests to change the status of this recommendation to “Resolved” based on the totality of ERT findings
E.57	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4 (E.70, 2021)	Verify the CH_4 emission estimate for 2014 for the distribution of natural gas, ensure time-series consistency for 1990–2014,	The error in data entry for 2014 was corrected and revised estimates for the category provided in the 2018 submission. The Party recalculated and reported in its CRF table 1.B.2 CO_2 and CH_4 emission estimates for subcategory 1.B.2.b.5 natural gas – distribution for the entire time series. The	Party accepts ERT recommendation

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(E.54, 2019) (E.42, 2017) (E.55, 2016) Consistency	estimate the CO_2 emissions for the same subcategory for 1990–2013 and provide a consistent time series for the CO_2 emissions.	default EF from table 4.2.5 and 4.2.4 in 2006 IPCC Guidelines are used by three timelines (as mentioned in E.43 above). However, the ERT noted AD for gas distribution (1.B.2.b.5) is still described as gas produced but not gas distributed, meanwhile the value is very different from what is listed in subcategory of gas production (1.B.2.b.2). For example, it is 4774.84 Mm^3 in 1.B.2.b.5 (gas distribution), whereas it is 54179 Mm^3 in 1.B.2.b.2 (gas production). The discrepancy occurs across the entire time-series. In additional, the AD reported in 2023 submission is 40-70% lower than that in 2021 submissions. No specific explanation is provided in NIR. During the review, the Party acknowledged that the AD description of this sub-category should be gas distributed, not gas produced, and further explained that a technical error probably occurred when importing data from work files into CRF tables, and efforts will be made to improve control at all stages of working with data, especially at the last stage - loading data into CRF tables.	
E.58	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4 (E.79, 2021) Transparency	Include detailed information on the AD, methodology and EF used for estimating emissions from natural gas processing in its next annual submission.	The Party provided a complete time series of estimates of fugitive CH_4 and CO_2 emissions from processing of natural gas in CRF table .1B.2. The ERT noted the methodology and EF used to estimate the emissions from gas processing is briefly introduced in NIR (for example, p.162e), showing that Tier 1 is used and default EFs from table 4.2.5 and table 4.2.4 are used by three different timelines. However, the AD is not specifically introduced, except the general mentioning that the missing AD data are provided by Bureau of National Statistics of the ASPR RK. According to the CRF table 1B2, the AD for this sub-category is gas produced with unit of 10^6m^4 in 2021 and 10^6m^3 in other years. During the review, the Party clarified that there is a technical error about unit in CRF table 1.B.2 for 2021and it would be revised in next submission, and the discussion on description of AD has not been fully settled down.	Party accepts ERT recommendation
E.59	1.B.2.c Venting and flaring – liquid and gaseous fuels – CO_2 and CH_4	Review and estimate the CO_2 and CH_4 emissions from the relevant venting and flaring of the liquid and gaseous fuels for 2013	The sub-category of 1.B.2.c (venting and flaring) has been recalculated in 2023 submissions. For subcategory venting, CH_4 and N_2O emissions were reported under 1.B.2.c.venting.i (oil) for the entire time-series for the first time, and NO is reported for 1.B.2.c.venting.ii (gas) and	The party requests to change the status of this recommendation to “Resolved” based on the totality of ERT findings

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(E.71, 2021) (E.55, 2019) (E.43, 2017) (E.56, 2016) Completeness	and 2014, and provide a complete and consistent estimate of the emissions for this subcategory.	1.B.2.c.venting.iii (combined). For flaring, the downtrend of AD for oil flaring since 2014 is explained on p.163, NIR, indicating the prohibition o of burning associated gas in flares regulated by national laws.	
E.60	1.B.2.c Venting and flaring – oil and natural gas – CO_2 and CH_4 (E.72, 2021) (E.73, 2019) Transparency	Include in the NIR a transparent and detailed explanation of the methodology used to determine the AD and EFs for the estimates and provide the conversion factors used to estimate emissions of CO_2, CH_4 and N_2O from flaring of oil and natural gas for subcategory 1.B.2.c.2.iii flaring – combined.	The emission from 1.B.2.c (flaring) has been recalculated in 2023 submissions, by disaggregating combined emission into oil and gas flaring, whereas combined emission is reported as NO. The AD used for gas flaring is gas production, keep consistency with what reports in 1A(b), and the AD for oil flaring is associated petroleum gas. The CH_4, CO_2 and N_2O EFs used for gas flaring, as introduced on p.163, NIRe, are from table 4.2.4-4.2.5 in 2006 IPCC Guidelines by 3 timelines (see E.43 above); for oil flaring, it states on the same page that the EFs has not changed over the entire period. In additional, the oil density which is necessary for the conversion is still not provided in NIR. During the review, the Party clarified that, for oil flaring, the EFs from table 4.2.4 are used for the entire timeseries. Party also provided the oil density used for calculation, which is 859kg/m^3. And the Party further clarified the approach to set EFs for gas flaring and oil flaring would be synergized in next submissions.	The party requests ERT to make a more precise recommendation to resolve the issue, since peer calculations have been made and reporting has been improved.
E.61	1.C CO_2 transport and storage – CO_2 (E.73, 2021) (E.56, 2019) (E.44, 2017) (E.57, 2016) Convention reporting adherence	Estimate CO_2 emissions for this category or ensure the correct use of notation keys in CRF table 1.C, and include a category-specific discussion in the NIR for this activity, in accordance with paragraph 50 of the UNFCCC Annex I inventory reporting guidelines.	The Party continued to use the notation key “NA” to report CO_2 emissions from category 1.C.2 injection and storage and for all associated relevant information, such as the AD and IEF. The NIR still did not include a category-specific discussion on category 1.C in NIR. During the review, the Party clarified that Kazakhstan is considering CO_2 "capture and storage" as possible projects in the future, but they may not start until 2035 when the price might be acceptable. And the Party acknowledged to change NA to NO for 1.B.c in future submissions.	Party accepts ERT recommendation
IPPU				
I.1	2. General (IPPU) – CO_2 (I.1, 2021) (I.1, 2019) (I.1, 2017) (I.1,	Strengthen the QA/QC processes to ensure correct use of notation keys and consistency of the information provided in the	The ERT noted that the Party has significantly improved the QA/QC of the report, mainly for the correct use of notation keys and consistency of the information provided in the annual submission. For NE issues, the Party reported in	The Party considers the recommendation implemented and requests that it be accepted as resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	2016) (I.1, 2015) (49, 2013) (69, 2012) Transparency	inventory submission. Explain in CRF table 9(a) in which category the emissions reported as "IE" are included.	CRF Table 9 2.C.1.b Pig Iron (CH_4) and 2.G.3.a medical app (N_2O) During the review, the Party clarified that Table 4.2 p.4.26 of the 2006 IPCC Guidelines doesn't provide CH4 EF for pig iron production, also that the Party provided preliminary estimates of N2O emissions from the use of anesthesia based on data from countries with similar conditions, the estimated consumption value in Kazakhstan estimated at 80 Kt eq. CO2., which is not significant in accordance with decision 24/CP.19, Annex 1, paragraph 37(b)	
I.2	2. General (IPPU) – CO_2 and HFCs (I.2, 2021) (I.2, 2019) (I.2, 2017) (I.10, 2016) (I.10, 2015) Convention reporting adherence	Strengthen the QA/QC procedures and update all comments in the CRF tables, and make the reporting consistent between the NIR and the CRF tables of the same submission.	The ERT noted that the Party has improved the QA/QC procedures for the IPPU sector where all comments in CRF tables were updated, the names of the type of activity were indicated, the corrected AD for subcategory 2.C.1.b pig iron in CRF table 2(I).A-Hs2, and the names of production were given, improved consistency between NIR and CRF tables.	The Party considers the recommendation implemented and requests that it be accepted as resolved
I.3	2. General (IPPU) – CO_2, CH_4 and N_2O (I.3, 2021) (I.3, 2019) (I.3, 2017) (I.11, 2016) (I.11, 2015) Transparency	Include the relevant AD descriptions in CRF table 2(I).A-H in order to improve the comparability and transparency of reported data.	See in ID# I.2	The Party considers the recommendation implemented and requests that it be accepted as resolved
I.4	2. General (IPPU) (I.4, 2021) (I.4, 2019) (I.4, 2017) (I.12, 2016) (I.12, 2015) Convention reporting adherence	Apply the structure and names of the inventory categories in the NIR following the UNFCCC Annex I inventory reporting guidelines, as per decision 24/CP.19.	The Party has reported specific section for electronics industry (2E) (Section 4.6, p. 236), also the Party has reported description of category 2.G.3 (N_2O) from product uses under Section 4.10, p. 263). Moreover, the Party has reported emission from 2.C.4 magnesium production (NIR section 4.4.4, pp.217–218), 2.C.5 lead production (NIR section 4.4.5, pp.218–221) and 2.C.6 zinc production (NIR section 4.74.6 pp.221–223) as subcategories under category 2.C metallurgical industry (NIR section 4.4, pp.198–223).	The Party considers the recommendation implemented and requests that it be accepted as resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
I.5	2. General (IPPU) (I.5, 2021) (I.5, 2019) (I.25, 2017) Convention reporting adherence	Report in the NIR, for the key categories identified by the trend or level, an explanation if the recommended methods from the appropriate decision trees in the 2006 IPCC Guidelines are not used, as required by the UNFCCC Annex I inventory reporting guidelines, paragraph 50(c).	The Party reported that 2.A.4.a (Ceramic) and 2.A.4.b (Soda Ash) are not KC, while 2. A.4.d (Limestone) has no classification. In CRF table 7 it was reported that 2.A.4 is a KC (L,T) The Party reported in NIR (Section 4.2.4.3.2, p. 186) that the default method was used to calculate GHG emissions for limestone and dolomite use. The Party reported in the NIR (Section 4.2.4.3.1, p.184) that in previous inventories, the calculation of emissions in this category (limestone and dolomite use) was carried out according to the data provided by the Bureau of National Statistics ASPR of the Republic of Kazakhstan on the basis of how much was produced, how much was sold, i.e. used in Kazakhstan. But since 2020, the Party have made changes to the methodology for calculating GHG emissions from this category, where data was required from metallurgical plants, clinker plants, and the use of limestone to produce calcium carbide. As reported in the Agriculture Section of the report, liming of soils in Kazakhstan is not carried out, therefore, the use of limestone in agriculture was excluded, the same procedure was carried out on the use of dolomite. The analysis of the collected data revealed some gaps in accounting for the use of limestone in the cement industry. Total greenhouse gas emissions from the use of limestone and dolomite in 2021 amounted to 3921.2 thousand tons of CO_2 eq., of which from the use of limestone 3244.7 thousand tons of CO_2 eq., and from the use of dolomite 676.4 thousand tons of CO_2 eq. respectively. According to the results of the inventory of greenhouse gas emissions in 2021, there is a significant increase compared to 2020, which amounted to 35.5 per cent. In relation to 1990, total GHG emissions from this category in 2021 exceeded 1990 GHG emissions by more than ten times. Such an increase in greenhouse gas emissions compared to 1990 is caused by an increase in the industrial production of limestone and dolomite in the country throughout the entire 1990–2021-time series. During the review, the Party clarified that in CRF table 7 and in the annex to the NIR, it was reported that 2.A.4 is a key category, and this is the correct conclusion, and the text	The Party considers the recommendation implemented and requests that it be accepted as resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			of the NIR 2023 report section 4.2 4.1 made an error. The Party stated that this error will be corrected in the next NIR report. The ERT considers that the recommendation has not yet been fully addressed because the Party has not reported the category as a key category in the NIR Section 4.2.4.1	
I.6	2. General (IPPU) (I.6, 2021) (I.6, 2019) (I.26, 2017) Transparency	Provide the description of the recalculations of emissions in the IPPU sector in accordance with the UNFCCC Annex I inventory reporting guidelines, paragraphs 43–45, and report in the NIR the reasons for recalculations, the assessment of the impact of recalculations on GHG emission trends, and changes of calculation methods, AD and EFs.	Addressing, The Party reported additional info on recalculations under some sections (2.F.1, p.256 and 2.F.4.a, p.260) Meanwhile, the ERT considers that the recommendation has not yet been fully addressed because the Party has not 1, reported sufficient information (missing info: the years covered, the assessment of the impact of recalculations on emission trends, or changes of calculation methods, AD and EFs	The party requests to change the status of this recommendation to “Resolved”, since it has made efforts to resolve it, or to give a more precise wording to the comment that will correspond to the current state of the situation.
I.7	2.A.1 Cement production – CO_2 (I.9, 2021) (I.9, 2019) (I.27, 2017) Transparency	Provide in the NIR clear and consistent information on the AD, CKD correction factor and methods used for CO_2 emission estimates for category 2.A.1 cement production, and include clarifications on changes to the methods and AD sources for 2000 onward.	Addressing, The Party reported in its NIR (section 4.2.1, pp.172–175) information on the AD, CKD correction factor and methods used for CO_2 emissions for category 2.A.1 cement production. However, there is no information on the methodology used to define the country-specific value of the CaO content in clinker (65.72 per cent). The Party reported in NIR (p.173-174) that the content of CaO in the clinker was determined based on data on the average content of CaO in the clinker obtained. from 9 out of 12 operating full-cycle cement plants. During the review week, the Party clarified that the Kazakh side cannot provide more detailed information on clinker production, CaO and CP values by individual cement companies, since the data on activities received from cement companies, according to the request, were received with the “Confidential” mark The ERT considers that the recommendation has not yet been fully addressed because the Party has not reported fully transparent information on the methodology used to	This recommendation will be taken into account when the next NIR report is carried out and information will be provided on the methodology used to determine the value of CaO content in clinker for the country.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			define the country-specific value of the CaO content in clinker	
I.8	2.A.1 Cement production – CO_2 (I.49, 2021) Transparency	Explain in the NIR the drivers for the significant inter-annual changes in the AD used in the estimation of CO_2 emissions from cement production.	Addressing:, The Party reported in its NIR (section 4.2.1, pp.172-175) information on the AD, CKD correction factor and methods used for estimating CO_2 emissions for category 2.A.1 cement production. The ERT noted that the AD reported in CRF table 2(I). A-Hs1 and in table 4.2 (section 4.2.1.1, p.170) of the NIR range from 1.00 kt (2003) to 7,393.80 kt (2018). The inter-annual changes in the AD for cement production for 2011/2012 (117.7 per cent), 2012/2013 (30.6 per cent) and 2020/2021 (-13.7 per cent) have been identified as significant. The change between 1990 and 2021 in AD is 278.2 per cent. The ERT noted that the Party reported in NIR (Section 4.2.1.1, p. 172) as well as in Table. 4.2 p.172-173, shows the dynamics of greenhouse gas emissions from clinker production for the entire time series. During the review, the Party clarified that the driving force behind significant interannual changes in AD according to the data of the Bureau of National Statistics of the Republic of Kazakhstan is an increase in the growth of industrial production of cement due to the demand for building material. The ERT noted that such information can't be found in the NIR. Moreover, the Party reported in NIR (p.174) that the data on activities received from cement companies, according to the request, were received with the "Confidential" mark The ERT considers that the recommendation has not yet been fully addressed because the Party has not reported fully transparent information on the significant inter-annual changes in the AD used in the estimation of CO_2 emissions from cement production	This recommendation will be taken into account in the next NIR report, which will provide transparent information on significant year-to-year changes in AD used in estimating CO2 emissions from cement production
I.9	2.A.2 Lime production – CO_2 (I.14, 2021) (I.14, 2019)	Improve the transparency of the information on the category 2.A.2 lime production in the NIR by providing the list of industries where the lime is	The Party reported in NIR, (Section 4.2.2.1, p.176) more information on the list of industries where the lime is produced, and which are included in the aggregated data on lime production in Kazakhstan. Moreover, the Party reported that the source data on lime production activities include all aggregated data (including non-market lime, i.e.	The Party considers the recommendation implemented and requests that it be accepted as resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(I.31, 2017) Transparency	produced and which are included in the aggregated data on lime production in Kazakhstan (e.g. pig iron and steel plants, copper plants, construction industry, sugar plants, etc.) and clarify, based on the procedures used for the compilation of national statistics, whether non-marketed lime production is included in the total national lime production used for the CO_2 emission calculation for the category.	lime that is used by enterprises for their own consumption) of the country, are complete and reflect all available information on lime production in Kazakhstan	
I.10	2.B.1 Ammonia production – CO_2 (I.19, 2021) (I.22, 2019) (I.9, 2017) (I.16, 2016) (I.16, 2015) Accuracy	Move to a tier 2 method to calculate CO_2 emissions from ammonia production, based on the amount of natural gas used and ensure consistent reporting of the category across the time series.	Resolved, The Party reported in the NIR (Section 4.3.1.5, as well as in Table 4.12, p.193) that in connection with the transition to another level of calculation of greenhouse gas emissions for this category and moving to Tier2, recalculations were carried out for the entire time series resulting in changes in emissions, e.g. emissions in 1990 increased by 3.8 per cent, while greenhouse gas emissions in 2020 decreased by 20.3 per cent. The Party reported that the information on the choice of AD and emission factors is documented (it's reported in CRF Table2(I) A-Hs, which is a Country Specific IEF equals to 1.64 t/t, previously used EF is 1.68 t/t). The Party also reported in NIR, (Section 4.3.1.2, p.192) that the KazAzot JSC plant cannot provide data on the volume of natural gas consumption for ammonia production for 1990-2005, since it was established in 2005	The Party considers the recommendation implemented and requests that it be accepted as resolved
I.11	2.C.1 Iron and steel production – CO_2 and CH_4 (I.25, 2021) (I.28, 2019) (I.13, 2017) (I.19, 2016) (I.19, 2015) Accuracy	Investigate the ratio of sinter + pellets to steel + pig iron and describe the reasons for the observed ratio in the NIR, including the possibility of exports of sinter and/or pellets, which could explain the ratio; and review the AD for the	Resolved, The Party reported in NIR, (Section 4.4.1, 5, p.208-209 as well as in Table (4.22) a comparative analysis of the ratio of production volumes ("sinter + pellets" to "pig iron + steel") for 1990-2021, the analysis showed that the sum of the production volume " sinter + pellets " for the entire timeseries is on average 60.9 per cent, and the sum of the production volume "pig iron + steel" on average for all years is 39.1 per cent of the total production volume (" sinter + pellets" to "pig iron + steel")	The Party considers the recommendation implemented and requests that it be accepted as resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		whole time series, if found necessary.		
I.12	2.C.1 Iron and steel production – CO_2 (I.26, 2021) (I.29, 2019) (I.41, 2017) Transparency	Include in the NIR clear descriptions of the method, AD and EFs used in the emission estimates for subcategory 2.C.1.a steel in accordance with paragraph 50(a–b) of the UNFCCC Annex I inventory reporting guidelines.	The Party reported in NIR (Section 4.4.1.2.2, p.202) that steel production volumes were used from the data of the Bureau of National Statistics of ASPR RK and Arcelor Mittal Temirtau JSC. When assessing CO_2 emissions, data were used on the amount of pig iron (used for steel production) at Arcelor Mittal Temirtau JSC, considering the amount of reducing agent used in the production of steel (0.043 t/t) and the carbon content in steel (0.04 per cent). Separately, CO_2 emissions from electric steel production were estimated according to the IPCC Tier 3 method based on enterprise data on steel production by Arcelor Mittal Temirtau, JSC, consumption of metallized pellets, steel scrap and carbon electrodes, carbon content in raw materials and final products. The ERT noted that NIR does not specify how the AD from the largest steel production company, ArcelorMittal Temirtau JSC, and from the national statistics are used in the estimates, nor does it provide the EF used. The ERT considers that the recommendation has not yet been fully addressed because the Party has not reported fully transparent information on the method, AD and EFs used in the emission estimates for subcategory 2.C.1.a steel in accordance with paragraph 50(a–b) of the UNFCCC Annex I inventory reporting guidelines	This recommendation will be taken into account in the next NIR report, which will provide transparent information on the method, AD and EF used in emission estimates for 2.C.1.a steel in accordance with paragraph 50(a). –b) Guidelines for the preparation of cadastral reporting of Annex I of the UNFCCC.
I.13	2.C.1 Iron and steel production – CO_2 (I.27, 2021) (I.30, 2019) (I.42, 2017) Transparency	Provide in the NIR clear and complete information on the method, AD and EFs used for the estimates of pig iron and ensure consistency of this information with the information reported in the CRF tables.	The Party reported in the NIR (Section 4.4.1.2.1 as well as in Table 4.15, p.200-201) CO2 emission values that are consistent with those in the CRF tables, also the Party added description to the AD in CRF Table 2(I).A-Hs2, moreover, the EF has corrected to a CS (Country Specific) instead of D (Default)	The Party considers the recommendation implemented and requests that it be accepted as resolved
I.14	2.C.1 Iron and steel production – CO_2 (I.28, 2021) (I.32, 2019)	Revise the description of category 2.C.1 in the NIR to improve the transparency of the inventory by providing a clear statement that direct	Resolved: The Party reported NIR (Section 4.4, p. 198) a clear statement that no direct reduced iron production in the country (https://www.urmcompany.ru/production/dri/) and provided a link to LLC NPTK "OSK" Company (Russian Co., a supplier of raw materials for steel industry) which	The Party considers the recommendation implemented and requests that it be accepted as resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(I.44, 2017) Transparency	reduced iron production is not occurring in the country, including relevant references to the existing iron and steel plants.	stated that due to lack of accessible coke in the country, the production of DRI is not occurring in KAZ. https://metallplace.ru/about/stati-o-chernoy-metalurgii/zhelezo-pryamogo-vosstanovleniya	
I.15	2.C.1 Iron and steel production – CO_2 (I.29, 2021) (I.33, 2019) (I.45, 2017) Accuracy	Collect AD for fuels, reducing agents (coke breeze) and limestone used for sinter production, revise the CO_2 emission estimates for category 2.C.1.d sinter for the complete time series using tier 2 or 3 methods from the 2006 IPCC Guidelines and demonstrate that emissions from fuels used for sinter production are excluded from the energy sector.	Resolved: The Party reported NIR (Section 4.4.1.2.3, p. 205) that the CO_2 emissions for subcategory 2.C.1.d sinter were estimated using a tier 2 based on data provided by ArcelorMittal Temirtau JSC, Also, the Party reported that to avoid double counting of emissions, the volumes of gases used (coke oven and blast-furnace gases), as well as coke breeze used to produce sinter, were excluded from the Energy Sector	The Party considers the recommendation implemented and requests that it be accepted as resolved
I.16	2.C.1 Iron and steel production – CO_2 (I.30, 2021) (I.34, 2019) (I.46, 2017) Transparency	Collect AD for fuels (natural gas), reducing agents and limestone used for pellet production, revise the CO_2 emission estimates for category 2.C.1.e pellet for the complete time series using tier 2 or 3 methods from the 2006 IPCC Guidelines and demonstrate that emissions from fuels used for pellet production are excluded from the energy sector.	Resolved. The Party reported NIR (Section 4.4.1.2.4, p. 206) that to calculate CO_2 emissions for this category in the 2021 inventory, the calculation approach was changed by following different calculation sequence where a) the volume of the total consumption of natural gas to produce pellets from (thousand m^3) was converted to ton of reference fuel and then to (TJ), then b) the obtained value was multiplied by the carbon content in natural gas (14.836 tons/TJ) which gave us the amount of emissions from pellet production in thousand tons of CO_2 eq. The Party also reported that applying the new sequence has resulted in increase of greenhouse gas emissions in 2021 from the Pellet Production category by 64.16 per cent of GHG emissions in 1990. CO2 emissions in 2021 compared to 2020 show an increase in emissions by 22.3 per cent, which is caused by an increase in pellet production and, accordingly, an increase in natural gas consumption for pellet production (NIR, Table 4.20, p.206). During the review week, the Party confirmed and reported in NIR, p.207 that to avoid double counting of emissions,	The Party considers the recommendation implemented and requests that it be accepted as resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			the volume of natural gas used to produce pellets was excluded from the Energy Sector -	
I.17	2.C.1 Iron and steel production – CO_2 and CH_4 (I.31, 2021) (I.35, 2019) (I.47, 2017) Transparency	Provide in the NIR clear and documented information justifying that CO_2 and CH_4 emissions from coke production are not double counted under categories 2.C.1 iron and steel production, 1.A.1.b pig iron and 1.A.2.a iron and steel.	Resolved, The Party reported NIR (Section 4.4.1.2.1, p. 200) that CO_2 and CH_4 emissions from coke production are accounted for in the "Energy" sector, an update of CRF Table 9 was reported to include CH_4 emission (from 2.C.1.f to 1.A.1.c) under IE. Also, during the review, the Party clarified and sent official letter (Letter of request No. 13-1-13 / 2380-I dated 07.26.2022 signed by the Authorized Body), in which all parameters are indicated according to the formulas necessary for calculating GHG emissions from 2C categories, also the Party clarified that category 2C.1 takes into account emissions from the use of coke, but not from its production, and emissions from coke production are accounted for in the Energy Sector, categories 1.A.1.b pig iron and 1.A.2. iron and steel.	The Party considers the recommendation implemented and requests that it be accepted as resolved
I.18	2.C.2 Ferroalloys production – CO_2 (I.33, 2021) (I.37, 2019) (I.48, 2017) Transparency	Include in the NIR clear descriptions of the method, AD and EFs used for the emission estimates for category 2.C.2 ferroalloys production in accordance with paragraph 50(a–b) of the UNFCCC Annex I inventory reporting guidelines.	Resolved: The Party reported NIR (Section 4.4.2.2, p. 210 as well as Table 4.23, p.211) clarifications on AD and the basis the EFs used were chosen, and state that to calculate CO_2 emissions for this category, the Party used to use emission factor of the reducing agent (coke) equal to 3.3 t CO_2 / ton of reducing agent for the data of Kazchrome JSC, and the difference in production volumes between the data of the enterprise and the Bureau of National Statistics of the ASPIR RK was considered as "Other". The Party has revised the emission estimation from the "Other" by deriving the average value of the reducing agent consumption per 1 t of all ferroalloys production (thousand tons), then it was determined the average value of the reducing agent consumption per 1 ton "Other" (thousand tons), which amounted to 0.56 tons. Further, using reducing agent emission factor equal to 3.3t CO_2 /tonne of reducing agent CO_2 emissions from "Other" (thousand tons). Thus, greenhouse gas emissions from the category "Production of ferroalloys" are calculated using a reducing agent emission factor equal to 3.3t CO_2 /tonne of reducing agent. T	The Party considers the recommendation implemented and requests that it be accepted as resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
I.19	2.C.3 Aluminium production – CO_2 (I.34, 2021) (I.38, 2019) (I.16, 2017) (I.21, 2016) (I.21, 2015) Convention reporting adherence	Improve the reporting of information on aluminium technology and parameters provided in the NIR and strengthen the QA/QC procedures in preparing the report with a view to eliminating internal inconsistencies in the NIR.	Resolved: The Party reported NIR (Section 4.4.3.2, p. 216) information on category 2.C.3 aluminium production, including the technology and parameters of aluminium production in the country, the Party also has corrected the reference to the equation 4.21 of the 2006 IPCC Guidelines (vol. 3, chap. 4, p.4.45), which relates to CO2 emissions from prebaked anode consumption (tier 2 and 3 methods)	The Party considers the recommendation implemented and requests that it be accepted as resolved
I.20	2.D Non-energy products from fuels and solvent use – CO_2 and N_2O (I.37, 2021) (I.42, 2019) (I.18, 2017) (I.23, 2016) (I.23, 2015) Completeness	Provide estimates for the emissions for the category or evidence to show the insignificance of this category, in accordance with decision 24/CP.19, annex I, paragraph 37(b); and include clear information of the category included under other in CRF table 2(I).A-H.	Resolved: The Party, previously reported in the NIR information on lubricant production while in the CRF table 2(I).A-Hs2 CO_2 the Party reported emissions for category 2.D.1 lubricant use , and the CO_2 emissions for category 2.D.2 paraffin wax use using the notation key “NA, also the CO_2 emissions for category 2.D.3 other were reported using the notation key “NO” without providing explanations on the used notation keys. Moreover, there was no specific section in the NIR chapter on IPPU for any possible emissions for these subcategories. In the current submission, the Party reported in the NIR (Section 4.5.5, p. 229) a new subsection on the use of paraffins, also updated the reported info under CRF Table 2(I).A-Hs2 for 2.D.1 (Lubricant use), 2.D.2 (Paraffin was use) and 2.D.3 (Others) Meanwhile, it’s not reported in the NIR or the CRF tables any specification for 2.D.3 sub-category also the reported CO_2 emission under 2D3 (142.6 ktCO_2) which represent about 80 per cent of the emissions under the 2D category. However, although the methodologies for precursors are provided in the NIR, there is no information how CO2 from the category are calculated and what is included in the reported value During the review, the Party provided clarification on the used methodology for CO_2 emission estimation from this category and moreover clarified that since category 2.D.3 includes the use of urea from vehicles, the Party considered it possible to display all information on their use in the category "Transport" Section "Energy". This is since the	The Party requests to change the status of this recommendation to “Resolved”, since the category is assessed and described in NIR in some detail with evidence of the age and timing of the start of use of such technologies in Kazakhstan

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			description of transport; the condition and age of the car park are described in detail in this chapter.	
I.21	2.D.2 Paraffin wax use – CO_2 (I.38, 2021) (I.53, 2019) Completeness	Collect AD and estimate CO_2 emissions for category 2.D.2 paraffin wax use using the default methodology provided in the 2006 IPCC Guidelines (vol. 3, chap. 5, p.5.11) or clearly demonstrate in the NIR that emissions for this category are insignificant according to paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	The Party reported NIR (Section 4.5.5, p. 229) a new subsection on the use of paraffins, also updated the reported info under CRF Table 2(I).A-Hs2 for 2.D.2 (Paraffin was use). The ERT also noted that the Party reported that the AD for 2.D.2 was collected for the time series from 2007 to 2021 (Table 4.35 and Fig. 4.7, NIR p.230), while report no information on the AD for the time series from 1990-2006. During the review, the Party clarified that they have a problem with the AD, where the Bureau of National Statistics does not have information for the period from 1990 to 2006, and that it's rather difficult to restore the time series by extrapolation due to the non-linearity of the volume of emissions. The Party added that the CO_2 emissions for 2021 were 0.082 Gg (82 tons), which is negligible even under category 2.D (0.046 per cent), well below the threshold set out in decision 24/CP.19). the ERT notes that the Party may use the gap filling techniques suggested by the IPPC GL to obtain the missing AS for the period 1990-2006 The ERT considers that the recommendation has not yet been fully addressed because the Party has not reported fully transparent information on the AD for category 2.D.2 paraffin wax use for the period 1990-2006	The Party informs that in the next NIR the whole time series will be recalculated for the period from 1990-2006 using the extrapolation or splicing techniques in accordance with the IPCC Guidelines 2006 (Volume 1, Chapter 5, "Time Series Consistency" and 5.3.3 Splicing techniques)
I.22	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2 (I.39, 2021) (I.54, 2019) Completeness	Collect AD and estimate CO_2 emissions from urea-based catalytic converters using the default methodology provided in the 2006 IPCC Guidelines (vol. 2, chap. 3, p.3.12) or clearly demonstrate in the NIR that emissions from this subcategory are insignificant according to paragraph 37(b) of the UNFCCC Annex I	The Party reported in its NIR under Energy Sector (Section 3.4.5.3, p.117) accounting of urea-based catalytic converters for road transport, including the methodological approaches used, the initial data set and the estimates obtained to demonstrate the emission magnitude. As the emission should be reported under 2D3 (others), the ERT noted that there is 'significant' CO_2 emissions reported under 2D3 in CRF Table2(I).A-Hs2 with providing a description under the Energy Sector instead of doing so under the IPPU Sector in the NIR During the review, the Party clarified that the reported notation key "NO" for the CO2 emissions for the period 1990-2008, the ERT noted that the NIR includes no	The party requests to change the status of this recommendation to "Resolved", since the category is assessed and described in NIR in some detail with evidence of the age and timing of the start of use of such technologies in Kazakhstan.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		inventory reporting guidelines.	justifications for that, during the review, the Party clarified that this technology has begun to be used on a large scale after 2008 with an increase in the share of new cars, while before 2008, the majority of cars were not equipped with the technology.) w The issue was of completeness. In previous year the estimate was not included. If now included, it seems that currently the issue is of comparability or transparency	
I.23	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2 (I.50, 2021) Completeness	Report CO_2 emissions from urea-based catalytic converters under category 2.D.3 non-energy products from fuels and solvent use – other in the next annual submission and include clear information on their allocation in the relevant sections of the energy and IPPU chapters of the NIR, along with relevant methodological information and cross-references.	The Party reported in its NIR under Energy Sector (Section 3.4.5.3, p.117) accounting of urea-based catalytic converters for road transport, including the methodological approaches used, the initial data set and the estimates obtained to demonstrate the emission magnitude. As the emission should be reported under 2D3 (others), the ERT noted that there is 'significant' CO2 emissions reported under 2D3 in CRF Table2(I).A-Hs2 with providing a description under the Energy Sector instead of doing so under the IPPU Sector in the NIR During the review, the Party clarified that since category 2.D.3 includes the use of urea from vehicles, the Party considered it possible to display all information on their use in the category "Transport" Section "Energy". This is since the description of transport; the condition and age of the car park are described in detail in this chapter.) The issue was of completeness. In previous year the estimate was not included. If now included, it seems that currently the issue is of comparability or transparency	The Party requests that the status of this recommendation be changed to "Resolved", since the Party has done thorough work in this category.
I.24	2.F.1 Refrigeration and air conditioning –	Provide a transparent explanation in the NIR to justify the choice of the notation key "NO" for	[Resolved. The Party reported in its NIR (p.240 s4.7) that data on the consumption of ODS were evaluated using the historical method for the period 1990 – 2007. The Party justifies its	The party thanks ERT for the great work done

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	HFCs (I.40, 2021) (I.43, 2019) (I.20, 2017) (I.7, 2016) (I.7, 2015) (55, 2013) Transparency	years prior to 2007, or collect AD and estimate emissions of HFC-32, HFC-125 and HFC-143a from refrigeration and air-conditioning equipment for the entire time series.	use of "NO" in the early 90's due to the technology in country at that time. Each subcategory phased out older equipment according to national circumstances. The Party states that Kazakhstan does not produce refrigerants and that under the Montreal protocol common use gases were phased out between 1991 – 2000 (p.238) and banned completely in 2005 (p.246) including R-11,12,22. The Party based on the previous ERT recommendation provided AD prior to 2007. During the transition period, ODS Substitutes were imported and phased into the market. Most subcategories became constant users of ODS Substitutes by 1998 according to the data graphs provided by the Party. 2.F.1.a Commercial Refrigeration - The Party also stated that majority of commercial equipment used ammonia based equipment (NIR, p.238). 2.F.1.b Domestic Refrigeration - NIR (p.247, s4.7.3.4.) Equipment phased out R-600, a gas again not subject to this protocol and Figure 4.11 shows the trend. 2.F.1.c Industrial Refrigeration - NIR (p.247, s.4.7.3.5) Trend is described as affected by the early use of ammonia which was phased out and the trend reflected in Figure 4.12. 2.F.1.d Transport Refrigeration (labelled as F.1.e) – (a) NIR (p.248 s4.7.3.6. Refrigerated wagons), states that full depreciation of railway cars occurred between 2010 – 2016 and only one car is in use in 2021. Additionally, railway refrigerated wagons use R12 as well and are not applicable to this report. NIR (p.244) explains that the country used R11 and R12 predominantly up until 1998 when a change in rules by the country changed the business landscape and thus the equipment but up until then, the older generation equipment was utilized. (b) NIR (p.250, s. 4.7.3.7. Refrigerated semi-trailers, states that from 1991 – 1997 trucks used the R12 agent. Trend reflected in NIR figure 4.13. 2.F.1.e Mobile Refrigeration – NIR (p.251., section 4.7.3.8) Automotive Air Conditioning states that cars of the early period including 1990 were domestically produced and did not contain air conditions and is shown in Figure 4.14 – 4.16. NIR (p253., s 4.7.3.8.)	

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			2.F.1.F Stationary Air Conditions – NIR (p.255, s.4.7.3.9.) states that rapid economic development of cities and the active construction of social and sports facilities are the reason for growth in use of ODS Substitutes and the trend is reflected in Figure 4.17.	
I.25	2.F.1 Refrigeration and air conditioning – HFCs (I.41, 2021) (I.44, 2019) (I.21, 2017) (I.25, 2016) (I.25, 2015) Transparency	(a) Provide transparent information on methods, AD and EFs for this category; (b) Provide information on how time-series consistency is ensured for the category; (c) Provide clear information on the recalculations made across the entire time series; (d) Correct the reporting of the emissions in the CRF tables by providing data per subcategory, and clearly distinguish emissions from manufacturing, from stocks and from disposal.	(a) The Party reported in its NIR (p.240-242, s4.7.3.1.) Methodological Approaches, an improved description of how AD is collected, the review and verification by the Working Group, the use of a Tier 2b approach, and the use of Table 7.9 of the Guidelines. In the NIR (p.241) of the Party references the IPCC equations used, namely Chapter 3 Volume 7 equations 7.11, 7.13, 7.14 and provides the lifecycle information for EF on NIR (p.241) Table 4.41. However, the Party has mentioned the main source of data being the Refrigeration Association of Kazakhstan (30 companies), that AD is continuously being improved by updating its database, the Association plans to report publicly on its activity, remove some of the confidentiality of the data, make reporting mandatory and with the help of the UNDP establish a monitoring system and therefore still has some improvements towards transparency. During the review, the Party did not provide new information regarding improvements towards transparency. (b) The Party reported in its NIR (p.240 - p241) the methods used to estimate emissions by accounting for consumption by GDP for the period 1990 - 2007 and forecasted through to 2015. Table 4.41 shows figures used as EF, and describes the quality of the data source in NIR (p.255, s4.7.3.10.) as the best available. However, the NIR does not contain a specific explanation of the steps taken to ensure time series consistency. During the review, the Party stated that the series are harmonized according to the relevant criteria according to the 2006 IPCC Guidelines. (c) The Party reported in its NIR (p.256, s.4.7.3.11.), the Party expands its explanation on recalculations for the category 2.F.1. by stating the parameters that were included in the recalculations. However, the Party does not provide an example of how the recalculations were done and that its data collection methodology has changed but does not state	The Party requests that the status of this recommendation be changed to “Resolved”, since the Party has done thorough work in this category. At this stage, new chapters reflecting the state of the issue are presented in the NIR.

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			specifically how or reference the QA/QC process that corresponds to the change. During the review, the Party states that all calculations were made on the basis of easily accessible and verifiable data. (d) The Party in its CRF (Table 2(II).B-Hs2) has improved the table by populating the table according to the recommendations of the ERT and IPCC guidelines providing the data per sub-category, separating emissions sources (manufacturing, stocks, disposal, etc.) Additionally, in its NIR (p. 240-243, s.4.7.3.1.) describes the methodology by which the disaggregation was completed by providing the information. The ERT considers that the recommendations have not been fully addressed because the Party has not yet implemented its plans for mandatory AD collection, provided detailed information in the NIR on ensuring time-series consistency and statements on recalculations and sources of AD.	
I.26	2.F.1 Refrigeration and air conditioning – HFCs (I.42, 2021) (I.45, 2019) (I.51, 2017) Accuracy	Collect relevant AD (manufacturing, stocks and recovery), in particular for equipment in operation and disposal, and estimate HFC emissions for category 2.F.1 refrigeration and air conditioning by applying the corresponding method from the 2006 IPCC Guidelines; however, if that is not possible, estimate HFC emissions for this category using the techniques on data gathering presented in the 2006 IPCC Guidelines (vol. 1, chap. 2) and apply the corresponding method from the 2006 IPCC Guidelines.	The Party reported in its NIR (p.238, s4.7.) details the AD collection process by stating that experts, Refrigeration association, working groups including more than 30 companies came together to provide and verify the data. The section provides general and specific information on for the assumptions made for manufacturing, stocks, operation, disposal, destruction and recovery (NIR, p.237-p.256, s.47) The Party explains that it imports equipment, does no recovery or destruction and each category was estimated according to Tier 2a methods in the 2006 IPCC guidelines (Vol 3 Ch. 7 p.49). The CRF Table (2(II).B-Hs2) has been updated according to the guidelines and training in 2022 and disaggregated appropriately. During the review, The Party stated that corresponding comments were provided in the CRF Tables but both Table 2(II)B-Hs2 and Table 9 do not contain comments for the category. The ERT considers that the recommendation has not yet been fully addressed because the Party has not provided corresponding information in the CRF Table (2(II).B-Hs2s) and does not provide specific information on what methodologies were used in collecting data such as if gap filling methods were used.	The Party requests that the status of this recommendation be changed to “Resolved”, since the Party has done thorough work in this category. At this stage, new chapters reflecting the state of the issue are presented in the NIR.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
I.27	2.F.1 Refrigeration and air conditioning – HFCs (I.43, 2021) (I.55, 2019) Accuracy	Continue efforts to collect accurate AD and report HFC emissions for subcategory 2.F.1.c industrial refrigeration and include in the NIR clear descriptions of the method, AD and EFs used in the emission estimates for this subcategory, in accordance with paragraph 50(a–b) of the UNFCCC Annex I inventory reporting guidelines.	The Party reported in its NIR (p.256, s4.7.3.11) recalculations for all sub-categories and that due to previous ERT comments and training received (p.32) in 2022, the implementation of a working group comprising experts, over 30 companies, the refrigeration association and plans to improve by raising finances for a monitoring system for future emissions estimates with UNDP support (p240-241). Currently this working group is the source of all 2.F.1. AD. In the NIR (p.241, s. 4.7.3.1.) the Party highlights the IPCC methodologies used by referring the equations. It is not stated explicitly in the NIR the tiers used but the equations are from Vol 3 Ch 7 p.7.49 Tier 2a Emission Factor Approach. CRF table 2(II).B-Hs2 now reflects the improved data reporting.	The party requests to change the status of this recommendation to “Resolved”, based on the totality of ERT findings
I.28	2.F.1 Refrigeration and air conditioning – HFCs (I.44, 2021) (I.56, 2019) Accuracy	Calculate HFC emission estimates for subcategory 2.F.1.e mobile air conditioning using the default methodology provided in the 2006 IPCC Guidelines, with the EF for operation emissions from mobile air conditioning taken from the default range (2006 IPCC Guidelines, vol. 3, chap. 7, table 7.9, p.7.52), and accurate AD, including HFC emissions from disposal (end-of-life) if relevant, and provide transparent and detailed information in the NIR on the method, AD and other parameters used in the calculations (e.g. assumptions on the percentage of vehicles sold with air conditioning among the total number of vehicle registrations and the average HFC charge of	The Party reported in its NIR (p.256, s4.7.3.11.) that it now reports emission from stock and disposal separately and details the information on the national circumstances in references to AD, refillable factors, percentages and numbers of vehicles related, service life, methodologies used etc (p.248-250). In the NIR (p.241) Table 4.41 the factors correspond to the ranges of the IPCC Guidelines (Vol 3 Ch. 7 p.7.52 Table 7.9.) CRF table 2(II)B-Hs2 reflects the changes and appropriately fills the cells with the relevant information disaggregated as recommended by previous ERT. NIR (p.254, p.254) Figure 4.16 reflects the changes made by the Party when compared to its previous version Figure 4.11 of NIR 2021. The Party has stated which equations were used and described the methodologies in NIR (p.241, s4.7.3.1).	The party requests to change the status of this recommendation to “Resolved”, based on the totality of ERT findings

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		mobile air conditioners or other relevant documentation), in addition to reporting relevant AD and IEF values in CRF table 2(II).B-H.		
I.29	2.F.1 Refrigeration and air conditioning – HFCs (I.45, 2021) (I.57, 2019) Accuracy	Calculate HFC emission estimates for category 2.F.1 refrigeration and air conditioning using the methodology provided in the 2006 IPCC Guidelines, in particular for subcategories 2.F.1.a commercial refrigeration and 2.F.1.f stationary air conditioning, ensuring the use of accurate AD, and include HFC emission estimates by gas for the refrigerant blends used in Kazakhstan, ensuring, in particular, that HFC-125 is included.	The Party reported in its NIR (p.256, s4.7.3.11) explains how AD was changed based on disaggregation according to ERT recommendations and the IPCC guidelines. Assumptions are provided in the sub-category descriptions s4.7.3.2 and s4.7.3.3. and s4.7.3.9 and methodologies s4.7.3.1 beginning on p. 240 of the NIR. Additionally, the Party reported in the NIR (p.242) Table 4.42 the constituent blends of the relevant gases. CRF table 2(II)B-Hs2 now provides data on HFC-125 as recommended by the ERT.	The party requests to change the status of this recommendation to “Resolved”, based on the totality of ERT findings
I.30	2.F.1 Refrigeration and air conditioning – HFCs (I.46, 2021) (I.57, 2019) Transparency	Provide transparent and detailed information in the NIR on the method, AD and other parameters used for the emission estimates, including transparent information on the types of refrigeration and/or air-conditioning applications (commercial refrigeration, domestic refrigeration, transport refrigeration or stationary air conditioning) in which the specific refrigerant blends are used.	The Party reported in its NIR (p.240-243 s4.7.3.1) Methodologies and improved description of the calculation approach by referencing the IPCC guidelines and equations applied. The Party provides information on the types of refrigeration per subcategory and the data on market use by types of vehicles and circumstances under which they are utilized or not utilized. As mentioned by the previous ERT NIR (p.245) Table 4.43 provides a matrix of compressor types and refrigerants used as well as the constituents of each in Table 4.42 (p.242). The Party also described effects of improved data quality on AD and parameters applied such as Table 4.41 of the NIR (p.241) where maximum values of Vol 3 Ch. 7 Table 9 p. 52 of the IPCC Guidelines were used. Improved methodology is reflected in CRF Table 2(II)B-Hs2 where the table is filled appropriately as recommended by ERT.	The party requests to change the status of this recommendation to “Resolved”, based on the totality of ERT findings

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
I.31	2.F.1 Refrigeration and air conditioning – HFC-32 (I.51, 2021) Accuracy	Improve the accuracy of its emission estimates for HFC-32 in subcategory 2.F.1.f stationary air conditioning by reporting the corrected emission estimate for 2009 in CRF table 2(II).B-Hs2.	The Party reported in its CRF table 2(II)B-Hs2 a corrected value for the year 2009 for sub-category 2.F.1.f (from 5.37 t to value of 29.23 t). The corrected value is consistent with the trend of emissions for HFC-32 thus resolving the error.	The party requests to change the status of this recommendation to "Resolved", based on the totality of ERT findings
I.32	2.F.4 Aerosols – HFCs (I.52, 2021) Transparency	Improve the transparency of its reporting by explaining (e.g. by using a formula) the approach taken for the estimation of HFC emissions from metered dose inhalers and by transparently documenting AD and EFs and all other relevant assumptions used for the estimates in the NIR.	The Party reported in its NIR (p.257, s4.82) improved transparency by providing the assumptions used for calculations and EF, the equation used by the Party for emissions estimates, NIR (p.258) Figure 4.18 showing the correlation between population and number of patients, assumptions used to determine market share of metered dose inhalers and the improvements to the method are reflected in NIR (p.260, s.4.8.4.).	The party requests to change the status of this recommendation to "Resolved", based on the totality of ERT findings
I.33	2.G.3 N_2O from product uses – N_2O (I.48, 2021) (I.49, 2019) (I.52, 2017) Convention reporting adherence	Estimate N_2O emissions for subcategory 2.G.3.a medical applications and report these emissions in the next annual submission and include in the NIR information in accordance with paragraph 50(a–b) of the UNFCCC Annex I inventory reporting guidelines.	The Party reported AD and N_2O emissions for subcategory 2.G.3.a medical applications using the notation key "NA" and "NE" respectively in CRF table 2(I).A-Hs2. The Party has reported a specific sub-section to category 2.G.3 N_2O from product uses in the NIR (Section 4.10, p. 263), under this section, the Party reported that based on the total amount of consumption of nitrous oxide for medical purposes and the population, proportions were drawn up and an estimated consumption value in Kazakhstan was obtained, estimated at 80 Kt eq. CO_2. The ERT noted that the Party reported in CRF table 9 explanation to the 'NE' Notation key, stating that the Party provided preliminary estimates of N_2O emissions from the use of anesthesia based on data from countries with similar conditions, and that this category is not significant in accordance with decision 24/CP.19, Annex 1, paragraph 37(b).	The Party will make efforts to resolve this issue in the next inventory submission
Agriculture				
A.1	3. General (agriculture) –	Make every effort to develop country-specific	The Party reported in its NIR (section 5.2.2, table 5.7, p.275) a feed digestibility coefficient of 60 per cent for	The Party will make further efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	CH_4 and N_2O (A.14, 2021) Accuracy	coefficients for feed digestibility for dairy and non-dairy cattle, and sheep.	dairy cattle, non-dairy cattle and sheep. The same information is also provided in CRF table 3.A(a)s2. Kazakhstan reported additional information on how this coefficient is derived in its NIR (section 5.2.2, p.275). It explained in its NIR (section 5.2.2, p.275) that it used the default coefficient value of feed digestibility from the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10A.1, p.10.72), for Eastern Europe as the most suitable for its conditions. Kazakhstan has not included information on refining the default feed digestibility coefficient value used in the estimates or on developing country-specific coefficients for feed digestibility for dairy and non-dairy cattle, and sheep. During the review, the Party clarified that its work to develop country-specific coefficients for feed digestibility for dairy and non-dairy cattle, and sheep is currently underway, but there are problems in obtaining initial data on dietary composition for dairy and non-dairy cattle, and sheep.	
A.2	3.B Manure management – CH_4 and N_2O (A.2, 2021) (A.13, 2019) Accuracy	Collect robust information on MMS used for all animal species for the whole time series, ensuring the representation, at a minimum, of the current and 1990 distribution of MMS, taking into account changes and progress in agriculture production systems, and use this information in the emission calculations of future annual submissions.	The Party reported in its NIR (table 5.25, p.289) the shares of various manure management systems in livestock production. This fraction does not change for all animal species for the whole time series. The same information is also provided in CRF table 3.B(a)s2. Kazakhstan reported its NIR (section 5.3.2.2, p.289) that information on the distribution of manure by its collection, storage and use systems is based on the analysis of scientific literature, local meteorological conditions and the distribution of livestock by region and directly depends on the proportion of animal husbandry by various methods. However, the ERT considers that, given the significant changes in livestock management in the 1990s, distribution of animal housing and MMS may also have changed since the 1990s. During the review, the Party clarified that this work is currently underway, but there is a problem in obtaining reliable historical data on MMS in the 1990s	The Party will make further efforts to resolve this issue in the next inventory submission
A.3	3.D Direct and indirect N_2O emissions from agricultural soils – N_2O (A.5, 2021)	Provide detailed information on the reasons for recalculations of emissions for category 3.D agricultural soils, including, when relevant, information at the	The Party provided a section on recalculations for N_2O emissions from agricultural soils in the NIR (p.303-304). The recalculations cover animal manure applied to soils (3.D.a.2.a) due to the number of asses and buffaloes for 2015-2019 mineralization associated with the loss of soil organic matter (3.D.a.5), and nitrogen leaching and run-off. The ERT noted that the Party provided explanations on the	The Party will make further efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(A.17, 2019) Transparency	subcategory level, in the recalculation sections of the NIR, and tables showing the resulting differences among annual submissions.	N_2O recalculation in its NIR for mineralization associated with the loss of soil organic matter (3.D.a.5), including the difference between the estimates for the 2022 and current submissions (figure 5.9, table 5.32, p.303). However, the ERT noted some omissions in the presented information, e.g. the N_2O emissions from animal manure applied to soils (3.D.a.2.a), urine and dung deposited by grazing animals (3.D.a.3) were also recalculated for the whole time series. The Party did not explain why the estimates of emissions from Animal Manure Applied to Soils (3.D.a.2.a), Urine and Dung Deposited by Grazing Animals (3.D.a.3) were recalculated between the 2022 and current submissions. During the review, the Party referred to the detailed information about recalculations of emissions for category 3.D.a.5, graph, table, and explanation of recalculations as shown in section 5.5.5 of the NIR. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet reported all changes in estimates of emissions and indicate the reason for these changes among annual submissions for some of the subcategories under 3.D. (subcategory 3.D.a.2.a and 3.D.a.3).	
A.4	3.D.a.4 Crop residues – N_2O (A.16, 2021) Accuracy	Conduct an expert survey on the removal of crop residues in the country or provide evidence in the form of published reports that removal of crop residues is not practised in the country, and present the results in the NIR to justify the accuracy of the method applied. If removal of crop residues is significant, the Party should modify its country-specific methodology to include a variable for removal of crop residues and, if required, removal through burning when calculating the biomass that remains in	The Party reported same country-specific methodology in its NIR of 2023 submission (p.297) for the nitrogen input to the soil from crop residues as it was done in the NIR of 2021 submission. As noted by the previous ERT the equation used does not include a variable for removal of crop residues annually for purposes such as feed, bedding and construction, as is included in the default equation 11.6 of the 2006 IPCC Guidelines (vol. 4, chap. 11, p.11.14) or a variable for removal of residues through burning. There still no justification of the exclusion of the key parameters in the methodology (e.g. removal of crop residues annually for purposes such as feed, bedding and construction, removal of residues through burning) in the current NIR NIR (p.297). During the review, the Party clarified that there is currently no expert survey on the removal of crop residues in the country. The Party also clarified that there is legislation prohibiting residue burning activities, as described in Section 5.7 in the NIR 2023 submission.	The Party will make efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		the field, in line with the 2006 IPCC Guidelines (vol. 4, chap. 11, equation 11.6, p.11.14).		
A.5	3.D.a.5 Mineralization/ immobilization associated with loss/ gain of soil organic matter – N_2O (A.17, 2021) Accuracy	(a) apply equation 11.8 of the 2006 IPCC Guidelines (vol. 4, chap. 11, p.11.16) to the AD reported for net CSC in soils for mineral soils in cropland and land converted to cropland, which should be reported as the net annual amount of N mineralized in mineral soils as a result of loss of soil carbon through change in land use or management, and revise the estimates for subcategory 3.D.a.5 mineralization/immobilization associated with loss/gain of soil organic matter in CRF table 3.D for the entire time series; (b) report the methodology and AD used; and (c) report the comparison of the emission calculations between submissions in the recalculation section of the NIR, in accordance with the UNFCCC Annex I inventory reporting guidelines, paragraphs 43–45.	(a) The Party still reported the AD for N in mineral soils that is mineralized in association with loss of soil carbon under subcategory 3.D.a.5 using the notation key "NO" in its CRF table 3.D for 1990, while the net carbon stock change in soils was reported to be -2,277.3 kt C for that year in the NIR (table 6.3.5, p.354) and CRF table 4.B. During the review, the Party responded that There appears to have been a technical error in obtaining carbon loss AD from Cropland in 1990, this subcategory will be recalculated in the next NIR. (b) The Party reported exactly same text in its NIR of 2023 submission (p.299) for the estimation of N2O emissions from Mineralisation/immobilisation of N associated with loss/gain of soil organic matter as it was in the previous submission. The Party did not report AD in section 5.5 of its NIR. During the review, the Party responded that the methodological choice is described in section 6.4. The ERT noted that section 6.4 is not relevant to Mineralisation/immobilisation of N associated with loss/gain of soil organic matter. (c) The Party reported recalculation and carried out comparison of the emission calculations between submissions in the NIR (p.303-304). However, the implementation of this recommendation is dependent on the recalculation suggested by point a) above (a).	The Party will make efforts to resolve this issue in the next inventory submission
A.6	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N_2O (A.9, 2021) (A.10, 2019)	In the NIR, provide detailed information on the absence of organic soils in the country.	The Party reported a reference and its link its NIR (p.299) which showed the humus content in the soil of the northern, the most fertile part of Kazakhstan does not exceed 7%, which is below the definition for organic soils (>12 per cent).	Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(A.19, 2017) Transparency			
A.7	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N_2O (A.10, 2021) (A.21, 2019) Transparency	Provide references to scientific works regarding the characteristics of agricultural soils in Kazakhstan, such as Borovsky and Uspanov (1971) and Faizov, Urazaliev and Iorgansky (2001), including accompanying explanations in the NIR (section 5.5.2).	The Party included the references of Borovsky and Uspanov (1971) and Faizov, Urazaliev and Iorgansky (2001) in the NIR (p.299). The Party also included more up-to-date reference and its link in the NIR (p.299) to further explain that there is no organic soils exist in Kazakhstan.	Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved
A.8	3.D.b.2 N leaching and run-off (A.11, 2021) (A.22, 2019) Convention reporting adherence	(b) Improve the QC procedures for ensuring complete consistency of the reporting of the agriculture sector in the NIR and CRF tables; (c) Describe the specific QA/QC activities performed for the agriculture sector in the NIR.	(b) The Party reported consistent N2O emissions from N lost through leaching and run-off in the NIR (p.293) and in CRF table 3.D.b.2. (c) The Party described specific QA/QC activities for the agriculture sector in the NIR (p.308) and QA/QC procedures for section 5.5, including the comparison of AD with FAO database, comparison of EF with that contained in the EFDB for the countries with similar climate conditions, and the assessment of initial data and parameters by the specialist and government.	Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved
A.9	3.D.b.2 N leaching and run-off – N_2O (A.18, 2021) Transparency	Rigorously document the county-specific value of $Frac_{LEACH-(H)}$ of 0.1 in the NIR.	The Party reported in its NIR (p.302, footnote of the table 5.31) and CRF table 3.D.b.2 that the country-specific value of 0.1 for $Frac_{LEACH-(H)}$ with uncertainty range of 0.1-0.8 was applied to estimate the indirect N_2O emissions from leaching and run-off for cropland soils. The ERT noted that the Party did not improve the documentation for the country-specific $Frac_{LEACH-(H)}$ value and its uncertainty range compared with that in the NIR of 2021 submission.	The Party will make efforts to resolve this issue in the next inventory submission
A.10	3.F Field burning of agricultural residues – CH_4 and N_2O (A.19, 2021) Completeness	Conduct an expert survey and desk review of the literature regarding field burning of crop residues and report its finding in the NIR. On the basis of the findings, the Party should provide well-documented	Kazakhstan has reported the field burning of agricultural residues using the notation key "NO" in CRF Table 3.F for the entire time series, and the Party has provided a well-documented justification in Section 5.7 of NIR 2023 (page 324) that this activity is prohibited by several laws, including Article 47 of the Environmental Protection Act 160-1 of July 15, 1997. Similarly, to other neighbouring Annex I Parties that report the field burning of agricultural	Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		justification that crop residue burning does not occur or is insignificant according to paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. If the potential emissions prove to be above the significance threshold, the Party should provide emission estimates for the entire time series.	residues using the notation key "NO," the ERT considers that FAOSTAT takes into account spontaneous steppe and forest fires, which are considered in the LULUCF sector and reported in CRF Table 4(V) for biomass burning under wildfires and not burning of crop residues only.	
A.11	3.G Liming – CO_2 (A.12, 2021) (A.12, 2019) (A.21, 2017) Completeness	Provide, in the NIR, detailed justification for reporting CO_2 emissions from liming as "NO".	The Party continues to report liming using the notation key "NO" in CRF table 3. G for the entire time series and its NIR (section 5.8, p324) and web references as in NIR of 2021 submission. However, the Party does not refer to any national statistics such as the import or sale of lime for agricultural use. During the review, the Party referred back to the information provided in the NIR (Section 5.8, p.324). The ERT considers the recommendation has not yet been addressed because the Party has not yet provided well-documented justification these practices do not occur. The website referenced (https://agroinfo.kz/est-li-perspektivy-u-dolomitovoj-muki/) does find that dolomite can be used in some cases in Kazakhstan (Bakumenko, 2014) and the ERT concluded that emissions may still occur under the category.	The Party will make efforts to resolve this issue in the next inventory submission
LULUCF				
L.1	4. L1 General (LULUCF) – CO_2, CH_4 and N_2O (L.1, 2021) (L.1, 2019) (L.1, 2017) (L.1, 2016) (L.1, 2015) (table 3,	Improve completeness by including estimates for all mandatory categories, together with the relevant documentation supporting the estimates: (b) Net CO_2 emissions from grassland converted to forest land – mineral soils;	The Party reported in its NIR (p.480) that concerning points (b), (f) and (g) due to the unavailable data and the approach used to construct the land matrix, the Party is not able to estimate separately the carbon stock changes for individual conversion categories. The Party applied the Approach 1 land representation method according to the IPCC Guidelines. (b) The Party used the notation key "IE" for AD and "NA" for net CO_2 emissions from grassland converted to forest land – mineral soils.	Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved (b) The Party will make further efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	2013) (114, 2012) (95, 2011) Completeness	(c) Net CO_2 emissions from wetlands converted to forest land – organic soils; (f) Net CO_2 emissions from forest land converted to grassland – dead organic matter and mineral soils; (g) Net CO_2 emissions from other land converted to wetlands; (h) N_2O emissions from disturbance associated with land-use conversion to cropland, grassland converted to cropland – mineral soils.	(c) The Party its NIR (p.299) and CRF table 4.A reported that there is no organic soil in the country. (f) The Party used the notation key "IE" for AD and "NA" for dead organic matter and mineral soils in forest land converted to grassland. (g) The Party in the CRF table 4.D did not report on Net CO2 emissions from other lands converted to wetlands. During the review, the Party explained that Kazakhstan cannot estimate the changes in carbon stocks and emissions in land conversions separately, because it uses Approach 1 methods for land representation. The Party further clarified that it is continually improving its methods and will be able to report these emissions in future NIRs.(h) The Party reported in its NIR (p.480) that it carried out an assessment of N_2O emissions. During the review, the Party clarified that the results were entered into the CRF table 4(III). Calculations were performed at Tier 1, which is given in IPCC GL equations 11.1, 11.8 and 11.10 to estimate changes in N_2O emission stocks from mineral soils due to soil carbon mineralization. The assessment was made according to the calculations of soil carbon - by region. However, the ERT noted that in the table 4(III) the Party reported AD for lands converted to cropland, while N_2O emission was reported as "IE" without any explanation in the Documentation box.	(c) Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved (f) The Party will make further efforts to resolve this issue in the next inventory submission (g) Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved
L.2 rom the	General (LULUCF) – CO_2, CH_4 and N_2O (L.2, 2021) (L.4, 2019) (L.5, 2017) (L.15, 2016) (L.15, 2015) Completeness	Improve the completeness of the reporting for the sector by providing estimates for all mandatory categories and pools (as listed in ID# L.1 (FCCC/ARR/2017/KAZ) and for the relevant land conversions, currently reported as "NO").	The Party reported in its NIR (p.480) that its land matrix was done using Approach 1 Simplified Matrix (according to Volume 4, Chapter 3, Section 3.3.1 of the 2006 IPCC Guidelines) due to unavailability of data. The resulting emissions and removals are included in the emissions and removals of lands remaining in the same land-use category for each of the categories listed in ID#L.1 IPCC GLs, 2006. (Section 6.2.1.). The Party is now using "IE" for the AD and "NA" for Net CO_2 emissions in these land conversions. During the review, the Party clarified that because when estimating carbon stocks in Kazakhstan, the stock difference method is used, which does not allow separating carbon gains and losses, the compilers of the report replaced the NK "NO" with the NK "IE" and issued a comment. Republic of Kazakhstan, most of the land converted between categories is included in the area of land remaining	Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			in the same category. Therefore, in the explanation for the application, "IE" indicated in the CRF table in the form of comments that areas included in the category area remain in the same land use category.	
L.3	4. General (LULUCF) – CO_2 (L.3, 2021) (L.2, 2019) (L.2, 2017) (L.4, 2016) (L.4, 2015) (76, 2013) Completeness	Report areas of conversion from forest land to other land-use categories in land-use change matrices and provide estimations of GHG net emissions from deforestation in appropriate subcategories.	The Party did not report areas converted from forest land to other land-use categories in CRF table 4.1 and continues to use the notation key 'NO'. Estimates of emissions from forest land converted to other land-use categories were provided in CRF tables 4.B–4.F using the notation key 'NA'. In its NIR, the Party reported that there is no sufficient data to report land conversions and estimate emissions. During the review, the Party clarified that it is continually improving its data collection methods and will soon have sufficient data to have a full land-use change matrix. The ERT considers that the recommendation has not yet been addressed because the Party has not reported areas of conversion from forest land to other land-use in CRF Table 4.1.	he Party will make efforts to resolve this issue in the next inventory submission
L.4	4. General (LULUCF) – CO_2, CH_4 and N_2O (L.4, 2021) (L.5, 2019) (L.6, 2017) (L.17, 2016) (L.17, 2015) Transparency	Improve the methodological information for the estimated categories by including: (c) A description of the methodology applied, which includes: assumptions (and for each assumption, its logical basis and evidence of its reliability with regard to the condition to which it is applied) and the equations applied (noting that when an IPCC method is used, information on assumptions is not needed and equations may simply be quoted); (d) A description of the AD and their quality, including information on data	(c) The ERT noted that the Party improved the description of the methods applied for its estimates in the NIR, such as including a description of the methodology for reporting CSCs for all pools in forest land (section 6.2.3, pp.336–341) and provided references to the equation and assumptions used in the estimates. For the biomass carbon stock calculation for perennial crops on cropland, Kazakhstan used a new method according to IPCC Guidelines (Volume 4 Chapter 2 Section 2.3.1.1 equation 2.7) (NIR 6.3.2 page 356). (d) The Party reported in its NIR (p 322, 341, 355, 364 and 367) the sources of AD when assessing the carbon stock and other types of greenhouse gases in relation to the LULUCF. However, limited information was provided on methods for data collection, the temporal resolution of data and compilation methods. A description of the quality of the AD was not provided in the relevant sections for the uncertainty in the NIR chapter on LULUCF (Chapter 6 page 309-369). During the review the Party clarified that when assessing the stock of carbon and other types of greenhouse gases in relation to the LULUCF sector, mainly use data from subordinate organizations of the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan, the	(c) Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved (d) The Party will make further efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		collection (methodology and timing), data compilation (methodology) and uncertainties.	Ministry of Agriculture of the Republic of Kazakhstan, the Ministry of Digital Development of Information and the Aerospace Industry of the Republic of Kazakhstan, which regularly perform land registration in the country.	
L.5	4. General (LULUCF) – CO_2, CH_4 and N_2O (L.6, 2021) (L.6, 2019) (L.7, 2017) (L.18, 2016) (L.18, 2015) Transparency	Include in the NIR a description of any QA/QC checks undertaken, and the results of such checks.	The Party included specific sections on QA/QC procedures and verification for each land-use category in the NIR (p.342-343, p.357, p.365, pp.367-368) including a general overview of the QA/QC procedure undertaken. During the review, the Party explained that the QA procedures were carried out by an independent expert within the framework of the project of the Government of the Republic of Kazakhstan, UNDP and GEF, "Development of the Eighth National Communication of the Republic of Kazakhstan within the framework of the UNFCCC and preparation of two (fourth and fifth) Biennial Reports". However, the ERT noted that the information reported on specific LULUCF QA/QC procedures is still limited and not provided transparently in the NIR on the checks undertaken, the verification procedures and their results in the NIR.	The Party informs that, taking into account the previously issued comments regarding the conduct of external audits, an external review was conducted in the LULUCF sector. Which is described after each category in the QA/QC procedures and verification. The Party explained that for external review, as part of the elimination of the recommendations of the expert group in the Republic of Kazakhstan, the QA procedures were carried out by an independent expert within the framework of the project of the Government of the Republic of Kazakhstan, UNDP and GEF "Development of the Eighth National Communication of the Republic of Kazakhstan within the UNFCCC and preparation of two (fourth and fifth) Biennial Reports". In particular, the initial data, emission factors and methods used in the calculations were considered. As a result of the audit, recommendations were made regarding the calculations in the category that were used for recalculations.In this regard, the Party kindly requests that this issue be considered resolved. And the Party would also like to get an explanation regarding "it is still limited and not provided transparently in the NIR on the checks undertaken, the verification procedures and their results in the NIR."
L.6	4. General (LULUCF) – CO_2, CH_4 and N_2O (L.7, 2021) (L.7, 2019) (L.22, 2017) Accuracy	Fully resolve the inconsistencies identified in the reporting of land-use areas and report an accurate and consistent land representation used for the estimates in accordance with the 2006 IPCC Guidelines.	The Party has partially eliminated some land inconsistences reported in its NIR table 6.1.7 with areas reported in CRF tables 4.A-4.F. However, the ERT noted that there are still some inconsistencies for AD for forest land within the CRF tables and between CRF tables and the NIR. In CFR table 4.1 and 4.A, changes in the area of forest lands for 1990 to 2021 is 19,334.10 kha, while it is 18,834.30 kha in the CRF table 4(III) and in the NIR (p. 318 and table 6.1.6, p.320). Furthermore, in the NIR (p.317), the Party reported that the forest land is 19,085.9 kha. The ERT also noted that the net CO_2 emissions/removals given in the table 6.1.2 (NIR, p.312) and CRF tables 4.A and 4.C are inconsistent. During the review the Party clarified that the changes in the area of forest lands for 1990 to 2021 are corresponded to the	The party requests to change the status of this recommendation to “Resolved”, based on the totality of the responses submitted

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			areas of forest lands in Tables 6.1.6 as statistical data from the cadastre of forest lands of the Forestry and Wildlife Committee of the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan. The Party will specify the total area of forest lands and eliminate the inconsistencies in the total area of forest lands presented in the tables. The Party informed the ERT that the problem of interdepartmental inconsistency of data on the areas of the forest land is one of the reasons for not building a complete land matrix in the Republic of Kazakhstan for the purposes of GHG inventory.	
L.7	Land representation – CO_2 (L.8, 2021) (L.8, 2019) (L.8, 2017) (L.3, 2016) (L.3, 2015) (75, 2013) (116, 2012) Accuracy	Make efforts to convert existing statistics into the IPCC land-use categories, taking into consideration, among other issues, that: (a) Even if land use results in no emissions, it is good practice to report its area and use appropriate notation keys for net emissions and IEFs; (c) The definitions of land-use categories in the IPCC good practice guidance for LULUCF are rather flexible, and this should facilitate the use of available statistics, with the help of proxy data, expert judgment and justified assumptions, which should be documented in the NIR; (d) Lands that do not change land use should be reported separately from lands with land-use conversion; the Party may report aggregated estimates for all land conversions to a particular land use, when data are not available to	(a) The Party reported land use areas and used the appropriate notation keys for net emissions and IEFs. In its CRF Tables 4A-4E.The ERT, however, noted that the Party continuous to use the notation Key 'NO' for land conversions in Table 4F without giving any justification in the NIR. During the review the Party explained that it took into account the comments regarding the NK "NO" in the CRF tables. Due to the fact that Kazakhstan uses the reserve difference method when assessing the carbon stock, which does not allow separating carbon receipts and losses, the report compilers replaced the code "NO" with the symbol "IE", "NE" and issued a comment. (c) The Party reported in its NIR (p.309, section 6.1.2, table 6.1.1) its national land uses according to the Land Code of the Republic of Kazakhstan and their equivalent IPCC land categorises according to the IPCC guidelines. However, there was no information included on the assumptions or expert judgment and proxy data used how they facilitate the use of available statistics. During the review, the Party clarified that data from state statistical data on the availability of land and their distribution by ownership, category, land and users in the Republic of Kazakhstan were used to compile the land conversion matrix. (d) The Party reported in its NIR (p.480) that its land matrix was done using Approach 1 for land use representation (according to Volume 4, Chapter 3, Section 3.3.1 of the Guidelines). The Party clarified that it is continually improving its data collection methods and will soon be able to use a higher approach (the Party could not provide timelines). Kazakhstan has recorded land	(a) Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved (c) Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved (c) Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		report them separately. This should be clearly stated in the documentation boxes and documented in the NIR; (e) The category other land remaining other land is intended to allow the total reported land area to match the total area of the country.	conversion in the CRF Table 4A-4E with the NK 'IE' while the emission are reported using the NK 'NA'. (e) The Party reported in its NIR (p.311) the definition of other lands as including lands with soil devoid of vegetation, rocks, ice and all other lands not included in any of these other land use categories. Kazakhstan reported areas of other land remaining other land in CRF table 4.F and in the NIR (section 6.1, table 6.1.7, p.315). In the NIR (section 6.7, p.369) the Party explained that these areas are considered unmanaged and included to balance the total national area. However, the ERT noted that, the total reported area of the country is still not constant over time (2011 and 2014). Kazakhstan did not consider land conversion to and from other land to reflect how the balancing of the total area was carried out. However, the ERT noted that, according to CRF table 4.F and the NIR (section 6.1, table 6.1.5, p.317) the area varies over time. During the review the Party the explained that due to unavailability of data it uses the Approach 1 method for land representation according to the IPCC Guidelines (Volume 4 Chapter 3 Section 3.3.1) and cannot track land conversion. The Party further explained that it is continually improving its data collection methods and will soon be able to use a higher approach (the Party could not provide timelines).	(c) Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved
L.8	Land representation – CO_2 (L.9, 2021) (L.9, 2019) (L.9, 2017) (L.16, 2016) (L.16, 2015) Transparency	Include information on: (a) Ancillary data used for land classification, comprising timing and methodology of data collection and any further elaboration before their use for land classification; (b) The methodology applied for classifying land under land categories; (c) Explanations on how consistency is maintained when different sources of data and/or different methodologies are used for	a) The ERT noted that Kazakhstan reported in the NIR (section 6.1 (pp.322) general information on the AD providers involved in the preparation of the land representation, namely the Committee of Land Administration of the Ministry of Agriculture, the forest management enterprise of the Ministry of Ecology, Geology and Natural Resources, and the National Joint Stock Company State Corporation Government for Citizens of the Ministry of Digital Development, Innovations and Aerospace Industry. The Party, however, has still not provided information on the ancillary data used (e.g. type of data obtained from each organisation, methods used by the organisations to collect the data, the time periods the data was collected etc) during the preparation of land representation in the NIR or during the review. b) The Party reported in its NIR (p.309, table 6.1.1 Correspondence between the definitions of the IPCC land	a) The Party will make efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		preparing the land representation.	categories and land types of the Republic of Kazakhstan) information on the way national land-use classes were aggregated into the six IPCC land-use categories according to the IPCC guidelines (Volume 4, Chapter 2 Section 3.2). c) The Party in the NIR (p.323) reported that it was impossible to fully resolve the issue of consistency of data and representation received from various departments. During the review, Party explained that the inconsistency in land areas in the country is the reason for the construction of a simplified land matrix. The Party further explained that it is continuously improving its data collection methods and will soon be able to use approach 2 for the land representation methods.	b)Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved c)Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved
L.9	Land representation – CO_2 (L.10, 2021) (L.10, 2019) (L.10, 2017) (L.19, 2016) (L.19, 2015) Accuracy	Revise the methodology according to good practice provided in the 2006 IPCC Guidelines (vol. 4, chap. 3) in order to build a consistent land representation, and develop and implement QA/QC procedures in order to check the consistency of conversions between land uses, to ensure that the total land area is constant over time and to ensure that the GHG inventory estimates are not affected by technical mistakes.	The Party reported the area of land-use categories and a national total area for the entire time series in NIR table 6.1.7 (section 6.1, p.321) and CRF table 4.1 and explained how it had improved its methodology in the NIR (section 6.1, p.320). The Party reported in its NIR that it used Approach 1 for land representation according to IPCC guidelines (Volume 4, Chapter 3, Section 3.3). However, the ERT noted that reported national total area is not constant over time in 2011 and 2014 compared with the other years The ERT also noted that Party did not report the QA/QC procedure to check the consistency of information on land representations. No further information was obtained in the NIR or during the review.	As noted by the party earlier, according to the Consolidated Analytical Report on the state and use of the lands of the Republic of Kazakhstan for 2021 (Ministry of Agriculture of the Republic of Kazakhstan) on November 1, 2021, the total territory of the Republic of Kazakhstan amounted to 272,491.0 thousand hectares. Therefore, for the coordinated representation of land use areas in accordance with the requirements of the IPCC RP, 2006 Volume 4, Chapter 3, the executors used Level 1 approach 1.Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved
L.10	4.A Forest land – CO_2 (L.12, 2021) (L.11, 2019) (L.11, 2017) (L.20, 2016) (L.20, 2015) Transparency	Verify reported values of deadwood and biomass carbon stock of the forest subcategories hardwood and other trees and revise them, as needed, as well as include the relevant explanations on the national circumstances in the NIR.	The Party reported CSCs separately for living biomass, dead wood, litter and soil for forest lands in CRF table 4.A and the NIR (table 6.2.4, p.335), and provided information for wood stock (in NIR, table 6.2.2, p.328) and the regional conversion coefficients (in NIR, table 6.2.6, pp.338-339) with the source of the data (p.337) that point out archival materials of periodic forest accounting (in NIR, section 6.2.3, pp.336-341). The Party stated that conversion coefficients for calculating the carbon stock in biomass and deadwood reservoirs by species groups and age groups of	Today, the party informs that the article on standards and coefficients is in print. In this regard, it is not possible to provide a link to the article for data verification.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			trees and shrubs of the State Forest Fund in the regions of the Republic of Kazakhstan were used with reference to Methodological Guidelines (For calculations of anthropogenic emissions from sources and removals by sinks of greenhouse gases in forestry and agriculture for the annual national report of the Republic of Kazakhstan: Methodological approaches taking into account local conditions and information) [in print]. However, The ERT noted that the referenced material was not yet available. During the review that Party reported that the article was in queue for printing and would make it available as soon as it gets published.	
L.11	4.A.1 Forest land remaining forest land – CO_2 (L.13, 2021) (L.12, 2019) (L.12, 2017) (L.7, 2016) (L.7, 2015) (80, 2013) (124, 2012) (101 and 105, 2011) Comparability	Report CSC separately for all the pools; report both biomass gains and biomass losses separately.	The Party reported CSC changes in living biomass, dead organic matter and soils separately in forest land remaining forest land. During the review, the Party clarified that due to the stock difference method used, it is not possible to separate carbon stock changes in the living biomass pool for forest land remaining forest land and land converted to forest land. Therefore, the calculated value is listed in the forest land remaining forest land (section 6.2.1) and the Party reported in its CRF table 4.A CSC in living biomass losses using the notation key "IE", as required when using the stock difference method. The ERT considers that the recommendation has been fully addressed.	The Party thanks ERT for its assistance in implementing this recommendation
L.12	4.A.1 Forest land remaining forest land – CO_2 (L.25, 2021) Accuracy	Include in the NIR detailed information about the forest survey (i.e. the size of plot used for the inventory and the parameters covered that are relevant to the annual submission) and the updated calculation methodology for mineral soils on forest land.	The Party reported in its NIR (section 6.2.1, table 6.2.1, p.327) that, at the national level, the area covered by forests varied between 9,391.4 kha and 13,293.6 kha, with an increase in standing timber stock from 354.03 to 445.86 million m^3 from 1988 to 2021. However, the ERT noted that the values reported for standing timber stock and total forest land is covered by forests still remain inconsistent within the NIR. The wood stock for 2021 was reported 456.85 million m^3 in NIR (p.325) and 13,317 kha of the total forest land is covered by forests (p.318 and table 6.1.6, p.320). Furthermore, the Party reported in its NIR (section 6.2.1, table 6.2.4, p.335) annual changes in the carbon stock for forests of the Republic of Kazakhstan. However, there is inconsistency for net CO_2 emissions/removals between table 6.2.4 (NIR, section, table 6.2.1, p.335) and CRF table 4.A for the time series.	The Party will make efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			During the review, the Party clarified that the area covered by forests varies from 9309.9 hectares to 13317.0 kha, the stock of wood on the root increased from 354.0 to 445.86 thousand tons m^3 (1988-2021). This information was obtained from the archive of the Forestry and Wildlife Committee of the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan and the State Archive of Land Resources of the Ministry of Agriculture of the Republic of Kazakhstan. The Party will take additional measures to provide the agreed information to the NIR. The Party reported the updated calculation methodology for mineral soils on forest lands in its NIR (section 6.2.3, p.337) using the IPCC Guidelines. In the calculation, all forest areas by region were used, including unvegetated areas (clearings, hectares, and sparse). During the review, the Party clarified that for forestland soils, carbon stock was calculated using the default methodology (Equation 2.25, Chapter 2, Volume 4 of the Guidelines), and national benchmarks for soil organic carbon stock from the section publication and stock change factors (in press) were used. The ERT considers that the recommendation has not yet been fully addressed because there is still a significant inter-annual variation in the IEFs in mineral soils in forest land remaining forest land and there is no information about the national data used and its quality in the NIR.	
L.13	4.B.1 Cropland remaining cropland – CO_2 (L.15, 2021) (L.14, 2019) (L.15, 2017) (L.9, 2016) (L.9, 2015) (83, 2013) (128, 2012) Convention reporting adherence	Apply the necessary procedures for the verification of emissions from soils, including any procedures in accordance with the QA/QC plan, and include these emissions in the CRF tables.	The Party reported in CRF table 4.B the CSCs in mineral soils in cropland remaining cropland and explained the methodology used in the NIR (section 6.3.2, pp.355–361). Kazakhstan reported in the NIR (section 6.3.1, pp.343–355) that additional analyses of humus content in soils obtained during agrochemical surveys of agricultural land were performed and the results of long-term soil observations on a network of monitoring stationary and semi-stationary ecological sites for 1993.... 2021 were used to control the calculations. During the review, the Party clarified that Kazakhstan had an external review to verify the initial data, emission factors and methods used in the calculations. However, the NIR did not still contain specific information on the procedure of the verification of carbon contents and the respective emissions from mineral soils. In the NIR (section 6.3.5, p.357), the Party noted that in the future it is planned to improve the quality of calculations by clarifying	The Party thanks ERT for its assistance in implementing this recommendation

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			the carbon coefficient for deposits for soil reservoirs of cultivated lands for individual areas. The ERT considers that the recommendation has not yet been fully addressed.	
L.14	4.B.1 Cropland remaining cropland – CO_2 (L.16, 2021) (L.15, 2019) (L.17, 2017) (L.23, 2016) (L.23, 2015) Accuracy	Estimate carbon stock losses from biomass in cropland and report all information on the method and background data used for calculating the rates used for estimating the CSC.	The Party reported carbon stock gains and losses for biomass and mineral soils of cropland remaining cropland in its CRF table 4.B and provided information in its NIR (section 6.3.2, pp.355-356) and about CSCs in croplands it in its NIR (table 6.3.5, pp. 354-355). The Party included the calculation of the net CSC in dead organic matter to the living biomass and used "IE" for the CSC in dead organic matter, as suggested in the previous ARR. Moreover, the Party provided information on its approach and the methodology to calculate carbon stock change in biomass of restored natural vegetation and perennial plantings in its NIR (section 6.3.2, p.356). During the review, the Party also stated that the area of 30-year-old plantations in the next reporting year becomes the area of 1-year perennial crops, taking into account the difference in the total area of perennial crops between years to take into account the cycle of renewal of perennial plantations (section 6.3.2). The ERT considers that the recommendation has been fully addressed.	The Party thanks ERT for its assistance in implementing this recommendation
L.15	4.C.1 Grassland remaining grassland – CO_2 (L.17, 2021) (L.16, 2019) (L.18, 2017) (L.10, 2016) (L.10, 2015) (84, 2013) (125, 2012) Transparency	Check the reliability of the AD for the degree of grassland degradation for the entire time series.	The Party reported information regarding the distribution of pasture areas by different degrees of degradation in its NIR (section 6.4.2, pp.361-364) and indicated the data source (section 6.4.2, p.364). In the NIR, the calculation methodology is described, and information was provided regarding the distribution of grassland areas by different degrees of degradation and the source of data is indicated. The coefficients F1 and F2 are presented (section 6.4.2, table 6.4.6, p.363) to express the management mode, which primarily reflects the load of livestock on Grassland vegetation cover and soil, as well as the distribution of livestock across the territory. During the review, no further information was obtained from the Party. The ERT considers that the recommendation has not yet been fully addressed because of lack of detailed information on the verification of the AD which is especially needed to explain the inconsistency among the AD values (see ID#L.16).	The party requests to change the status of this recommendation to "Resolved", based on the totality of the responses submitted.The Party informs that, taking into account the previously issued comments regarding the conduct of external audits, an external review was conducted in the LULUCF sector. Which is described after each category in the QA/QC procedures and verification .
L.16	4.C.1 Grassland remaining grassland – CO_2	Implement the procedures included in the QA/QC plan and correct the error	The Party reported that in its CRF table 4.1, table 4.C and 4.(III), grasslands are 189,111.6 kha, while the pasture area is 183,994 kha in the NIR (table 6.4.2, p.358-359, table	The Party will make efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(L.18, 2021) (L.17, 2019) (L.19, 2017) (L.11, 2016) (L.11, 2015) (85, 2013) (126, 2012) (111, 2011) Convention reporting adherence	leading to inconsistent reporting of areas of grassland.	6.4.1, p.359, and table 6.4.6, p.363). However, the ERT noted that there is inconsistency for the AD between the CRF table 4.C and table 4(III) in grassland remaining grassland. Moreover, table 6.4.2 (CO_2 emissions/removals for pastures) shows the total area of grassland and total CO_2 emissions/removals, while the net CO_2 emissions/removals of all grasslands were showed as -27,590.9 kt in the table 6.1.2 (NIR, p.312) and 28754.35 kt in CRF table 4.C. During the review, the Party clarified that the total area of pastures and hayfields for 2021 amounted to 189,111.6, including pastures (183,994) and hayfields (5,117.4). The ERT considers that the recommendation has not yet been fully addressed because of lack of information on the implementation of QA/QC procedures for resolving the inconsistencies of AD was included in the NIR, apart from a reference to the general overview of the QA/QC procedures (section 6.4.4, p.365).	
L.17	4.C.1 Grassland remaining grassland – CO_2 (L.19, 2021) (L.18, 2019) (L.20, 2017) (L.24, 2016) (L.24, 2015) Transparency	Consistently report grassland area in the submission and report information on the methodology applied for calculating the values contained in NIR table 6.11, as well as on information on the data used to validate them.	The Party reported in its NIR (section 6.4.2, pp.361-364) information on the methodology applied of the country-specific CSC EFs for the category of grassland for biomass and soil. The calculation methodology is described, and the coefficients F1 and F2 are presented, expressing the management regime, which primarily reflects the load of livestock on pastures of vegetation cover and soil, as well as the distribution of livestock over the territory. For the validation of coefficients and standards, the Party provided a methodological article (in print) as a reference in the NIR (p.362). In the NIR (section 6.4.5, p.365), the Party noted that in the future it is planned to improve the quality of calculations by aggregating them at the regional level with the specification of carbon standards for soil and biomass reservoirs, as well as the coefficients of the pasture management regime for individual areas. The ERT considers that the recommendation has been fully addressed.	The Party thanks ERT for its assistance in implementing this recommendation
L.18	4.C.2 Land converted to grassland – CO_2 (L.20, 2021) (L.19, 2019) (L.21, 2017) (L.12, 2016) (L.12, 2015)	Include AD in the CRF tables and estimate CSC in all pools.	The Party reported in its CRF table 4.C all land conversions to grassland using the notation key “NO,IE” for the AD and “NA” for the CSC estimates for all pools. Kazakhstan reported that calculations for cropland temporarily out of crop rotation to grassland as a separate sub-category are shown annually in the national report under the Cropland category (NIR, section 6.3.1, table 6.3.4). In the NIR (p.345), the Party stated that by 2021, the area of arable land	The Party will make efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(86, 2013) (130, 2012) Completeness		in the crop rotation continued to recover and amounted to 26,011. 0 thousand hectares, which is 324.3 thousand hectares more than the area for 2020. The areas of perennial plantings, which are mainly represented by horticultural crops, grape plantations, decreased from 164.8 thousand hectares (1990) to 116.3 (2010), followed by an increase to 146.9 thousand hectares in 2021 (Table 6.3.4, p.352). During the review, no further information was obtained from the Party. The ERT considers that the recommendation has not yet been fully addressed even the improvement on the AD, because the redistribution of CSC by pool for land conversions (the area of cultivated land temporarily withdrawn to fallow land (pastures) with subsequent return to crop rotation, and the areas of pastures transferred to forest lands) is not presented in the CRF.	
L.19	4.E.2 Land converted to settlements – CO_2 (L.21, 2021) (L.21, 2019) Accuracy	Report CSCs and corresponding CO_2 emissions/removals for land converted to settlements in line with the 2006 IPCC Guidelines (vol. 4, chap. 8, section 8.3, pp.8.17–8.25).	According to the previous ARR (2021), the Party was planning to request additional information on tree cover per unit area and land-use change to settlements from the Bureau of National Statistics and provide updated information on CSCs on land converted to settlements. Due to insufficient data in this category, the decision was made by the compilers not to conduct an assessment of carbon stock changes at tier 1 (NIR, table 6.6.1) and the Party reported that the Settlement category is not a key category (NIR, section 6.6.1, p.367, and 489). According to IPCC (2006 IPCC Guidelines vol. 1, chap. 4), in Approach 1, key categories are identified using a pre-determined cumulative emissions threshold. However, ERT noted that there is no evidence in the NIR (Appendix 1 and section 6.6) that the Settlement is not a key category. During the review, the Party clarified that there was a recalculation, however as a result of which it was revealed that the value of carbon was insignificant, and also during external verification by an international expert, it was recommended to carry out an assessment at level 1 according to the 2006 IPCC Guidelines. In this regard, the Settlements category was assessed as a non-key category.	Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved
L.20	4(I) Direct N_2O emissions from N inputs to managed soils – N_2O	Provide transparent and documented information in the NIR justifying that there is no N fertilization activity on forest land,	The Party reported the notation key “NO,NA” for forest land (NA for organic N fertilizers in forest land remaining forest land) and “NO” for wetlands, settlements and other lands in CRF table 4(I) for direct N_2O emissions from N inputs to managed soils. During the review, the Party	he Party will make efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(L.22, 2021) (L.22, 2019) Transparency	wetlands and settlements, as reported in CRF table 4(I). If this is not possible, report N_2O emissions in the next annual submission in accordance with the recommendations of the 2006 IPCC Guidelines (vol. 4, chap. 11, section 11.2.1, pp.11.6–11.14).	clarified that Kazakhstan has made an official request to the Bureau of National Statistics regarding the application of nitrogen fertilizers to lands that are accounted for as forest areas, wetlands and settlements, but there is no data regarding the application of fertilizers (there is an official response letter) (NIR, Appendix 4, p.489). However, there is no information in the NIR or about the reason why the Party used NA for the N fertilization activity in the forest land, if there is no data regarding that.	
L.21	4(III) Direct N_2O emissions from N mineralization/ immobilization – N_2O (L.23, 2021) (L.23, 2019) Completeness	Calculate direct N_2O emissions from N mineralization associated with loss/gain of soil organic matter resulting from a change of land use or management of mineral soils for each land-use category present in the country using the methodology provided in the 2006 IPCC Guidelines (vol. 4, chap. 11, section 11.2.1, pp.11.6–11.16) and report them in CRF table 4(III) and the NIR, including a description of the methodology applied, in the next annual submission.	The Party for the first time this year, with the help of an international expert, made an estimate of direct N_2O emissions associated with the loss of soil carbon (NIR, section 6.2.3). The calculation was made using the Tier 1 method using default coefficients according to the 2006 IPCC Guidelines (vol. 4, chap. 11, section 11.2.1, pp.11.6–11.16). The Party reported in its NIR (section 6.2.3, p.340) that a regional assessment was made for soil carbon and found the emissions associated with direct N_2O emissions are insignificant for forest land soil carbon. However, the ERT noted that there are entries in CRF table 4(III) for emissions in forest lands between 1990 and 2008, but after 2008 the Party used the notation key “NA”. The areas of the land use categories (forest land, cropland, grasslands) are given as AD across the entire time series and used the notation key “IE” in the CRF table 4(III) for the N_2O emissions for croplands without any information on the allocation of cropland, “NO,NA” for grassland, and “NO” for the others in CRF table 4(III) after 2008. “NA” is not relevant as notation key when emissions are already reported for other years. During the review, the Party clarified that when filling in the CRF tables, the compilers of the report took into account the comments regarding the Notation Key "NO" in the CRF tables. When assessing the carbon stock, Kazakhstan uses the method of reserve difference, which does not allow to separate carbon receipts and losses, therefore, the compilers of the report replaced the Notation Key "NO" with the Notation Key "IE" and issued a comment. During the review, Party explained that in the Republic of Kazakhstan, most of the lands that have been converted between categories are included in the areas of land remaining in the same category. Therefore, in the explanation for the use of "IE" it is indicated in the form of	The Party will make efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			comments in the CRF table that the areas are included in the area of the category remaining in the same category of land use. Regarding cropland, comments were also given in the CRF that the calculation of N_2O was carried out in the Agriculture sector. The ERT considers that the recommendation has not yet been fully addressed, because of the usage of the notation key "NA" for the direct N_2O emissions from N mineralization/immobilization in forest land, and the lack of the information on the allocation of cropland on the CRF table 4(III).	
L.22	4(V) Biomass burning – CO_2, CH_4 and N_2O (L.24, 2021) (L.24, 2019) Transparency	Report GHG emissions from wildfires for forest land and grassland using actual AD for 2017 and onward and provide transparent information in the NIR on improvements performed, including on the collection of relevant data.	The Party reported annual GHG emissions from forest fires on forested lands and grasslands for the entire time series in its NIR (table 6.2.5, p.336 and 6.4.3, p.361, respectively) and entered the data to the CRF table 4(V). The Party provided information on the methodology and the relevant data for calculating wildfires from forests and steppes in its NIR (section 6.2.1, section 6.2.3, section 6.4.2) and indicated the source of data. The Party stated in its NIR (Appendix 4, p.490) that the source of the official area of annual forest fires is the data obtained from the CMW of the RSE "Kazakh base of the aviation base of forests and forestry services". Instructions and methods for monitoring forest and steppe fires will be requested by the Party and included in the next National Report. The collection of information for DNA was carried out according to Rules No. 46 https://adilet.zan.kz/rus/docs/V2200026905 During the review, the Party informed that the methodology for calculating forest (steppe) fires was included in the national report to eliminate the remark, and a link to the article was also provided for a complete overview of the methodology. In the CRF tables for the specified code "IE", comments are made that emissions from CO_2, CH_4 and N_2O are included in section 4 A.1. 4(V). The ERT considers that the recommendation has been fully addressed.	The Party thanks ERT for its assistance in implementing this recommendation
L.23	4(V) Biomass burning – CO_2, CH_4 and N_2O (L.26, 2021) Transparency	Complement the information in the NIR on areas of forest fires with information on the amount of biomass burned for different land types, the methodology and CO_2, CH_4 and N_2O EFs applied,	The Party reported in CRF table 4(V) CH_4 and N_2O emissions from wildfires on forest land. The relevant CO_2 emissions are reported for forest land remaining forest land and grassland remaining grassland in CRF table 4(V). For the CO_2, CH_4 and N_2O emissions from wildfires, the Party used the notation key "IE" for the AD in land converted to forest land with the information on their allocation provided in the documentation box of the table or in the NIR (in line	Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		and the allocation of CO_2 emissions from biomass burning.	with footnote 5 to CRF table 4(V)). The notation key "NA" for the IEFs was used for the CO_2, CH_4 and N_2O emissions from wildfires in land converted to grassland. However, in the same land use category, there is no information on its allocation of the AD for wildfires. The CO_2 emissions from wildfires in croplands were not estimated and CH_4 and N_2O were reported using the notation key "IE" for the AD (NIR, table 4(V)) with the information on their allocation. Furthermore, there is no explanation in CRF table 9. The ERT considers that the recommendation has not yet been fully addressed. During the review, the Party clarified that the source of the official area of annual forest fires is the data is subordinate organization of the Committee for Forestry and Wildlife of the Ministry of Agriculture of the Republic of Kazakhstan "Kazakh base of the aviation base of forests and forestry services." Regarding the instructions and methodology for monitoring forest and steppe fires will be requested and included in the next National Inventory Report. The obtaining the initial data for the NIR was carried out in accordance with Rule No. 46 https://adilet.zan.kz/rus/docs/V2200026905. The Party provided information on the methodology in its NIR (see the formula, p.340, and section 6.2.1 and section 6.2.3) and the burned area in ha as AD (table 6.2.5. p.336) for calculating forest (steppe) fires. The source of data is indicated (a link to the article for a full review of the methodology) and the approach is consistent with the IPCC GLs. During the review, the Party clarified that in the CRF Tables on the Notation Key "IE", comments are posted that emissions from CO_2, CH_4 and N_2O are included in Section 4 A.1. 4(V). However, there is no information on EFs used in its NIR (table 6.2.7) for the CH_4 and N_2O emissions from the wildfires in forests. The ERT considers that the recommendation has not yet been fully addressed.	
Waste				
W.1	5. General (waste) – CO_2, CH_4 and N_2O (W.1, 2021)	Provide estimates for the CH_4 and N_2O emissions from composting, and CO_2, CH_4 and N_2O emissions from waste incineration	The Party provided emissions for waste incineration of clinical waste. However, the ERT considers that the recommendation has not yet been fully addressed because of the following reasons: 1) Contradictory to the reporting of insignificance of CO2, CH4 and N2O emissions from open	The Party agrees with the conclusion of the ERT

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(W.1, 2019) (W.1, 2017) (W.5, 2016) Completeness	and biogenic open burning, or report the appropriate notation keys in line with decision 24/CP.19, annex I, paragraph 37.	burning of both biogenic and no-biogenic MSW in the NIR in light of para.37(b) of the UNFCCC reporting guidelines (p.378), emissions from those categories are reported as "NO" in CRF table 5.C; 2) In CRF table 5.B, the Party reported CH4 and N2O emissions from biological treatment of solid waste – both composting and anaerobic digestion at biogas facilities subcategories as "NO", but in the NIR, the Party did not provide additional explanation on this reporting. During the review, the Party explained that the recommendation will be taken into account in the next NIR.	
W.2	5. General (waste) – CO_2, CH_4 and N_2O (W.2, 2021) (W.2, 2019) (W.2, 2017) (W.6, 2016) Convention reporting adherence	Implement a QA/QC check to ensure that data provided in the NIR are consistent with the latest data in the submitted CRF tables.	The ERT noted that the Party is making effort to improve the consistency with the information provided in the NIR and the CRF tables. For example, the Party reported DOC_f of 0.5 in both NIR and the CRF table 5. The population data reported in the CRF table 5.D and the NIR table 7.17 are consistent. However, in addition to the error pointed out by the previous ARR, the ERT noted some new examples of inconsistencies in the 2023 submission. For example, in CRF table 5.D, the protein consumption for 2003 was reported as 15,074.77 kg/capita/year, while in table 7.17 in the NIR, protein consumption for 2003 is reported as 32.85 kg/capita/year. Further, during the review, the ERT noted many inconsistencies between the NIR, CRF tables and the new information provided by the Party in responding the request form the ERT (see W.35). During the review the Party informed that, as part of the preparation of the 9th national communication, it is planned to involve external peer review in all sectors, as well as the introduction of cross-checking to eliminate typos. The ERT considers that, by further enhancing the QA/QC in particular for the purpose of reporting annual GHG inventories under the Convention, the consistency of NIR and the CRF tables can be improved in the next submission.	The Party agrees with the conclusion of the ERT
W.3	5. General (waste) – CO_2, CH_4 and N_2O (W.3, 2021) (W.3, 2019) (W.3, 2017)	Provide consistent information on the methods applied in the CRF tables and the NIR, as well as detailed information on the tiers used for the estimated categories in the sector and	Kazakhstan did not clearly explain how the methods used are consistent with the IPCC decision trees, in particular, on CH4 emissions form the SWD, despite that the Party states that it applied tier 2 method and recalculations were performed for this key category since previous submission. (see paras. 17 and 50 of the UNFCCC reporting GLs).	The Party agrees with the recommendation and will take it into account in the next submission.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(W.7, 2016) (W.5, 2015) Transparency	how they are consistent with the IPCC decision trees used for method selection.	In section 7.2.1 (p.373) of the NIR, the Party explains that tier 1 method as provided in the 2006 PCC Guidelines was used to estimate CH4 emissions from solid waste disposal, while it states that a tier 2 method (as provided by the 2006 IPCC Guidelines) was used in p.377 of the NIR section 7.2.2. However, in CRF table summary 3s2, the Party reported as “M” (model) for both method and EF. Similarly, the ERT noted that, considering the approach the Party used to obtain historical waste generation rates per annum, the AD used for the emissions estimates seems not sufficient to indicate tier 2 which requires historical waste disposal at SWDS based on country-specific statistics, surveys or other similar sources. (See W.35 below) The ERT considers that the recommendation has not yet been fully addressed as the inconsistency between the CRF and NIR remain in the 2023 submission.	
W.4	5. General (waste) – CO_2, CH_4 and N_2O (W.4, 2021) (W.4, 2019) (W.15, 2017) Transparency	Ensure that in the NIR the contribution of emissions for the categories within the waste sector for the latest reported year is correct and make it consistent with the information reported in the CRF tables.	The Party reports in the NIR 2023 (p.371) the contributions of emissions from categories under the waste sector for 1990 in figure 7.1 and for 2021 in figure 7.2 and they are consistent with the information in the CRF tables. However, the ERT considers that the recommendation has not yet been fully resolved because of the following examples. The ERT noted that, in the NIR, the Party explains that, in 1990, the main contribution of emissions in the sector accounted for the category of wastewater - 63%, which is not correct and not consistent with figure 7.1. Further, the Party reported in table 7.1 in its NIR (pp.371–372) emissions by sub-categories and the total emissions in the waste sector in CO2 eq. For most of the cases, reported emissions in table 7.1 are not consistent with the values reported in the CRF summary table 2 and table 10s. Observed discrepancies are not systematic, however, spread across the sector. The ERT noted that, in uploading estimated emissions to the CRF reporter, the Party used rounded numbers in most of the sectoral tables, however, the ways of rounding and levels of decimal numbers are not consistent. This could be one of the causes of observed discrepancies between emissions reported in the NIR and those in the CRF tables. For example, reported emissions from 5.A solid waste disposal in CO2-eq., two decimal	The Party agrees with the recommendation and will take it into account in the next submission.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			numbers of reported emissions in the CRF tables are all either .00, .25, .50 or .75 for the while time series, which is unlikely occur. During the review, the Party explained that they are typos when filling out the CRF and somewhere during rounding, the data may not match. The Party also explained that, as part of the preparation of the 9th national communication, it plans to involve external peer review in all sectors, as well as the introduction of cross-checking. (see W. 2 above)	
W.5	5.A Solid waste disposal on land – CH_4 (W.5, 2021) (W.5, 2019) (W.4, 2017) (W.1, 2016) (W.1, 2015) (90, 2013) Completeness	Provide a justification, based on statistical data, that confirms how industrial waste is treated and disposed, and estimate and report the emissions from industrial waste, if applicable.	In section 7.1 (p.370). Overview of the waste sector in the NIR2023, the Party explains that 4.0 million tons of municipal waste were collected in the Republic of Kazakhstan in 2021, and the share of industrial waste (20.2%) is the second largest waste type, following to household waste (65.6%). However, the NIR contains no information if and how the industrial waste is considered in the estimates. During the review, the Party explained that the information about 20% was contained in the official bulletin of National Statistics. However, in the current NIR, emissions from industrial waste were not taken into account. The Party also confirmed that in the separate landfills for industrial waste, some types of waste are buried. However, the emissions from those landfills are not estimated. The Party indicated that the information on industrial waste management is currently being investigated and will be presented in the next NIR. See also W.19 and W24. The ERT considers that the recommendation has not yet been fully resolved.	The Party agrees with the recommendation and will take it into account in the next submission.
W.6	5.A Solid waste disposal on land – CH_4 (W.6, 2021) (W.8, 2019) (W.16, 2017) Transparency	Obtain good-quality country-specific AD in order to estimate CH_4 emissions for this category using the tier 2 IPCC FOD method.	The original recommendation was linked to the methodology used in the previous submissions when tier 2 was used. During the review, the ERT learned that the approach and methodologies used to estimate CH4 emissions from the SWD have been changed since previous submission. For example, in the 2023 submission, the Party estimated emissions, using the total volume of MSW generated in the national level as provided by the National Statistical Office and revised categorisation of landfills since the previous submissions. Further, the Party removed the subcategory of	Recommendations in paragraph W.35 will be taken into account at the next submission, however, the party considers this paragraph irrelevant

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			semi-aerobic landfills under managed landfills despite that the emissions from the landfill of Almaty, the largest city of the country, was reported under this subcategory in the previous submissions. During the review, the Party explained that there is no such landfills in Almaty (See W.35) The ERT considers that the recommendation has not yet been fully resolved, however, similar recommendation that are relevant to the methods and approach used for the 20023 submissions is made in W.35 in table 5 of this report.	
W.7	5.A Solid waste disposal on land – CH_4 (W.7, 2021) (W.9 and W.18, 2019) (W.17, 2017) Transparency	Provide in the NIR clear and comprehensive descriptions of the AD used for the calculation of annual waste generation for CH_4 emission estimates for category 5.A solid waste disposal, including values for the complete time series on the AD used for the emission estimates, such as per capita waste generation, total population and urban population, as well as collected waste volume and waste density for the years when these AD are used, as appropriate.	In NIR 2023, together with the updated table of the total, urban and rural population and the amount of municipal waste, for each year for the period between 1990 and 2021 (as provided in table 7.3 in page 374 in the NIR), the Party included the information on the average volume of waste per capita par year in the urban and in the rural areas are provided (p.373). The Party also reported in its NIR (p.375) and Table 7.4 (pp.375-376) CH4 and CO2 emissions from two categories namely: managed (anaerobic) landfills and uncontrolled (deep) landfills of solid waste. The Party explained that landfills in Astana (the capital of the Republic of Kazakhstan) are considered managed and anaerobic while for the rest of the cities of Kazakhstan, the landfills can be considered unmanageable and “shallow”, which is not consistent with the information in table 7.4. (p376) During the review, the Party clarified that the information on landfills was obtained from official permits for emissions into the environment issued by the authorized body. However, the Party did not provide the information on its classification of the SWDS and how the emissions from landfills in Almaty is not resulting in an underestimation of CH4 emissions for this category. (see W.6) As explained in W.6 above, due to the changes in the approach used to estimate emissions under this category, recommendations on the key AD previously used as a part of this previous recommendation are no longer relevant. Therefore, the ERT made the recommendations associating with the methods and approach used for the 20023 submissions in W.35 of table 5 of this report.	Recommendations in paragraph W.35 will be taken into account at the next submission, however, the party considers this paragraph irrelevant

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
W.8	5.A Solid waste disposal on land – CH_4 (W.8, 2021) (W.18, 2019) Transparency	Justify the unexpected low per capita waste generation values compared with values reported by similar or neighbouring countries and with the values presented in table 2A.1 of the 2006 IPCC Guidelines (vol. 5, chap. 2, annex 2A.1, pp.2.17–2.19), or, if this is not possible, revise the CH_4 emission estimates for category 5.A solid waste disposal for the whole time series using revised data for per capita waste generation of the urban population.	The original recommendation was linked to the methodology used in the previous submissions when tier 2 was used. As explained in W.6 and 7 above, during the review, the Party clarified that the annual waste generation rate and the population data were not used to obtain total volume of MSW for estimating emissions for the 2023 submission. However, the ERT considers that the AD used for estimating CH4 emissions from this category in 2023 submission are also not clearly explained in the NIR. Therefore, the ERT considers that the recommendation has not yet been fully resolved. The ERT made the recommendations associating with the methods and approach used for the 20023 submissions in W.35 of table 5 of this report.	As the parties indicated, the volumes of waste generation are used from statistical collections, and the volumes per capita were obtained by calculation. Recommendations in paragraph W.35 will be taken into account at the next submission, however, the party considers this paragraph irrelevant
W.9	5.A Solid waste disposal on land – CH_4 (W.10, 2021) (W.10, 2019) (W.18, 2017) Accuracy	Update DOC values for relevant years of the time series based on representative values of waste composition in the country reflecting changes in the waste management practices over time and ensure that CH_4 emissions for category 5.A solid waste disposal are estimated in accordance with the 2006 IPCC Guidelines.	The ERT considers that the recommendation has not yet been fully addressed because the Party applied the IPCC default DOC values in the 2023 submission. (See W.18 below.) In the NIR (p.377, the Party reported that the DOC value was estimated based on the long–term results of studying the composition of solid waste and obtained average DOC values are 0.21 for the cities of Kazakhstan, 0.14 for Astana. However, during the telephone conference with the waste sector expert during the review, the Party confirmed that in estimating emissions, the IPCC default value for bulk waste (0.15) was used for the entire reporting period.	The Party agrees with the recommendation and will take it into account in the next submission.
W.10	5.A Solid waste disposal on land – CH_4 (W.11, 2021) (W.17, 2019) Accuracy	Provide an explanation for the unusual ratio between the IEFs for managed anaerobic and unmanaged waste disposal sites, and/or revise the corresponding CH_4 emission estimates for the complete time series, if necessary.	The Party recalculated the emissions from this category. As the result, The IEFs of the CH4 emissions from anaerobic landfills reported in 2023 submission are the same with the ones reported in 2021 submission for the entire time series. While, the IEFs of CH4 emissions from unmanaged landfills reported in 2023 submission are higher than those in 2021 submission for the whole timeseries with the range between 48.1% (1991) - 64.8% (2006). The ERT also noted that the increasing and decreasing trends in the timeseries of IEFs of CH4 emissions from anaerobic landfills and those	The Party agrees with the conclusion of the ERT

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			from unmanaged landfills are moving opposite directions. For the period between 1990-1997 and in 2007-2011, IEFs of subcategory "unmanaged" is slightly lower (ranging between 0.030 – 0.036 t/t waste and 0.023 – 0.025 t/t waste) than those for the subcategory "managed-anaerobic" (0.044-0.045 t/t waste and 0.032 – 0.039 t/t waste), while in 1998-2006 and 2012-2021, the IEFs for subcategory "managed-aerobic" (0.018 – 0.031 t/t waste and 0.018-0.028 t/t waste) are slightly lower than "unmanaged" (0.034 – 0.039 t/t waste and 0.028 – 0.040 t/t waste). During the review the Party stated that the volume of waste increased along with the growth of the population throughout the time. There are no sharp jumps in the statistical data which were obtained from national statistics. The ERT noted that, in general, the IEFs provided in the CRF tables are the products of the CRF tables, by dividing the reported emission by the units of activity, which is, in this case, amount of waste at the SWDS. The ERT also noted that the AD in this case is the based on the population data and the annual waste generation rates of the Party, which is not used for the emissions estimates of this category. (see W.35 below). Considering the methodology used for this category in the 2023 submission, the ERT considers that the recommendation is no longer fully relevant.	
W.11	5.A Solid waste disposal on land – CH_4 (W.12, 2021) (W.19, 2019) Transparency	Provide, in accordance with the UNFCCC Annex I inventory reporting guidelines, comprehensive, verifiable and documented information explaining significant changes caused by recalculations in the NIR, in particular when key parameters such as waste generation per capita and the MCF are revised.	The Party reported in its 2023 submission (p.380) under Section 7.2.6 Recalculations) that the emissions were recalculated again over the entire time series and that the obtained values are reflected in the current NIR. However, the Party has not provided descriptions of recalculation, such as values of AD and/parameters changed from the previous submissions, the reasons of changes, impact of recalculation and justification including how the recalculation results are the improvement from the previous submissions. The ERT considers that the recommendation has not been resolved as the Party has not provided the comprehensive, verifiable and documented information explaining significant changes caused by recalculations in the NIR.	The Party indicated in its NIR that the recalculation was made due to changes in the types of polygons. The Party considers the recommendation irrelevant.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
W.12	5.A Solid waste disposal on land – CH_4 (W.13, 2021) (W.20, 2019) Transparency	Provide comprehensive, verifiable and documented information on the reported country-specific DOC_f values or, if this is not possible, use the default value of DOC_f (0.5) for revising CH_4 emission estimates for category 5.A solid waste disposal.	In the NIR 2023 submission (p.376 and CRF Table 5A), the Party used the default value of DOCf (0.5) for estimating CH4 emissions from both managed – anaerobic and unmanaged landfill subcategories for all reporting years. During the review, the Party confirmed that it selected the default value provided by the 2006 IPCC Guidelines.	The Party agrees with the conclusion of the ERT and requests that the recommendation be considered irrelevant.
W.13	5.A Solid waste disposal on land – CH_4 (W.20, 2021) Transparency	(a) Investigate whether CH_4 flaring or energy recovery occurs at landfills in the country, including in Nur-Sultan, and report on this in its next annual submission, including a justification, if relevant, for the assumption that CH_4 energy recovery does not occur at any landfills. (b) If landfill CH_4 flaring or energy recovery is found to occur in the country, collect data on the amount of landfill CH_4 flaring or energy recovery across the entire time series, document these data and include the amount of flared landfill CH_4 or CH_4 for energy recovery in estimates of CH_4 emissions for category 5.A solid waste disposal.	The Party reported in CRF Table 5A the use of notation key "NO" for both CH4 flaring and for Energy recovery occurring at landfills in Kazakhstan. However, the Party did not report in its NIR this information and did not provide any assumptions for energy recovery not occurring at landfills. During the review, the Party clarified that Energy recovery is not carried out in landfills but did not clarify if flaring occurs. The ERT considers that the recommendation has not yet been addressed because while the Party has used notation key NO in CRF Table 5A, it has not provided corresponding information in the NIR and has also not provided assumptions justifying why energy recovery not occurring.	The party explained to the ERT that there are no recovery plants and the construction of incinerators has not begun. The Party considers the recommendation irrelevant.
W.14	5.A Solid waste disposal on land – CH_4 (W.21, 2021) Accuracy	Revise the estimates of CH_4 emissions from solid waste disposal on land by applying reaction rate values that correspond to	The Party has not reported in its NIR on the application of reaction rate values that correspond to the dry boreal and temperate climate zone, in line with the 2006 IPCC Guidelines (vol. 5, chap. 3, table 3.3, p.3.17) as suggested by the previous ERT, but continues to use reaction rate for wet	The Party agrees with the recommendation and will take it into account in the next submission.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		the dry boreal and temperate climate zone, in line with the 2006 IPCC Guidelines (vol. 5, chap. 3, table 3.3, p.3.17).	boreal and temperate climate zone. Given that Astana experiences long warm dry summers and long dry winters while in Almaty and larger rural parts the summers are warm and dry, and winters partly cloudy, frigid, snowy, windy, and overcast. Precipitation varies between arid and semi-arid conditions, with winter being particularly dry (9th national communication of the Republic of Kazakhstan available at https://unfccc.int/documents/626607) The ERT considers that the recommendation has not yet been addressed because the Party has not yet addressed the use of appropriate climate zone for estimates of CH4 from solid waste in the 2023 NIR submission.(see W.35)	
W.15	5.A Solid waste disposal on land – CH_4 (W.22, 2021) Transparency	Include information on applied delay time in the NIR.	The Party did not report in its NIR any information on the use of delay time to estimate CH4 emissions from solid waste disposal. During the review, the Party clarified that it used the Default Delay time is 6 months. The ERT considers that the recommendation has not yet been addressed because the Party has not yet reported in its NIR the Use of the 6-months Default Delay Time.	The Party agrees with the recommendation and will take it into account in the next submission.
W.16	5.A Solid waste disposal on land – CH_4 (W.23, 2021) Convention reporting adherence	Report consistent information on types of SWDS in its NIR, including textual information, figures and tables.	See W.7	Recommendations in paragraph W.35 will be taken into account at the next submission, however, the party considers this paragraph irrelevant
W.17	5.A Solid waste disposal on land – CH_4 (W.24, 2021) Accuracy	(a) Provide in its NIR a clear explanation and well-documented justification as to why unmanaged SWDS are considered shallow with a corresponding MCF value of 0.4. (b) If justification cannot be provided, reconsider the type of unmanaged SWDS in accordance with the 2006 IPCC Guidelines	The Party reported in Section 7.2.1 of the NIR that in accordance with the definition provided by the 2006 IPCC Guidelines, the Methane Correction Coefficients for methane (MCF) for other cities (except for Astana whose landfills are managed) the MCF value is equal to 0.4 as their landfills are considered unmanaged and shallow. However, during the telephone conference with the Waste sector expert held during the review, the Party confirmed that MCF 0.8 (for unmanaged -deep) was applied in estimating emissions. The ERT considers that the recommendation has not been fully addressed since the documentation on the type of unmanaged SWDS has not been provided in the NIR.	The Party agrees with the recommendation and will take it into account in the next submission.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		(vol. 5, chap. 3, table 3.1, p.3.14) and document the choice for the applied MCF values in its NIR.		
W.18	5.A Solid waste disposal on land – CH_4 (W.26, 2021) Transparency	Include in its NIR the following information: (a) DOC values by type of SWDS and average annual national DOC values for 1990–2019; (b) Relevant explanation as to how DOC values were derived for 1950–2019; (c) References and main assumptions used to derive DOC values for 1950–2019; (d) Explanation of changes in DOC values across the time series.	See W. 9	The Party agrees with the recommendation and will take it into account in the next submission.
W.19	5.A.1 Managed waste disposal sites – CH_4 (W.15, 2021) (W.11, 2019) (W.19, 2017) Completeness	Ensure that CH_4 emissions from industrial waste containing DOC (e.g. from food, wood processing and fishing industries) disposed at SWDS are estimated and reported in accordance with the 2006 IPCC Guidelines.	See W.5	The Party agrees with the recommendation and will take it into account in the next submission.
W.20	5.A.1 Managed waste disposal sites – CH_4 (W.25, 2021) Transparency	Include in the NIR background information with relevant references to support the classification of Nur-Sultan landfill as managed anaerobic and Almaty landfill as managed semi-aerobic in line with the 2006 IPCC Guidelines (vol. 5, chap. 3, table 3.1, p.3.14). Such information	See W.7	Recommendations in paragraph W.35 will be taken into account at the next submission, however, the party considers this paragraph irrelevant

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		can be collected directly from the operators of Nur-Sultan and Almaty landfills.		
W.21	5.B Biological treatment of solid waste – CH_4 and N_2O (W.27, 2021) Transparency	Collect information on any possible emissions linked to the operation of the Nur-Sultan mechanical-biological treatment plant and report them in CRF table 5.B.	The Party has not reported in its NIR emissions from biological treatment of waste and indicated this category as NO in CRF Table 5B. The Party has not provided any background information on mechanical-biological treatment in the NIR. even though the Party provided information during the 2021 review that implies the possibility of emissions from this category. In addition to the information discussed in the review in 2021, the ERT noted some sources of information on the biological treatment practice and composting in recent years that include: https://astanatimes.com/2018/10/kazakhstan-to-ban-plastic-paper-and-glass-burying-by-2019-construction-and-food-waste-by-2021/ https://worldbiomarketinsights.com/kazakhstan-oilfield-composts-255-tonnes-of-food-waste-after-new-law/ https://forbes.kz/news/2020/03/03/newsid_220260 https://www.switch-asia.eu/site/assets/files/3607/biodegradable_waste_kazakhstan_en.pdf During the review, the Party clarified that biological treatment is not included in the calculation of emissions because Executive bodies do not have information about the volume of compost and that work is underway to establish contact with private organizations that are engaged in biological processing of waste. The ERT considers that the recommendation has not yet been addressed because the Party has not justified the non-existence of biological treatment of solid waste in Kazakhstan and considers that not estimating emissions from biological treatment of Solid waste is an underestimation of CH4 emissions for this category.	The Party agrees with the recommendation and will take it into account in the next submission.
W.22	5.B Biological treatment of solid waste – CH_4 and N_2O	Include in its NIR an individual section on biological treatment, to include information on the mechanical-biological	The ERT considers that the recommendation has not yet been addressed because the NIR does not contain an individual section on biological treatment of solid waste. See W.21	The Party agrees with the recommendation and will take it into account in the next submission.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
	(W.27, 2021) Transparency	treatment plant in Nur-Sultan including information as to whether composting or anaerobic digestion of waste occur at this facility; information on common practice for food waste and garden waste treatment in rural areas and the private sector in the country; and an overview of the recycling practices used in line with the 2013 Concept for the Transition of the Republic of Kazakhstan to Green Economy, as provided to the ERT during the review.		
W.23	5.C.1 Waste incineration – CO_2, CH_4 and N_2O (W.18, 2021) (W.14, 2019) (W.11, 2017) (W.14, 2016) (W.12, 2015) Comparability	Use the appropriate notation key for waste incineration consistent with decision 24/CP.19, annex I, paragraph 37.	The ERT considers that the recommendation has not yet been fully addressed because of the following reasons. In the 2023 CRF table 5.C.1 on waste incineration, the Party reported "NO" for all AD of all subcategories and all gases. Although the Party reported actual emissions from the combustion of clinical waste under the category of 5.C.1.b (Non-biogenic -Other) for the years between 2006 and 2021, AD of those emissions is also reported as "NO". However, in its NIR, the Party has not reported any new information to justify the use of "NO" for solid waste incineration. During the review, the Party provided the Environmental Code of the Republic of Kazakhstan dated 02.01.23 No.184-VII, Article 365 as the source of the information on solid waste incineration. However, the information provided does not confirm non-existence of incineration facilities/equipment that treat MSW and other types of solid waste in the country. (See also W.23 below). The ERT considers that "NE" is more appropriate in reporting AD and the emissions of solid waste incineration for the period 1990 - 2005. In the 2023 CRF Table 5.C.1 on waste incineration, the Party reported "NO" for CH_4 and N_2O emissions under biogenic waste incineration for the period 2006–2019, even	The Party will make efforts to resolve this issue in the next inventory submission

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			when a fraction of biogenic clinical waste was incinerated. The ERT considers that notation key "IE" should be used in CRF table 5.C, as CH4 and N2O until the biogenic fraction is reported separately from the non-biogenic fraction. For the category 5.C.2 on open burning of waste, The ERT also noted that the Party includedits preliminary estimation of emissions using the Tier 1 method of the IPCC in order to justify the insignificance of the emissions from this category. CO2, N2O and CH4 emissions do not exceed 500 kt CO2 eq., respectively. As a result, The Party reported the emissions from open-burning of MSW is estimated as 216.67 kt CO2 in 2021 (NIR table 7.5 p.379-389) and does not apply para 37(b) of the UNFCCC reporting guidelines to include these emissions to the national. However, the ERT noted that in CRF table 5.C, all AD and emissions from Open burning of waste under 5.C.2 are reported as "NO.", which is not correct since it is assumed that the activities take place. The ERT considered that notation key "NE" should be used, and the explanation must be added to CRF table 9, to be consistent with the reporting in the NIR. During the review the Party explained that notation keys will be revised for the next submission.	
W.24	5.C Incineration and open burning of waste – CO_2, CH_4 and N_2O (W.28, 2021) Transparency	Include in the NIR: (a) Justification that the thermal treatment of industrial waste (other than clinical waste) did not take place in the country for the entire time series or that the emissions from industrial waste incineration are below the significance threshold in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines; (b) Comprehensive explanation of industrial waste treatment in Kazakhstan, including	The ERT noted that Kazakhstan reported, in CRF table 5.C, only one category of waste incinerated under category 5.C.1, namely clinical waste, included under other non-biogenic waste. The Party did not report any information regarding the incineration of waste, except for clinical waste. The ERT noted that the NIR does not include any justification for not reporting emissions other than clinical waste. During the review, the Party clarified that heat treatment is prohibited for the main types of hazardous waste, there are separate landfills for industrial waste, and some types are buried. Currently, work is underway to collect information on industrial waste to calculate and report emissions in the next submission of the NIR. Also, See W.7 The ERT considers that the recommendation has not yet been addressed because the Party has not yet provided in its NIR the corresponding justification in case it considers that industrial waste (not including clinical waste) is not incinerated in the country.	The Party agrees with the recommendation and will take it into account in the next submission.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		typical practice for hazardous waste neutralization in the country.		
W.25	5.C.1 Waste incineration – CO_2 (W.29, 2021) Accuracy	Revise the oxidation factor used to estimate CO_2 emissions from clinical waste for waste incineration by applying the default value of 1.0 provided in the 2006 IPCC Guidelines (vol. 5, chap. 5, table 5.2, p.5.18) or by applying a well-documented and justified country-specific value.	For the 2023 submission, the Party recalculated CO2 emissions for the entire time series (page 427 in Chapter 7.4 "Greenhouse Gas Emissions from Medical Waste Incineration" and data in CRF was updated applying assuming that the completeness of combustion is 100% which is the default value of 1.0 provided in the 2006 IPCC Guidelines (vol. 5, chap. 5, table 5.2, p.5.18) The ERT considers that the recommendation has been addressed, since the default value of waste incineration oxidation factor was used in accordance with the 2006 IPCC Guidelines.	Thank you
W.26	5.C.1 Waste incineration – CO_2, CH_4 and N_2O (W.30, 2021) Comparability	Specify clinical waste incineration as an individual subcategory under other in CRF table 5.C and transparently report the AD, emissions and IEFs for this subcategory.	The Party reported in its CRF Table 5.C.5.c - Medical waste incineration emissions under 5. C .1.2. b "Other", but not as a separate subcategory. The ERT noted that AD and IEF were not specified for that category in CRF Table 5C. During the review, the Party clarified that it plans to take into account the recommendation in the next NIR. The ERT considers that the recommendation has not yet been addressed because the Party has not yet report medical waste incineration for clinical waste as a sub-category in CRF Table 5C as well as indicating the corresponding AD, emissions and IEFs.	The Party will make efforts to resolve this issue in the next inventory submission
W.27	5.C.1 Waste incineration – CH_4 and N_2O (W.31, 2021) Accuracy	(a) Revise the CH_4 and N_2O EFs either by applying default EFs provided in the 2006 IPCC Guidelines (vol. 5, chap. 5, table 5.3, p.5.20 for CH_4, and table 5.4, p.5.21 for N_2O) or using well-	In the NIR pages pp.403-404 and CRF table summary 3, Kazakhstan reported that the default factors were used for the EFs of CO2, CH4 and N2O. While, in the NIR, the Party reported that the ERT noted that the CH4 EF applied for CH4 (of 0.6 kg/kt of staged waste based on wet weight (for periodic, stocker)) and N2O EF of (0.6 kg/Gg of staged waste based on wet weight (for periodic)) were applied in the 2023 submission) (NIR tables 7.20 and 7.21),).	The Party intends to recalculate the entire time series in accordance with the values proposed in the 2006 IPCC Guidelines (Volume 5, Chapter 5, Table 5.3, page 5.20 for CH_4 (e.g. 6 kg/ Gg waste incinerated for semi-continuous combustion, stoker) and Table 5.4, paragraph 5.21 for N_2O with semi-continuous combustion)).

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		documented country-specific EFs, if available; (b) correct detected technical errors by enhancing QA/QC checks; and (c) ensure that CH_4 and N_2O EFs are consistently applied across the entire time series.	The ERT noted that they differ from the default values proposed in 2006 IPCC Guidelines (vol. 5, chap. 5, table 5.3, p.5.20 for CH4 (e.g., 6 kg/Gg waste incinerated on a wet weight basis for semi-continuous incineration, stocker), and table 5.4, p.5.21 for N2O (e.g., 41 kg/Gg waste incinerated on a wet weight basis for semi-continuous incineration, stocker)). However, no technical information that justifies the values of country specific EFs is provided in the NIR. During the review, the Party clarified that the entire time series will be recalculated in accordance with the values proposed in the 2006 IPCC Guidelines (Volume 5, Chapter 5, Table 5.3, page 5.20 for CH4 (e.g., 6 kg/Gg waste incinerated for semi-continuous combustion, stocker) and Table 5.4, p 5.21 for N2O for semi-continuous combustion)). The ERT considers that the recommendation has not yet been addressed because the Party has not yet used the correct CH_4 and N_2O EFs	
W.28	5.C.1 Waste incineration – CO_2, CH_4 and N_2O (W.32, 2021) Transparency	Include in its NIR the statement that there was no incineration of waste with energy recovery in the country in 1990–2019 and that the start of construction of a waste incineration plant is planned for 2021.	The Party did not report in its NIR any information on waste incineration with energy recovery and used the notation key "NO" in CRF table 5.C. During the review, the Party clarified that the construction of the incineration plant has not been started. The ERT considers that the recommendation has not yet been addressed because the Party has not yet provided a justification in its NIR to support the notation key "NO" in CRF table 5C for waste incineration with energy recovery	The Party agrees with the recommendation and will take it into account in the next submission.
W.29	5.C.1 Waste incineration – CO_2, CH_4 and N_2O (W.33, 2021) Convention reporting adherence	Provide correct references to the methodological basis for estimating emissions from clinical waste incineration in the NIR.	The Party reported in its NIR (p.402) that the default values of emission coefficients for calculating CO2 emissions from medical waste incineration were taken from table 5.6 of the IPCC good practice guidance (2000), Chapter 5, Table 5.6, and are given in Table 7.1 The ERT noted that for estimating CH4 and N2O emissions, the Party applied the default values from the IPCC 2006 IPCC Guidelines. Further, during the review, the Party indicated that, in the NIR 2023, all methodological issues with correct references to 2006 IPCC Guidelines, are	There was a typo in the NIR on page 402 - it says that IPCC was used Good Practice Manual, 2000, but in reality we are talking about the 2006 Manual. The party will provide the correct references the next time it submits the NIR

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
			described in Chapter 7.4 "Greenhouse Gas Emissions from Medical Waste Incineration". During the review, the Party clarified that there was a typo error, and it will be corrected for the next submission. The ERT considers that the Party can further enhance its reporting by strengthening the QC/QA procedures and removing the wrong references to the methodological guidance used. The ERT considers that the recommendation has not yet been addressed because the Party has not yet provided the correct references to the methodological basis for estimating emissions from clinical waste incineration in the NIR.	
W.30	5.C.2 Open burning of waste – CO_2, CH_4 and N_2O (W.19, 2021) (W.15, 2019) (W.12, 2017) (W.13, 2016) (W.11, 2015) Completeness	Further investigate the potential CO_2, CH_4 and N_2O emissions from open burning in unauthorized SWDS and include the estimates of emissions from open burning, as needed.	The Party reported in the NIR (section 7.2.3, pp.378–379 English version) its potential estimation of CO2, CH4 and N2O emissions from open burning of waste by applying the IPCC Tier 1, to demonstrate that those emissions were insignificant, in light of consideration of Para. 37 (b) of the UNFCCC reporting GLs, as emissions from those individual gases do not exceed 500 kt CO2 and below 0.05 per cent of the national total (without LULUCF) respectively, for all reported years. The ERT noted that the NIR does not include any preliminary estimation or information about emissions from open burning in unauthorized SWDS. The ERT considers that there is a potential underestimation of the emissions for the category and therefore there is no justification that these emissions from open burning of waste are insignificant. During the review, the Party clarified that the recommendation will be considered in the next NIR. The ERT considers that the recommendation has not yet been fully addressed because the Party and has not yet included emission from open burning in unauthorized SWDS and there is no justification that the emissions from open burning of waste are insignificant, in accordance with decision 24/CP.19. In addition, the ERT noted that the emissions from open burning of waste were reported using the notation key “NO” in CRF table 5.C MSW. See W.23 above on this point.	The Party agrees with the recommendation and will take it into account in the next submission.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
W.31	5.D Wastewater treatment and discharge – CH_4 (W.34, 2021) Accuracy	Apply higher-tier methods in accordance with the decision tree in the 2006 IPCC Guidelines (vol. 5, chap. 6, figure 6.2, p.6.10) to estimate CH_4 emissions from wastewater treatment and discharge or clearly explain in the NIR the reason why it was unable to implement the recommended method.	The Party reported in its NIR (p.383) that the assessment of greenhouse gas emissions from municipal wastewater treatment was carried out on the basis of the 2006 IPCC Guidelines, and the methodology used corresponding to tier 2, since national coefficients of the degree of wastewater treatment/discharge routes and methods are used in the calculation. According to the 2006 IPCC Guidelines Vol 5 Chapter 6, 6.2.1 (p. 6.9) "The Tier 2 method follows the same method as Tier 1 but allows for incorporation of a country specific emission factor and country specific AD. Decision tree for CH4 emissions from domestic wastewater p. 6.10 of the 2006 IPCC Guidelines, requires the country-specific emission factors including B0 and MCFs for tier 2. The ERT noted that the Party used national AD default EF (for Bo and, MCF) without any explanation for not using CS EFs. The ERT considers the method used to estimate CH4 emissions corresponds with Tier 1 and not Tier 2. During the review, the Party clarified that the use of CS values for Bo, MCF is not currently planned, due to the lack of the possibility of conducting research and that defaults values were selected according to regional conditions. The ERT considers that the recommendation has not yet been addressed because the Party has not yet applied higher-tier methods in accordance with the decision tree in the 2006 IPCC Guidelines to estimate CH_4 emissions from wastewater treatment and discharge.	The Party agrees with the recommendation and will take it into account in the next submission.
W.32	5.D Wastewater treatment and discharge – CH_4 and N_2O (W.35, 2021) Comparability	Replace: (a) The notation key "NO" for N_2O emissions from industrial wastewater for 1990–2019 with the notation key "NE", since these emissions are not estimated and may occur and the 2006 IPCC Guidelines do not provide a corresponding methodology to estimate these emissions, and	The Party reported in its NIR (p.x)/CRF in its CRF table 5D AD from sludge removal with the notation key "NO" in accordance with the 2006 IPCC Guidelines (Section 6.2 Chap 5 Vol 5) since the default value of zero was used for sludge removed. The ERT noted that the Party still reported N_2O emissions from industrial wastewater (for 1990–2021) with the notation key "NO" in its CRF table 5D and does not include any relevant information about it in its NIR. The ERT considers that "NE" is more appropriate until the NIR contains a justification that N_2O emissions from industrial wastewater did not occur in the country for 1990–	The Party agrees with the recommendation and will take it into account in the next submission.

ID#	Issue/problem classification[1, 2]	Recommendation from previous review report	ERT assessment and rationale	Party comment
		provide the relevant explanation in CRF table 9; (b) The notation key "IE" for sludge removed in CRF table 5.D with the notation key "NO", because the default value of zero was used for sludge removed.	2021 or an explanation that emissions are not estimated though they occur During the review, the Party clarified that the recommendation will be taken into account in the next NIR. The ERT considers that the recommendation has not yet been addressed because the Party has not yet replaced the notation key "NO" for N_2O emissions from industrial wastewater for 1990–2019 with the notation key "NE" or provided any justification in its NIR. In the CRF table 5.D, Sludge removal is reported as NO for both domestic and industrial wastewater.	
W.33	5.D.2 Industrial wastewater – CH_4 (W.37, 2021) Accuracy	Collect data on pulp and paper manufacturing in the country for the entire time series, correct the estimates and report corresponding CH_4 emissions from pulp and paper manufacturing under category 5.D.2 industrial wastewater.	The ERT noted that recalculations for CH4 emission of category 5.D.2 - Industrial wastewater were made for the entire time series 1990-2021. As a result of the organization of working groups with representatives of state bodies, updated data on the volume of industrial production were obtained. The Party included data on output volumes from paper production and estimated CH4 emissions from pulp and paper manufacturing under category 5.D.2 industrial wastewater in its inventory, as reported in its NIR on page 394. The ERT considers that the recommendation has been addressed because the Party has collected data on pulp and paper manufacturing in the country for the entire time series, corrected the estimates and report corresponding CH_4 emissions from pulp and paper manufacturing under category 5.D.2 industrial wastewater.	The Party thanks the ERT for the work done
W.34	5.D.2 Industrial wastewater – CH_4 (W.38, 2021) Transparency	Include a description of the CH_4 emission trend for category 5.D.2 industrial wastewater and a relevant explanation for the large inter-annual changes in the total organic product in its NIR, demonstrating that these inter-annual changes are caused by the changes in the industrial sector of Kazakhstan and not by any	The Party did not report in its NIR an explanation of the CH4 emission trends for the category. However, the ERT noted that the inter-annual changes in the total organic product for category 5.D.2 industrial wastewater continue to be significant for the following years: 1992/1993 (–35.1 per cent), 1993/1994 (–41.8 per cent), 1994/1995 (–41.2 per cent), 2000/2001 (70.8 per cent), 2008/2009 (57.0 per cent) 2010/2011 (-42.8 per cent) and 2020/2021 (32.4 per cent). During the review, the Party clarified that significant fluctuations are associated with the inclusion of the pulp and paper industry, where data on production volumes fluctuate.	The NIR shows the production volumes (Table 7.13), according to which it is possible to track emission trends over a time series, since they are directly related to production volumes, and the default coefficients used (Table 7.12). The Party does not consider the recommendation relevant, since emissions are calculated transparently.

ID#	*Issue/problem classification*[1, 2]	*Recommendation from previous review report*	*ERT assessment and rationale*	*Party comment*
		error that could occur during primary data collection, processing or data transfer.	Since the coefficient of wastewater generation from this type of industry is very high, production volumes affect emission trends. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet included a description of the CH_4 emission trend for category 5.D.2 - Industrial wastewater and a relevant explanation for the inter-annual changes in the total organic product in its NIR.	

Table 2
Additional findings made during the individual review of the 2023 annual submission of Kazakhstan

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
Energy			
E.1	1. General	Correct or explain the following identified changes/fluctuations in next submissions: a) CO_2, CH_4, and N_2O IEFs for liquid fuels in pipeline transport (1.A.3.e.ii Other (other transportation)) reported in CRF table 1.A(a)2 for 2019 changed by –36 per cent for CO_2, –66.8 per cent for N_2O and +160.5 per cent for CH4 in the 2023 submission compared to the 2021 submission. Meanwhile, according to CRF Table1.A(a)s3, the AD for the subsector is changed from 2,659 TJ to 10,496 TJ for 2019 between 2021 and 2023 submission. b) In 1.A.3.d Domestic navigation the N_2O IEF for Gasoline for 2021 and 2020 (32.00 kg/TJ) is the highest of all reporting Parties (0.30–32.00 kg/TJ) and more than twice higher of the second highest value (2.00 kg/TJ). Additionally, in other years (1990–2019), the reported values (3.20 kg/TJ) are also the highest of all reporting Parties in each year (0.23–3.20 kg/TJ). The inter-annual change 2019/2020 (900.00 per cent) is larger than those of other reporting Parties. c) In 1.A.3.e.i Pipeline transport the inter-annual changes of CH_4 IEF for pipeline transport Gaseous Fuels from 2011/2012 (22.54 per cent) and 2012/2013 (62.71 per cent) are relatively larger than those of other reporting Parties. d) In 1.A.3.a Domestic aviation the CO_2 IEF for Jet Kerosene for 2021 (7.15 t/TJ) is outside of the range of the IPCC default values (69.8–74.4 t/TJ). For 2021, the reported value (7.15 t/TJ) is the lowest of all reporting Parties (7.15–73.49 t/TJ) and more than twice lower of the second lowest value (70.78 t/TJ). The inter-annual change 2020/2021 (–90.00 per cent) is larger than those of other reporting Parties. The CH_4 IEF for Jet Kerosene for 2021 (0.05 kg/TJ) is outside of the range of the IPCC default values (0.215–1 kg/TJ). For 2021, the reported value (0.05 kg/TJ) is the lowest of all reporting Parties (0.05-5.53 kg/TJ) and more than twice lower of the second lowest value (0.36 kg/TJ). The inter-annual change 2020/2021 is larger than those of other reporting Parties. The N_2O IEF for Jet Kerosene for 2021 (0.20 kg/TJ) is/are outside of the range of the IPCC default values (0.6–5 kg/TJ). For 2021, the reported value (0.20 kg/TJ) is the lowest of all reporting Parties (0.20–6.61 kg/TJ) and more than twice lower of the second lowest value (1.98 kg/TJ). The inter-annual change 2020/2021 (–90.00 per cent) is larger than those of other reporting Parties.	Party accepts ERT recommendation

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
E.2	1.A.3.b.i Cars – liquefied petroleum gases – CH_4 and N_2O	The ERT noted that the IEF for cars using Liquefied Petroleum Gases as fuel has been changed by 1400 per cent for N_2O and 48.39 per cent for CH_4 in CRF Table1.A(a)s3 in the 2023 submission compared to the 2021 submission. Also, the new IEFs are not consistent with IPCC default emission factors. As a result, the ERT noted that the N_2O and CH_4 emissions in 2019 from cars using Liquefied Petroleum Gases as fuel has been changed by the same extents. The explanation provided in the NIR 2023 section 3.4.11.2 (p. 134) does not justify the changes in the EFs of CH_4 and N_2O for cars equipped with gas equipment. During the review, the Party clarified that there is a technical error when importing or preparing the file for download. The Party will take the comment into account when preparing the next NIR.	Party accepts ERT recommendation
E.3	1.A.3.b.i Cars – diesel oil and LPG– CH_4 and N_2O	The ERT noted that there is a significant recalculation for the N_2O IEF for diesel oil for cars: from 5.70 to 3.90 kg/TJ (31.6 per cent decrease) across the time series. Also, in the NIR 2023 compared to previous submissions, the IEF for LPG were changed from 0.20 to 3.00 kg/TJ for N_2O and from 62.00 to 92.00 kg/TJ for CH4. During the review, the Party clarified that all the initial data were checked, as well as the applied coefficients for calculating GHG emissions. Currently, the coefficients from the 2006 IPCC Guidelines are applied. At the same time, experts tend to use the COPERT model for calculations in the near future, which should significantly improve the quality of the Transport category. Check the consistency of the EFs used for dieseil oil and LPG.	The Party requests to consider the existing situation. Currently, the series has been revised, the coefficients correspond to the IPCC. The party asks to remove the remark.
E.4	1.A.3.e.ii Other (other transportation) – liquid fuels – CH_4, N_2O, and CO_2	The ERT noted the comparison of the CH_4, CO_2 and N_2O emissions from liquid fuels of the Other (non-pipeline) Transportation between 2023 and 2021 submissions show inconsistencies and the AD values (x10) are revised across the time series. During the review, the Party clarified that as part of the improvements to the National Inventory, all subcategories of "Fugitive Emissions" were recalculated. This was due to new data that the Party received from the Bureau of National Statistics. As part of these activities, category 1.A.3.e.ii – Other was also recalculated. The existing discrepancies with the previous period are explained by the revision of the applied coefficients for CO_2 and CH_4 gases (for N_2O the coefficient remained the same). Note that the resulting difference may be caused by a different proportion of the pumped fuel. In a certain period, this can be gas, in another period, oil, respectively, the overall situation is not entirely homogeneous, which in principle is normal for this subcategory. The ERT considers that the clarification provided by the Party dose not justify the inconsistencies and the revised AD values (x10) in the sector.	The Party asks for more specific wording of the comment in order for it to be successfully resolved.
E.5	1.B.1.b Solid fuel transformation – solid fuels – CH_4 and CO_2	The Party reported in its CRF table 1.B.1 the CH_4 and CO_2 emissions from Solid fuel transformation (1.B.1.b). ERT noted significant recalculation has been done for this subcategory, for example, AD for 2019 is 104.81 Mt, in 2023 submissions, where it was	The Party asks for more specific wording of the comment in order for it to be successfully resolved.

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
		4.24 Mt in 2022 and 2021 submissions; in addition, the CH_4 IEF was also revised, as it was 2.82E-05 kg/t in 2019 in 2021 submissions, whereas it is now 1.67E-04 kg/t in current submissions. Similar change is also observed for CO_2 IEF. However, no relevant information is provided in NIR, except general introduction on p.146, NIRe that the recalculation was done for all subcategories included in 1.B.1. During the review, the Party clarified that recalculation was done for solid fuel transformation (included under 1.B.1.b) due to the availability of more information, including national parameters; and further clarified that scope of this subcategory (1.B.1b) is emissions from endogenous fires, presented on p.147, NIRe. The Party also provided additional information for the national circumstances of underground coal mining relevant to uncontrolled combustion of waste heap, as well as country-specific parameters used to estimate the emissions from endogenous fires. According the footnotes in CRF table 1.B.1 that the emissions from coke and charcoal production should be included in subcategory (1.B.1b); and according to 2006 IPCC Guidelines (p.4.8, Volume 2), emissions of CO_2 from uncontrolled combustion due to coal exploitation activities should be reported under 1.B.1.b. Taking consideration there is inconsistency between IPCC Gls and UNFCCC Annex I inventory reporting guidelines, the ERT recommends that the Party either continue to report the emission from endogenous fires under this subcategory (1.B.1.b) or introduce a new subcategory under other and include a clarification in the NIR that the location of the emissions and provide methods/national parameters for this estimation in future submissions.	
E.6	1.B.2 Oil, natural gas and other emissions from energy production –liquid and gas fuels – CH_4 and CO_2	The Party reported in its NIRe (for example, p.159) that three timelines was assumed to transit the application of default EF from table 4.2.5 to table 4.2.4 in 2006 IPCC Guidelines, namely in 1990–1997, 1998–2010 and 2011–2021 (see E.43 above). However, ERT noted: a) as the unit of AD reported in CRF table 1B.2.a (oil) is kt, the density of oil, critical to the application of default data in 2006 IPCC Guidelines where the basis of the data is cubit meter (m^3), is not reported in NIR; b) for all subcategories that using default data from table 4.2.4 and table 4.2.5, the starting year using data from table 4.2.4 is 2010, not 2011; c) the EF data used for transition period (1998–2009) is not transparently reported in NIR for how they were determined. On p.159, NIRe it states the Party took into account the penetration rate of advanced equipment installed in oil and gas system, increasing by 8 per cent per year, however, the Party did not provide more information to illustrate the process. During the review, the Party provided the information of oil density used for the conversion (859kg/m^3); clarified that the start year of using data from table 4.2.4 is 2010 not 2011; and provided additional document to illustrate the approach to estimate the EFs used for transit period (1998–2009), taking into oil exploration as an example.	The Party asks for more specific wording of the comment in order for it to be successfully resolved.

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
		Report transparently the way to determine the EFs used for 1.B.2 by providing necessary conversion factors (for example, oil density), correct timelines and an example to illustrate the process to set EFs for the transit period (1998–2009).	
E.7	1.B.2.a Oil – liquid fuel – CH_4	The Party reported in CRF table 1.B.2 that CH_4 IEF of 1.B. 2.a.i (oil exploration) is increasing along the time series, from 213.12 kg/kt oil produced in 1990 to 225.72 kg/kt oil produced in 2021. However, according to the description in NIR (p. 159), tier 1 method is used here and the emission factors used for this subcategory are transiting from default data in table 4.4.5, 2006 IPCC Guidelines to that in table 4.2.4, which means the IEF should be decreasing gradually in the time-series. During the review, the Party clarified that discrepancy might be caused by technical error and the data would be further checked and documented in next submissions. Recheck the process to determine the CH_4 EFs used for 1.B. 2.a.i (oil exploration) and include the revised estimation in CRF table 1.B.2 and NIR, or explain why the IEF of this sub-category is growing along the time-series in NIR.	Party accepts ERT recommendation
E.8	1.B.2.a Oil – oil and gas fuels – CO_2	The Party reported in CRF table 1.B.2 that CO_2 IEF of 1.B. 2.a.i (oil exploration) is decreasing along the time series in general, from 11,844.93kg/kt oil produced in 1990–1997 to 10,595.96 kg/kt oil produced in 2010–2021, equivalent to 1.02E-2 Gg/1000m^3 and 9.10E-3 Gg/1000m^3(assuming the density of oil is 859kg/m^3), respectively. However, (a) in year of 2008 and 2009, the level of IEF is much lower than that of in 2010–2021, i.e, they are 10,476.94 kg/kt and 10,532.47 kg/kt in 2008 and 2009, respectively, and then rebounded to 10,595.03 kg/kt in 2010 and afterwards; (b) though the data for the period 2010–2021 keeps consistent with the default data listed in Table 4-2-4 (i.e sum of 1.00E-4 Gg/1000m^3 for well drilling, 9.00E-3Gg/1000m^3 for well testing and 1.90E-6Gg/1000m^3 for well services), the data for the period of 1990–1997 is different from that in Table 4-2-5, 8.04E-2 Gg/1000m^3 (i.e sum of 9.00E-4 Gg/1000m^3 (average of the given range) for well drilling, 7.95E-2Gg/1000m^3 for well testing and 1.70E-5 Gg/1000m^3 for well services). During the review, the Party clarified that the discrepancy might be caused by technical error and the data would be further checked and documented in next submissions. Recheck the process to determine the CO_2 EFs used for 1.B. 2.a.i (oil exploration) and include the revised estimation in CRF table 1.B.2 and NIR, or explain why the CO_2 IEF of this sub-category fluctuates and is not consistent with that in table 4.2.5 for the period of 1990–1997.	Party accepts ERT recommendation
E.9	1.B.2.b Natural gas – gas fuels – CH_4 and CO_2	Similar to the other sub-categories in 1.B.2, the Party highlighted on p.162, NIRe that the EFs used for gas processing are from table 4-2-4 and table 4-4-5 of the 2006 IPCC Guidelines. However, the data reported in subcategory 1.B.2.b.3 (gas processing) in CRF table 1B.2 is not correspondent to that presents in these two tables. For example, the IEF of CH_4 for the period of 1990–1997 is 12,190 kg/Mm^3 (equal to 1.22 E-2 Gg/Mm^3)in CRF table 1.B.2, different from the data from table 4.2.5 in which it is:	The Party asks for more specific wording of the comment in order for it to be successfully resolved.

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
		1.59E-4 Gg/m^3 for sour gas (average of range between 9.70E-5Gg/Mm^3 and 2.20E-04 Gg/Mm^3), or 7.90E-4 Gg/m^3 for sweet gas(average of range between 4.80E-5Gg/Mm^3 and 1.10E-03 Gg/Mm^3). Similar inconsistency was also observed for the period 2010–2021 and for CO_2 IEF. During the review, the Party clarified that the gas processed in Kazakhstan is sour gas and technical error occurred when calculating the EFs from table 4.2.4 and 4.2.5. In addition, the Party provided the revised CH_4 and CO_2 emissions for the whole time-series for subcategory of gas processing. Recheck the EFs used for the calculation of the CH_4 and CO_2 emissions from subcategory 1.B.2.b.3 (gas processing) and document the revised EF and emissions in CRF table 1.B.2 and NIR, or explain why the the data reported in subcategory 1.B.2.b.3 (gas processing) in CRF table 1B.2 is not correspondent to that presents in table 4.2.4-4.2.5.	
E.10	1.B.2.b Natural gas – gaseous fuels – CH_4 and CO_2	The ERT noted the IEF of CH_4 for this sub-category (1.B.2.b.4_gas transmission and storage) 480 kg/ Mm^3 for the period of 2010–2021, corresponds to the high end of data range listed in Table 4-2-4, i.e, 6.60E-5 ~4.80E-4 Gg/Mm^3 (equal to 66 ~480 kg/Mm^3). However, as highlighted in NIRe (p.161–162) in general, the average of the IPCC range (273 kg kg/Mm^3) should be chosen, if the default data provided by IPCC Guidelines are given in a range. For the period of 1990-1997, the CH_4 IEF is 1066.50 kg/Mm^3, different from the data listed in table 4-2-5, i.e. 16.6E-5 ~1.10E-3 Gg/Mm^3 (equal to 166 ~1100 kg/Mm^{3,} with average of 633 kg/Mm^3). The CO_2 IEF is 6.83 kg/ Mm^3 for the period of 1990–1997, different from the data listed in table 4-2-5, i.e. 8.80E-7 ~2.00E-6 Gg/Mm^3 (equal to 0.88 ~20 kg/Mm^{3,} with average of 1.44 kg/Mm^3), and for period of 2020–2021, it is 4.09 kg/ Mm^3, also different compared to the data listed in table 4-2-4, i.e. 8.80E-7 Gg/Mm^3, equal to 0.88 kg/Mm^3. During the review, the Party clarified that: (a) for CH_4 EF for 2010–2021, the upper range of EFs presented in table 4.2.4 was chosen based on the fact that companies declare their intention to improve their performance in the future; (b) for the discrepancies between CH_4 EF (1990–1997), CO_2 EF (1990–1997 and 2010–2021) presented in CRF table 1.B.2 with what in table 4.2.5 and table 4.2.4, technical errors may have occured and the Party plans to recheck them. Revisit the EFs used for CH_4 and CO_2 emission calculation from gas transmission/storage for the whole time-series and document the results in NIR and CRF in next submissions.	The Party asks for more specific wording of the comment in order for it to be successfully resolved.
E.11	1.B.2.c Venting and flaring – liquid and gaseous fuels – CH_4 and CO_2	The Party reported in CRF table 1.B.2 that the AD used for oil venting are described as oil production with unit of 1000 m^3. Using the density provided by the Party, 859 kg/m^3(see E.3 above), AD is to be 86,228.70 Kt in 2021. This value differs from the data provided under 1.B.2.a.oil production (86,879.31 kt) or data reported in 1A(b) (74,733.22 kt). The difference occurs across the entire time-series.	The Party asks for more specific wording of the comment in order for it to be successfully resolved.

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
		During the review, the Party clarified that the reasons for such disagreements may be related to data updating done by the National Bureau of Statistics during or after the GHG inventory preparation, and further check will be made. Correct the AD used to estimate CH_4 and CO_2 emission from oil venting, ensuring the consistency with other sub-categories which uses same AD with this sub-category.	
	E.16 1.B.1.c Other – solid fuels – CO_2 and CH_4	The Party recalculated the emissions from this subcategory (1.B.1.c other specified as coke oven gas flaring in CRF table 1.B) for the entire timeseries. The ERT noted that the AD for this subcategory has been significantly changed compared with that in 2021 submissions. For example, AD was reported as 2,203.06 Mt for 2019 in 2021 submissions, whereas it was 2.60 Mt in 2023 submission. In general, the AD in current summation is 1‰ of that in 2021 submissions. No specific explanation was provided in NIR. During the review, the Party clarified that the change of emissions and AD is partly caused by the updated data for this category, partly caused by a technic error. Correct the identified technical error and present new emission estimation from coke oven gas flaring in next submissions.	The Party asks for more specific wording of the comment in order for it to be successfully resolved.
IPPU			
I.34	2.B.1 Ammonia production – CO_2	The Party reported in the NIR (Section 4.3.1.5, p. 193) information on recalculations and improvements for the category. The ERT noted the significant recalculations for CO2 IEF compared to the 2021 submission. The constant IEF was replaced with changing IEF. The recalculation for 2019 resulted in a decrease by 24.5 per cent (e.g., from 2.11 to 1.52 t/t). The ERT noted that the CO_2 IEFs for 2.B.1 Ammonia Production for 2019, 2021 (1.59 and - 1.64 t/t) are outside of the range of the IPCC default values (1.67–3.27 t/t). The inter-annual changes 2009/2010 (31.04 per cent), 2010/2011 (–12.90 per cent) and 2018/2019 (–14.17 per cent) are relatively larger than those of other reporting Parties. It is not clear to the ERT what are the specific adjustments or considerations that were made in the recalculation for 2019 that led to the observed decrease in CO_2 IEF from 2.11 to 1.52 t/t. Also, if there were any quality control measures or validation processes in place to ensure the accuracy and reliability of the emissions data provided by the ammonia plant. During the review the Party clarified that the calculation method has been revised from tier 1 to tier 2, considering natural gas used for ammonia production. AD is provided directly by the ammonia plant where data on the use of natural gas from 1990–2005 were obtained by calculation, as a percentage of the total production of ammonia, while from 2006–2021, actual data on natural gas consumption provided in accordance with (Letter of request No. 13-1-13 / 2380-I dated 07.26.2022 signed by the Authorized body), letter of response ref. No. 65-271-05 / 3349 dated 08.24. 2022 JSC “KazAzot”. The decrease in CO_2 IEF is caused by a decrease in the actual fuel consumption per unit	This recommendation will be taken into account when performing future NIR. Increase the transparency of the report, ensuring the accuracy and reliability of data on CO2 emissions from ammonia production

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
		of production. Moreover, the Party confirmed that data provided by KazAzot JSC is reliable and ensures the accuracy of the data. Enhance the transparency of the report by explaining the changes that resulted to the observed decrease in CO2 IEF from 2.11 to 1.52 t/t, and measures taken by the Party to ensure the accuracy and reliability of the emissions data provided by the ammonia plant.	
I.35	2.C.1 Iron and steel production – CO_2	The Party reported in NIR (Section 4.4.1.5, p.208) information on recalculations and improvements for the category 2.C.1 (Iron and Seel Production). The ERT noted that there was a significant recalculation for the CO_2 IEF for 2.C.1.d (Sinter) by 425.1 per cent from 0.17 to 0.88 t/t. The 2021 value is outside the IPCC default values (0.15 – 0.25 t/t). It was not clear to the ERT what are the factors that drove the substantial increase of 425.1 per cent in the CO2 for sinter production, and how does the newly adopted tier 2 methodology practically close to tier 3 contribute to this recalculated value, and also how were coke breeze and gas combustion emissions quantified. Moreover, it was not clear how was the accuracy and reliability of the recalculated emissions data verified and validated and if there were any external parties, audits, or procedures conducted to ensure the quality of the updated calculations. During the review week, the Party clarified that accounting for CO_2 emissions from sinter production was carried out not by default, but by the IPCC tier 2 method based on extended analysis, encompassing emissions from coke breeze use and gas combustion, spanning the years 1990 to 2020. In addition, the Party added that Arcelor Mittal Temirtau, JSC, initially used the IPCC tier 2 method for accounting CO_2 emissions from sinter production, but in response to a request from Zhasyl Damu JSC, they provided more detailed data on sinter production activities, including factors like gas consumption, materials used, and off-gas transport, which will likely facilitate a more accurate emission calculation. Moreover, the CO_2 emissions from sinter production were determined by two primary sources: emissions from the use of coke breeze and emissions from gas combustion, specifically including the consumption of coke oven gas by the sinter furnace and blast furnace gas for sinter production, with gas consumption calculated in "tsf" (tons of standard fuel) and TJ, factoring in the carbon content in natural gas, which was not considered in previous calculations that relied on default values and gas density conversions. Finally, the accuracy and reliability of the recalculated emissions data for the "Sinter Production" category were verified through a process similar to calculations performed by counterparts in the Russian Federation, following a training field seminar in September 2022 at the Institute of Global Climate and Ecology, and this verification is further ensured by checks conducted by various state bodies, including the Bureau of National Statistics of the Republic of Kazakhstan and the State Revenue Committee of the Ministry of Finance of the Republic of Kazakhstan, to maintain quality control over initial data and greenhouse gas emission calculations.	This recommendation will be taken into account when performing future NIR. Increase the transparency of the report by identifying the factors that led to the significant increase in IEF for sinter production

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
		Enhance the transparency of the report by reporting the factors that drove the substantial increase of 425.1 percent in the CO_2 IEF for Sinter production, how coke breeze and gas combustion emissions were quantified, and the assumptions and precautions taken by the Party to ensure the accuracy and reliability of the updated calculations	
I.36	2.C.3 Aluminium production – CO_2, PFC	The Party reported in NIR (Section 4.4.3, p.214) information on 2.C.3 (Aluminum production). The ERT noted that there was a significant recalculation for the CO_2 IEF for aluminum production with decrease by 66.6 per cent in 2019 (from 5.11 to 1.71 t/t), similarly, the by-product emissions of PFCs also decreased across the time series: with a decrease by 98.1per cent for 2019 (from 660,395.36 to 12,669.69 t CO_2 eq.). It was not clear from the NIR what were the specific technological or process changes implemented to achieve the significant reduction of 66.6 per cent in the CO_2 IEF for aluminum production and emissions reduction of PFCs by 98.1 per cent in 2019, and how were the "minutes of anode effect per bath-day" data provided by "Zhasyl Damu", JSC, validated to ensure their accuracy and reliability in recalculating PFC emissions. During the review, the Party clarified that CO_2 IEF were determined from laboratory studies conducted by JSC "Kazakhstan electrolysis plant" and were used for prebaked electrolyzers, with the data indicating 1.84 per cent sulfur and 0.3 per cent ash content in the baked anodes. Significant emission reduction in this category was mainly due to using minutes of anode effect per bath-day for all year compared to previous inventories using a fixed average value of 1.19 for Kazakhstan's anode effect. In response to inquiries from Zhasyl Damu JSC, JSC “Kazakhstan Electrolysis Plant” reported no changes in their aluminum production process but highlighted the addition of an anode production division since 2015. They provided comprehensive data, including aluminum production volumes and reducing agent usage from 2007 to 2021, allowing for more advanced calculations approaching level 3, which led to a recalculation of the entire series for the same period. The Slope method was employed to calculate PFC emissions in the GHG inventory, involving the relationship between CF4 emissions per tonne of aluminum production and minutes of anode effect per bath-day, with detailed anode effect data provided by JSC "Kazakhstan Electrolysis Plant" following a request from JSC "Zhasyl Damu" (Letter of request No. 13-1-13/2380-I dated 07.26.2022); prior to 2019, anode effect minutes were averaged at 1.19, and equation 4.26 from the 2006 IPCC Guidelines was used, with slope coefficients of 0.143 for CF4 and 0.121 for C2F6 Data provided by Kazakhstan Electrolysis Plant JSC in response to the request (Request Letter No. 13-1-13/2380-I dated 07.26.2022) and the subsequent response letter (ref. No. 01-16-3070 dated 15.08.2022) are considered reliable and accurate, as the request was endorsed by the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan, the Authorized National Body for Kyoto Protocol coordination, and Zhasyl Damu, JSC, is responsible for collecting, processing, and calculating greenhouse gas	This recommendation will be taken into account when performing future NIR reports. Increase the transparency of the report by providing more information about specific technological or technological changes in aluminum production in the Republic of Kazakhstan.

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
		emissions data according to NIR categories, as well as supporting the NIR review process Enhance the transparency of the report by reporting more information on the specific technological or process changes implemented to achieve the significant reduction of 66.6 per cent in the CO_2 IEF for aluminum production and emissions reduction of PFCs by 98.1 per cent in 2019, and how were the "minutes of anode effect per bath-day" data provided by "Zhasyl Damu", JSC, validated to ensure their accuracy and reliability in recalculating PFC emissions	
I.37	2.F.1 Refrigeration and air conditioning – HFC-143a	The Party reported in its NIR p.256 s.4.7.3.11 Recalculations and improvements states "all series were recalculated taking into account losses from the equipment used (bank), taking into account the time horizon and the rest of the substances." CRF Table 2(II)B-Hs2 has been updated for columns for stock and remaining in product and product life factor and disposal loss factor. However, subcategory 2.F.1.a Commercial Refrigeration constituent H-143a shows a disposal loss factor of 10 per cent when other entries are 100 per cent. During the review, the Party stated that there was probably a technical error when preparing the new data format and that it will revise the CRF Table 2(II)B-Hs2 Sub-category 2.F.1.a. - Commercial Refrigeration for H-143a in preparation of the next NIR in reference to the disposal loss factor. Improve its QA/QC process so that input errors such as the disposal loss factor of 10 per cent for 2.F.1.a Commercial Refrigeration (HFC-143a) are captured and potential underestimation or overestimation is avoided, as well as to clearly describe the context and assumptions for the choice of such factors.	The party accepts the ERT recommendation
I.38	2.F.1 Refrigeration and air conditioning – HFC-125, HFC-134a, HFC-143a	The Party reported in its NIR (p.249 s.4.7.3.7) existing semi-trailers were produced approximately in the last decade and according to technical regulations the service life of refrigerated semi-trailers is 10–12 years. NIR (p.250, s4.7.3.7) says refrigerated semi-trailers in service have a service life between 10–15 years and that refrigeration systems are replenished almost annually. However CRF Table 2(II).B-Hs2 for sub-category 2.F.1.d has product life factors of the range 3 – 5 per cent. The Party reports its Product life as default although 2006 IPCC Guidelines (Vol 3, Chap 7, s7.5.2.2, p7.51, Table 7.9) has range of 15 – 50 per cent. During the review, the Party stated that it will revise its comments to reflect the current situation more accurately with refrigerated trucks. The Party also provided an excel file where reviewer calculations give a percentage near the magnitude of the 3 – 5 per cent value (approximately 6.4 per cent). Present the Product Life Factor as country specific and not default if it estimates its own value and that it should improve the description of the technical context for improved transparency and therefore ensuring that it is not potentially underestimating or overestimating emissions from sub-category 2.F.1.d – Transport Refrigeration.PartyPartyPartyPartyPartyPartytierPartyPartyParty	The party accepts the ERT recommendation

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Party comments*
	2.F.4 Aerosols – HFC-134a	The Party in its NIR (p.258) states that special literature was studied which correlated the number of patients affect by bronchial disease with the number of patients who use metered-dose inhalers daily and reports the method to the tier 2 (p.260). The Party also states (p.257) that the life of the drug is only two-years which is consistent with the 2006 IPPC Guidelines (Vol 3, Chap 7, section 7.3.2.1). During the review, the Party states that it considers all emissions for the year from all inhalers used in total. Refers to its approach as a country-specific method as it does not follow the decision tree in the 2006 IPCC Guidelines (Vol 7, Chap 7, Fig 7.3) and change the reporting of the AD for average annual stocks) due to national circumstances. The ERT also recommends that it reports in operating systems in CRF Table 2(II).B-Hs2 as "NA" instead of "NO".	The Party asks to leave the remark, since the subcategory has been calculated, an approach is used to evaluate the initial data of AD, otherwise the IPCC methodology is used.
Agriculture			
A.12	3.A Enteric fermentation – CH_4	The Party reported that tier 2 was used to calculation CH_4 emissions from dairy cattle, non-dairy cattle and sheep in its NIR (p.272), while the key parameters for the calculation of gross energy were not reported such as daily weight gain for dairy cattle, non-dairy cattle and sheep, the live body weight at 1-year old or at the slaughter if slaughtered prior to 1 year of age for sheep in its NIR. During the review, the Party clarified that daily weight gain for cattle was taken as zero since there is no dynamic and reliable data on this issue. In the calculations of gross energy, the Party did not distinguish sheep by age composition, since there is no such statistical information in the country, just as there is no information on the weight characteristics of sheep at slaughter to one-year old. Transparently explain in its NIR what data and parameters have been used as input for the tier 2 estimates. The ERT also encourages the Party make every effort to collect daily weight gain for dairy and non-dairy cattle, weight gain and the live body weight at 1-year old or at the slaughter if slaughtered prior to 1 year of age for sheep to improve the accuracy of CH_4 emissions from dairy, non-dairy cattle and sheep.	The Party will make efforts to resolve this issue in the next inventory submission
A.13	3.A Enteric fermentation – CH_4	The ERT noted that the enteric fermentation is a key category according to the key category analysis reported by the Party in its NIR (p.44 and p.415). Dairy cattle, non-dairy cattle and sheep contributed more than 90 per cent of the total CH_4 emissions from enteric fermentation sector, accounted to 47.06, 27.38, and 15.91 per cent, respectively in 2021 (p.272). Enhanced characterization is required for each livestock species. Classification of livestock populations into subcategories for each species according to age, type of production, and sex is good practice according to 2006 IPCC Guidelines (2006 IPCC Guidelines p.10.9, chap 10, vol.4). However, the Party did not classify the key category into subcategories for dairy cattle, non-dairy cattle and sheep. During the review, the Party clarified that it has attempted to classify the livestock as much as possible in accordance with Chapter 10, vol. 4 of 2006 IPCC Guidelines, but	The Party will make efforts to find additional information to calculate methane emissions from enteric fermentation of animals

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		there is currently in the country no AD available to calculate tier 2 emissions for these animal subcategories. As a consequence, calculations were carried out at the level of animal species. Make every effort to subdivide cattle and sheep by subcategories and collect required data for to calculate GE based on the enhanced characterization in order to improve the accuracy of CH_4 emissions from enteric fermentation.	
A.14	3.A Enteric fermentation – CH_4	The Party reported the average live weight of dairy cattle during the entire time series in its NIR (p.274). The ERT noted that the average live weight of dairy cattle keeps unchanged, but the average daily milk production changes every year from the lowest 4.12 kg/day (in 1996) to the highest of 6.48 kg/day (in 2020), the difference is 57.3 per cent. During the review, the Party clarified that the live weight of cows was not collected by the national statistics, so the average value for all years was used. The Party currently have plans to indirectly adjust the live weight of cows for the entire time series. Make every effort to collect live weight of dairy cattle across the time series to reflect the actual productivity and to improve the accuracy of CH_4 emissions from enteric fermentation.	The Party will make efforts to find additional information to calculate methane emissions from enteric fermentation of animals
A.15	3.B.3 Swine – CH_4	The ERT reiterates the encouragement from the 2016, 2017, 2019 and 2021 annual review reports (FCCC/ARR/2016/KAZ, ID# A.17, FCCC/ARR/2017/KAZ, ID# A.13, FCCC/ARR/2019/KAZ, ID# A.15 and FCCC/ARR/2021/KAZ, ID# A.15, respectively) for the Party to make efforts to apply tier 2 methodology for the estimation of CH_4 emissions from MMS for swine. Default values for B_o of manure and VS from the 2006 IPCC Guidelines (vol. 4, chap. 10, annex 10A.2, table 10.A-7, p.10.80) could be applied.	The Party will make efforts to resolve this issue in the next inventory submission
A.16	3.B.5 Indirect N2O emissions – N_2O	The Party reported in its NIR (p.289) that the indirect emissions of N_2O as a result of nitrogen volatilization in the form of NH_3 and NOx were estimated using the 2006 IPCC Guidelines Equation 10.27. The ERT noted that the emission factors and the $Frac_{LossMS}$ under different manure management systems were not reported in the NIR. During the review, the Party provided worksheet to show that the default EFs and $Frac_{LossMS}$ from 2006 IPCC Guidelines were applied for calculate indirect N_2O emissions from manure management systems. Report the choice and the values used for the EFs and $Frac_{LossMS}$ in the estimation of the indirect emissions of N_2O in the next NIR	The Party will provide the necessary information in the next inventory submission
A.17	3.C.1 Irrigated – CH_4	The Party reported that rice is cultivated with a shortened period of flooding with the introduction of mineral nitrogen and organic fertilizers in its NIR (p.290). The Party also reported that the adjusted CH_4 emission scaling factor (SFo) for organic amendment is 3.10 using equation 5.3 and conversion factors in Table 5.14 of the chapter 5, volume 4 of the 2006 IPCC Guidelines (NIR, p.292).	The Party will provide the necessary information in the next inventory submission

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		The ERT noted that there was no information on the type(s) of organic amendment and the application rate(s) in the NIR and CRF Table 3.C of 2023 submission. During the review, the Party clarified that manure is usually used as an organic additive when growing rice in the Kazakhstan and its application rates were estimated at 41–42 tons of farm manure per hectare. Iimprove the methodology for this category, including the use of data on the type of organic amendments, and its application rates during rice cultivation.	
A.18	3.D.a Direct N2O emissions from managed soils – N_2O	The Party reported that the planting areas of rice from 1990 to 1996 are 90.0–124.0 thousand hectares in table 5.26 of its NIR (p.291). The Party also reported that the mineral nitrogen fertilizers applied to the rice fields to be zero in table 5.28 of the NIR (p.295–296) for the same period. The mineral nitrogen fertilizers applied to rice fields were reported for the rest of the time series. As the N_2O EF of rice field is lower than upland fields, this could cause the higher estimates of N_2O emissions from application of mineral fertilizers for the period of 1990 to 1996. During the review, the Party clarified that the calculation of emissions relied on official data from the National Bureau of Statistics. The application of mineral fertilizers to the rice fields for 1990–1996 will be rechecked in the next NIR. Check application of mineral fertilizers with the official data from the National Bureau of Statistics. If the application of mineral fertilizers in the official data from the National Bureau of Statistics, Conduct survey and provide AD of mineral fertilizers applied to the rice fields based on survey results or conduct analysis on the relationship of rice planting area and the mineral fertilizer applied to the rice fields using the data from 1997–2021, and make assumption for mineral nitrogen fertilizers applied to rice fields during 1990–1996 based on the analysis.	The Party will provide the necessary information in the next inventory submission
A.19	3.D.a.5 Mineralization/immobilization associated with loss/gain of soil organic matter – N_2O	The Party reported that the amount of nitrogen released during the mineralization of organic matter in the soil was calculated using data on changes in the reserves of organic carbon in the soil of arable land in accordance with the IPCC Guidelines, 2006 in its NIR (p.299). The ERT was unable to replicate the calculations of AD of N in mineral soils that is mineralized in association with loss of soil carbon (Table 3.D) using equation 11.8 of the 2006 IPCC Guidelines (vol. 4, chap. 11, p.11.16), the net carbon stock change in mineral soils (table 6.3.5, p.354, CRF table 4.B) and the C:N ratio of arable land reported in its NIR ((10:1.01 p.299). During the review, the Party clarified that only arable land that is in crop rotation rather than entire volume of carbon loss from cultivated lands was included in the calculation of N from mineralized in association with loss of soil carbon. The Party also confirmed that it is not possible to provide the net soil organic carbon stock changes for arable land remaining in crop rotation, arable land removed from crop rotation to fallow (pastures), lands returned to crop rotation and perennial plantings, respectively, due to	The Party will revise estimates of nitrogen emissions from mineralization/immobilization associated with loss/gain of soil organic matter in its next inventory submission

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		the inconsistency in the source data for calculating the changes. When preparing the next NIR, this discrepancy will be eliminated. Report (a) the nitrogen from mineralization associated with loss of soil organic matter under the cropland subcategories of arable land remaining in crop rotation, arable land removed from crop rotation to fallow (pastures), lands returned to crop rotation and perennial plantings, respectively; (b) ensure the consistency between the net carbon storage changes used for the calculation of N from mineralization associated with the net carbon storage changes in cropland categories under LULUCF sector; (c) revise the estimates for subcategory 3.D.a.5 mineralization/immobilization associated with loss/gain of soil organic matter in CRF table 3.D for the entire time series in the next submission.	
A.20	3.D.b Indirect N2O emissions from managed soils – N_2O	The ERT was unable to repeat the calculation of nitrogen leaching and run-off (3.C.b.2) using the values of $Frac_{LEACH-(H)}$ (0.1) and the AD of N inputs to the soils from inorganic N fertilizers, organic N fertilizers, nitrogen from urine and dung deposited by grazing animals, nitrogen from crop residues, mineralization/immobilization associated with loss/gain of soil organic matter reported in Table 3.D of CRF. The calculated nitrogen leaching and run-off (3.C.b.2) is 266,718,360 kg N/yr by the ERT vs. 267,431,197 kg N/yr in the table 3.D of CRF. During the review, the Party provided worksheet to show the calculation of nitrogen leaching and run-off. The total nitrogen leaching and run-off is 267,431,197 kg N/yr same as reported in table 3.D of CRF. The ERT noted that the calculated of nitrogen from crop residues was 187,880,000 kg N/yr in the worksheet vs 180,750,000 kg N/yr in the in CRF table 3.D (3.D.a.4). The Party confirmed there is a technical error occurred for nitrogen from crop residues in the worksheet, which caused the wrong estimation of total nitrogen leaching and run-off in Table 3.D (3.D.2b.2) of the CRF. Improve the QA/QC procedures and revise the calculations of nitrogen leaching and run-off according to the observed errors.	The Party will make efforts to resolve this issue in the next inventory submission
LULUCF			
L.24	4.B.1 Cropland remaining cropland – CO_2	The Party reported in its CFR table 4.1, table 4.B and table 4(III), the cropland is 35,566.8 kha, while it is 31,957.3 kha (total of the crop land area) in the NIR (table 6.3.5, p.354–355). During the review, the Party clarified that the area of all arable land for 2021 is 35,566.8 hectares, of which arable land in crop rotation is 21419.5 thousand hectares, fallow land (grassland) is 9072.1 thousand hectares, arable land returned to crop rotation is 5027,2 thousand hectares, perennial plantings 148 thousand hectares. However, the ERT noted that new provided values are still inconsistent with the total area provided in CRF table 4.1, table 4.B and table 4(III). The Party reports that an error was made when filling out table 6.3.5 in column (4) subcategory of arable land returned to the crop rotation of the NIR 2023. Strengthen its QA/QC procedures to ensure consistency within the CRF tables and between the CRF tables and the NIR.	The Party reports that the area of all arable land for 2021 is 35,566.8 hectares, of which arable land in crop rotation is 21319.5 thousand hectares, fallow land (grassland) is 9072.1 thousand hectares, arable land returned to crop rotation is 5027,2 thousand hectares, perennial plantings 148 thousand hectares. The party reports that an error was made when filling out table 6.3.5 in column (4) subcategory of arable land returned to the crop rotation of the NIR 2023. The area of arable land for 2021 is 35,566.8 hectares, indicated in the

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			CRF, is correct. The party also reports that in the next report it will strengthen cross-checking to eliminate technical errors. Due to the fact that the Party provided the necessary information in the NIR, the Party kindly requests that this issue be considered resolved
Waste			
W.35	5.A Solid waste disposal on land – CH_4 and N_2O	The Party recalculated emissions from 5.A Solid waste disposal on land since the previous submission. During the review, the Party informed that semi-aerobic landfills in Almaty was removed from the 2023 submission since it found that there is no such landfill, and the information in the previous submission were incorrect. Further, the Party explained that the recalculation was done for the entire time series, for the landfill of the city of Astana and all other polygons of Kazakhstan. However, the ERT noted that the details of the recalculation were not well-documented. In order to understand the AD, methodologies and parameters used, the ERT requested the Party to share the IPCC FOD Excel spreadsheets and asked various clarifying questions on used AD, parameters, including DOC values. While reviewing received information, the ERT noted many inconsistencies between the NIR, CRF tables and the FOD Excel spreadsheets, on the information around e.g., the total amount of disposed waste by categories of SWDS (Astana and the rest of the country), used MCF factors (0.4 for unmanaged landfill – shallow reported in the NIR against 0.8 for unmanaged - deep used in the estimation files and 1 for managed landfills). There is a table 7.3 with population data in the NIR, however, it was not clear how those data are applied in the emissions estimates. In the FOD model provided, annual waste generation rates were indicated, however, the ERT was not able to reproduce the estimated emissions. During the review, the Party clarified that it estimated emissions using the volume of total MSW generated annually provided by the National Statistical Office. The Party allocated a part of volumes of waste to the city of Astana and categorized it as managed, and the MSW generated in rest of the country was categorised as unmanaged. In estimating emission, the Party applied the IPCC tier 1 methodology, using the IPCC default DOC value for the bulk waste (0.15). All unmanaged waste landfill sites are considered as deep and MCF of 0.8 was applied. To recalculate the emissions from the solid waste disposal for the entire time series using the IPCC FOD tier 2 method, by doing the following: (a) Revise the AD on municipal solid waste disposed at national level, based on the official statistics, where available; (b) Noting that Astana was built as a new capital city in 1997:	All the points of the recommendation will be taken into account in the next submission.

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		- identity when the city was equipped with the managed landfill site, and remove the historical waste data of Astana prior to that year in estimating emissions from that city, - then, include the historical data of Astana under the category of unmanaged in estimating emissions from the unmanaged landfills; (c) Distribute correctly the MSW data among different categories of SWDS: managed, unmanaged, deep and shallow; (d) Revise the DOC values according to the morphological composition of waste along the time-series; (e) Conduct an additional study/literature research to distinguish between different climate zones in the country and calculate emissions from these zones separately, in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 3.2.1.1, p.3.11), in order to identify appropriate values of *k* that are required for the IPCC FOD tier 2 method; (f) Obtain data on generation and management of industrial waste, estimate and report emissions for the completeness of this category; (g) Obtain data on generation and management of sludge disposed in landfills, estimate and report emissions for the completeness of this category; (h) Implement a QA/QC checks to ensure that the data and the method applied provided in the NIR are consistent with the latest data in the submitted CRF tables; (i) Provide well-documented information on the recalculation in the NIR, including the MSW per categories of SWSD, clear and comprehensive descriptions of the AD and other parameters used for the emissions estimates and how the time-series consistency was ensured, for the transparency of reporting Include the reference of the statistical data and other sources of information used, including the direct links where available, in order to allow the ERT to understand and reproduce the waste sector inventory.	
W.36	5.C.1 Waste incineration – CO_2, CH_4 and N_2O)	The Party reported in its NIR (p.402, English version) that, in 2021, there was a significant decrease in emissions from the incineration of medical waste (253 times less). It is also stated in the NIR (p.402, English version) that, in the course of informal correspondence, it was found that, approximately 400 enterprises out of 1,000 did not report in 2021, which affected the final figure that shows the strong decrease in the final years. The ERT considers that there is a lack of completeness for 2021 with an underestimation of the emissions, since 40 per cent of the incineration facilities were not included in the emissions estimates.	When developing the next NIR, the Party intends to recalculate the entire time series based on data received in response to our request from the Ministry of Health of the Republic of Kazakhstan, since the IAC data looks heterogeneous and unreliable.

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		During the review, the Party informed that, due to the fact that the data received from the Information and Analytical Center (IAC) is very heterogeneous, data from the Ministry of Health of the Republic of Kazakhstan will be used for a new NIR. The entire time series will be recalculated (Also See W38). Take necessary steps to collect AD from all medical incineration facilities in the country in order to avoid underestimation of emissions under this category. In case of lack of response for part of the facilities, the Party may use the methods to fill the data gap in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 5 Time Series Consistency), in order to avoid such a large omissions and inconsistencies in the emission trends.	
W.37	5.C.1 Waste incineration – – CO_2, CH_4 and N_2O)	The Party reported in its NIR (p 404, table 7.23 English version) total emission from medical waste incineration. The ERT noted that emissions reported for 2016 (60.45 kt CO_2 eq) and 2017 (33.37 kt CO_2 eq) were higher than in 2020 (30.97 kt CO_2 eq) when the amount of incinerated medical waste was higher due to COVID-19. In the NIR (p.402 English version), the Party explains that initial data were derived from two different sources of information: for the period up to 2018 data were provided by the Ministry of Health, and for 2019–2021, Information and Analytical Center (IAC). However, the ERT noted that the NIR contains no overall explanation as to how time-series consistency between the data until 2018 (from the Ministry of Health) and the AD for the rest of the time series (from IAC) was ensured. During the review, the Party informed that the peak for 2016 and 2017, indicated in the data from the ministry of Health is most likely only a trend towards gradual growth, while data from IAC shows a rapid decline. Eensure the consistency of the time series in accordance with the 2006 IPCC Guidelines (Volume 1, Chapter 5) by using the same method and data source(s) in all years or by applying an appropriate splicing technique for combining different methods or data sets.	To ensure consistency of time series according to IPCC Guidelines 2006, when developing the next NIR, the entire time series will be recalculated using the original data (AD) received from the Ministry of Health of the Republic of Kazakhstan.
W.38	5.D.1 Domestic wastewater – CH_4	The Party reported in its NIR (section 7.3.1.4, p.390e), that recalculations for the category were made for the entire period in connection with the clarification of the total mass of organic materials in wastewater The ERT noted that significant impact of recalculation (from NIR 2021) were observed for 1990 (–6.48 per cent), 2016 (–2.38 per cent), however, the method, approach and assumptions used in obtaining updated total mass of organic materials are provided in the NIR. The ERT also noted that the NIR does not include a justification indicating how the change improved the emissions estimates and the impact of the recalculation across the time series. During the review, the Party clarified that the data on the use of toilet types from the Bureau of National Statistics for 2020–2021 were obtained. Due to the change in the distribution of the types of toilets used, emissions have increased since 2020. Provide well-documented information on the recalculation in light of para. 44 of the UNFCCC Annex I inventory reporting guidelines, when recalculation is conducted.	The results of the emissions reflected in the previous presentation of 2021 (Table 7.8) are consistent with the results in 2023. Emissions for 2020-2021 were calculated based on data from the Bureau of National Statistics. The Party does not consider the recommendation justified.

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W.39	5.D.1 Domestic wastewater – CH_4	The Party reported in its NIR (p.386) that there are no data on the use of septic tanks in national statistics for the period 1990–2004. The ERT considers that this does not necessarily mean that there were no septic tanks used in 1990–2004. During the review, the Party clarified that according to national statistics, until 2005, the percentage of types of toilets used was distributed only between the latrine and the sewer and thus, septic tanks were not used until 2005. The ERT considers this approach affects the accuracy of the emission estimates under this category since the default MCF of septic tanks (0.5)(see Table 6.3 Chap 6 Vol 5 2006 IPCC Guidelines) is higher than those of the other systems that are reported in the country (NIR, p 384): Centralize aerobic treatment plant (MCF 0.3) and Latrine (MCF 0.1). Further investigates the occurrence of septic tanks during the time series of 1990–2004 and estimate relevant emissions or provides the information that justifies that septic tanks were not used in the country until 2005.	The information will be clarified with the state body of the Bureau of National Statistics of the Republic of Kazakhstan.
W.40	5.D.1 Domestic wastewater – CH_4	The Party reported in its NIR (p.384) table 7.7, values of MCF and CH_4 emission factor for the different domestic wastewater treatment/discharge systems: centralized aerobic water treatment plants and septic systems and latrine. The ERT noted that the NIR does not explain if there is industrial co-discharge in the domestic wastewater treatment systems. The ERT also noted that there is no reference in the NIR of which I value (correction factor for additional industrial discharges of BOD into sewers) was used to estimate CH_4 emission for each system in urban and rural areas. During the review, the Party clarified that the industrial wastewater is not discharged without treatment. Include clear information in its next NIR on the information of co-discharge of industrial wastewater into the domestic wastewater treatment systems and on the information about the I value used to estimate CH_4 emissions in accordance with equation 6.3 Chapter 6 Vol 5 of the 2006 IPCC Guidelines.	The Party will take the recommendation into account in the next submission.
W.41	5.C.2 Open burning of waste – CO_2, CH_4, N_2O	The Party reported in its NIR (p.378 English version) an estimation of potential emissions from open burning of waste, based on rural population. The ERT noted that the NIR did not contain any relevant information on the composition of the incinerated waste including the type of burned waste and the data source used in the estimates. During the review, the Party clarified that Equation 5.7 of Chapter 5, Volume 5 of the 2006 IPCC Guidelines was used to calculate the total amount of municipal waste subjected to open incineration and the share of the population burning waste is recognized as 0.35, but no further information on incinerated waste composition was provided. The ERT noted that according to the 2006 IPCC Guidelines (vol.5, chap. 5, section 5.4.1) waste composition is needed to estimate the Dry matter content in per cent of wet weight, Total carbon content in per cent of dry weight and fossil carbon fraction in per cent of total carbon content, parameters that are used to estimate CO_2 emissions 2006 IPCC Guidelines (vol.5, chap. 5, section 5.2.1.1).	The Party will take the recommendation into account in the next submission.

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		Enhance the transparency of the NIR by including relevant information of the composition of the open incinerated waste and the parameters used to estimate CO_2 emissions from open burning of waste	