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**Report for the Stage 3 in-depth review of emission
inventories submitted under the UNECE LRTAP
Convention and EU National Emissions Ceilings
Directive for:**

**STAGE 3 REVIEW REPORT
AZERBAIJAN**

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INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention is given by the UNECE document '*Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols*' ⁽¹⁾ – hereafter referred to as the 'Methods and Procedures' document.
2. This annual review, has concentrated on SO₂, NO_x, NMVOC, NH₃, plus PM₁₀ & PM_{2.5} for the time series years 1990 – 2016 reflecting current priorities from EMEP Steering Body and the Task Force on Emission Inventories and Projections (TFEIP). HMs and POPs have been reviewed to the extent possible.
3. This report covers the stage 3 centralised reviews of the UNECE LRTAP Convention and EU NEC Directive inventories of Azerbaijan coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 18th June 2018 to 21th June 2018 in Copenhagen Denmark and was hosted by the European Environment Agency (EEA). The following team of nominated experts from the roster of experts performed the review: Generalist – Ben Pearson (UK), Energy – Marion Pinterits (EC) and Isabelle Higuët (Belgium), Transport – Magdalena Zimakowska-Laskowska (Poland) and Giorgos Melios (Greece), Industry – Julien Jabot (Norway) and Ben Pearson, Agriculture & Nature – Anais Durand (France), Waste – Kees Peek (Netherlands).
4. Elisabeth Rigler (Austria) was the lead reviewer. The review was coordinated by Katarina Marečková, (EMEP Centre on Emission Inventories and Projections - CEIP).

¹ Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols. Note by the Task Force on Emission Inventories and Projections.
ECE/EB.AIR/GE.1/2007/16
http://www.ceip.at/fileadmin/inhalte/emep/review/RevGuid_ece.eb.air.ge.1.2007.16.e.pdf

PART A: KEY REVIEW FINDINGS

5. The inventory is generally in line with the EMEP EEA Inventory Guidebook and the UNECE Reporting Guidelines. However, in many cases emissions appear to have been estimated using previous versions of the 2016 EMEP/EEA Emission Inventory Guidebook. Transport emissions are reported based on fuel used.

6. The ERT commends Azerbaijan for providing an IIR and for responding to questions raised by the ERT during the review of the inventory, both of which enabled the ERT to provide recommendations for the further development of the inventory.

7. The ERT found the emission inventory and the IIR to be generally of good quality. Recommendations to further improve the inventory are provided below.

INVENTORY SUBMISSION

8. Azerbaijan submitted the inventory under the UNECE CLRTAP on 28th February 2018, after the deadline of 15th February. The inventory was submitted in NFR 2014 format and covered the Protocol base years and a full time series for 1990 - 2016 (the latest year) for NO_x, NMVOC, NH₃, PM₁₀, PM_{2.5}, TSP and Hg, and for most other pollutants a full time series for the years since 1995. BC has been reported for the years 2014-2016. NFR tables were resubmitted on 27th March 2018. Azerbaijan also submitted an IIR on 27th March 2018, after the deadline of 15th March.

9. The submission did not include data on projections or gridded emissions data. Regarding the reporting of projections, Azerbaijan indicated the need for support from TFEIP to prepare emission projections and gridded data. The ERT welcomes this development.

10. The ERT concludes that the inventory submitted by Azerbaijan is generally of good quality and is in general well documented in the Informative Inventory Report (IIR).

KEY CATEGORIES

11. Azerbaijan has compiled and presented in its IIR a level Key Source Category Analysis for the following pollutants: NO_x, CO, NMVOC and NH₃. All sectors have been included. The level assessment is performed for 2016 for all four of these pollutants.

QUALITY

Transparency

12. The ERT recognises the level of effort undertaken by Azerbaijan in providing an inventory with a significant level of detail, which makes it possible to undertake a detailed review. The IIR is clearly structured and well presented, covering all of the key areas required. The ERT encourages Azerbaijan to continue to develop the IIR with some additional descriptions in particular for agriculture and waste. The ERT also encourages the Party to provide more detailed and specific descriptions

regarding the methodologies for each sector, including the source of emission factors and the Guidebook Tier of the approach used where appropriate.

13. The ERT commends Azerbaijan for the extensive use of notation keys throughout reporting tables, facilitating a clear understanding of the completeness of the inventory across the time series. For some sectors however there is some inconsistency in the choice of notation keys across the time series, particularly between the "NE" and the "NA" notation key. For example in general where emissions of a pollutant have been estimated for a sector for one or more years, and/or EFs are available in the Guidebook, it would not be expected that the value is reported as "NA" for any year. Conversely where a pollutant is reported as "NA" for a sector, it would be expected that there would be no need to use the "NE" notation for any year without estimates. The ERT encourages the Party to review such discrepancies ahead of future submissions to further improve the transparency of the submission.

Completeness

14. The ERT acknowledges the effort to which Azerbaijan has gone to provide estimates of emissions for all sub-sectors and all pollutants reviewed.

15. Azerbaijan's inventory for the pollutants reviewed is generally complete for recent years for the key categories in its inventory. However, there are significant variations in completeness across the time series. Relatively few sectors have been reported for the period covering 1995-2006, and even fewer for 1990-1994. During the review Azerbaijan has indicated that it experiences significant difficulty to find data for earlier periods, but will continue the efforts to improve the completeness, which the ERT commends.

16. The ERT identified some possible missing sources in the agriculture, waste and solvents sectors. The ERT considers these sources have little influence on the national total but encourages Azerbaijan to provide a rationale for excluding and/or descriptions of plans to estimate these sources/regions/pollutants/species in the IIR.

17. The ERT recommends that Azerbaijan performs additional reviews to identify potential gaps in the inventory. The correct usage of notation keys is highly recommended to support the finding of such gaps.

Consistency, including recalculations and time-series

18. Azerbaijan has undertaken no recalculations between its 2017 and 2018 submissions, however the Party indicates that it is planning to recalculate a number of sectors for future submissions. The ERT would encourage that in conjunction with these recalculations Azerbaijan provides detailed information on the rationale as well as the impacts of the changes on the national estimates and time series in its future IIR submissions.

19. There ERT noted apparent inconsistencies across the time-series for a number of sectors, and it is understood that these most likely arise from discontinuities in methodology since previous years have not been revised in line with the latest year's data. Specific inconsistencies are in general not described fully

in the latest submission, and the ERT would encourage Azerbaijan to make an effort that such descriptions are provided in the IIR in future submissions.

Comparability

20. The ERT notes that the inventory of Azerbaijan is comparable with those of other reporting parties, although in many cases emissions appear to have been estimated using previous versions of the 2016 EMEP/EEA Emission Inventory Guidebook. The ERT encourages the Party to update calculations for all years in future submissions to reflect the latest version of the Guidebook.

21. The allocation of source categories generally follows that of the EMEP/UNECE Reporting Guidelines, and the ERT encourages Azerbaijan to continue with this approach of national inventory calculation.

CLRTAP/NECD comparability

22. As a non-EU country, Azerbaijan does not report emissions under the NEC Directive.

Accuracy and uncertainties

23. Azerbaijan has not compiled uncertainty estimates for its UNECE submission, however in the IIR it is indicated that this is planned for future submissions. The ERT encourages Azerbaijan to compile at least Tier 1 uncertainty estimates for future submissions at the earliest possible opportunity.

Verification and quality assurance/quality control approaches

24. Azerbaijan indicates that a quality assurance/quality control (QA/QC) system is in place to ensure completeness, exactness, and transparency of submitted data, in which each calculation is checked and reviewed by the inventory group. The Party's IIR does not however go into sufficient detail to ascertain whether this is in accordance with the EMEP/EEA Guidebook (Inventory Management Chapter).

25. The ERT commends Azerbaijan on its general quality assurance/quality control (QA/QC) activities. However, sector specific checks are not documented in the IIR. The ERT encourages Azerbaijan to provide information on sector specific information on QA/QC procedures in future submissions.

FOLLOW-UP TO PREVIOUS REVIEWS

26. Following the previous Stage 3 review in 2015 Azerbaijan has implemented a number of improvements recommended by the ERT, including estimating emissions of black carbon from all sectors, NH₃ from 1A4bi from 2014 onwards, and emissions of all pollutants from 1A2gviii for 2015 only. Azerbaijan has further indicated in its IIR that estimation of uncertainties is planned as a future improvement, as recommended in the previous Stage 3 review.

27. Azerbaijan has not yet implemented several recommendations from the previous Stage 3 review, and these are again recommended by the ERT following this review.

AREAS FOR IMPROVEMENTS IDENTIFIED BY AZERBAIJAN

28. The ERT commends Azerbaijan for its improvement in the temporal and sectoral scope of its inventory over recent years, as well as the Party's expressed intention to continue its ongoing improvement plan. The IIR identifies a number of key areas for improvement, and the ERT commends the provision of this information and concurs this with the areas identified, which include:

- (a) The intention to make further improvements to enhance emission data and covered categories, to make data more comparable and consistent through recalculations, and to incorporate Tier 2 methodologies for key categories.
- (b) The planned estimation of uncertainties in line with EMEP guidelines; the ERT encourages this as a useful tool for pinpointing sectors to focus efforts on to improve accuracy.
- (c) An expressed interest in submitting projections and gridded data, and a requirement for assistance in preparing these in accordance with the guidelines. The ERT would encourage this endeavour and considers it a valuable use of additional resources if these are required.

29. Further to these identified improvements, the ERT encourages Azerbaijan to take steps to improve the level of detail presented in its IIR, particularly ahead of any future reviews.

30. The ERT recognises the keen interest which Azerbaijan has taken in technical improvements and training for the inventory team, and encourages the continuation of this as a focus for the Party.

TECHNICAL CORRECTIONS CONSIDERED AND OR CALCULATED BY ERT

31. The IIR identified several significant inconsistencies in the inventories and proposed technical corrections for sectors 1A1a, 1A3bi, 1A3biii, 1A3biv, 2A1, 2C6, 2C7a, 2D3a, 2D3b and 2H1 to the country. For more detailed information go to sectoral chapters.

Table 1 Summary of potential technical corrections identified by ERT for country

NFR category (s)	Pollutants	Years	Calculated by country/ ERT Not calculated	Potential contribution to NT (%)
1A1a	NO _x , NMVOC, SO _x , PM _{2.5} , PM ₁₀ , TSP, BC, CO, Pb, Cd, Hg, As, Cr, Cu, Ni, Se, Zn, PCDD/F, PAHs,	2005, 2010, 2016	ERT	
1A3bi	SO _x , PM ₁₀ , TSP, Cd, Hg, As, Cr, Cu, Ni, Se, Zn	2005, 2010, 2016	ERT	
1A3biii	SO _x , PM ₁₀ , TSP, Cd, Hg, As, Cr, Cu, Ni, Se, Zn	2010, 2016	ERT	
1A3biv	PM _{2.5} , PM ₁₀ , TSP	2010, 2016	ERT	
2A1	BC	2005, 2010	ERT	
2C6	Pb, Cd, Hg, Zn, PCBs	2010	ERT	
2C7a	Pb, PCBs, Cu, As,	2010	ERT	
2D3a	Hg, NMVOC	2005, 2010, 2016	ERT	
2D3b	BC	2010, 2016	ERT	
2H1	BC	2005, 2010, 2016	ERT	
3Da1	NH ₃ , NO _x , NMVOC, PM ₁₀ , PM _{2.5}	1990, 2005, 2010, 2016	ERT	

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

32. The ERT identifies the following cross-cutting issues for improvement. ERT recommends that Azerbaijan :

- (a) Completes the KCA for the remaining pollutants and provides results in the IIR in standard format.
- (b) Checks the use and documentation of notation keys and improves the allocation of emissions.
- (c) Further improves the documentation of methodologies used to estimate emissions, especially regarding EFs and AD and background information.
- (d) Provides recalculations for historic years so that the inventory is consistent and comparable across the time series, and outlines rationales for the recalculations and information on the impacts on emission levels for the time series in the IIR.
- (e) Completes the inventory by estimating and reporting missing emission values and that it specifies whether sources exist or not, and provides reasons for cases where emissions are not estimated in the IIR.
- (f) Provides explanations for the drivers behind the emission trends in the IIR.
- (g) Moves on to higher tier methods, at least for key sources.
- (h) Carries out uncertainty analysis and reports the results in the IIR, and that it uses the results of the analysis to prioritise improvements for the inventory.
- (i) Includes more details of sector specific QA/QC practices and includes the results of the work in the IIR.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Pollutants Reviewed		all		
Years		1990 – 2016		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
1A1a	Public electricity and heat production	X		X
1A1b	Petroleum refining	X		X
1A1c	Manufacture of solid fuels and other energy industries	X		X
1A2a	Iron and steel	X		
1A2b	Non-ferrous metals	X		
1A2c	Chemicals	X		
1A2d	Pulp, Paper and Print	X		
1A2e	Food processing, beverages and tobacco	X		
1A2f	Stationary combustion in manufacturing industries and construction: Non-metallic minerals	X		
1A2gviii	Stationary combustion in manufacturing industries and construction: Other	X		
1A3ei	Pipeline transport	X		X
1A3eii	Other		X	
1A4ai	Commercial/institutional: Stationary	X		
1A4bi	Residential: Stationary	X		X
1A4ci	Agriculture/Forestry/Fishing: Stationary	X		
1A5a	Other stationary (including military)		X	X
1B1a	Fugitive emission from solid fuels: Coal mining and handling		X	
1B1b	Fugitive emission from solid fuels: Solid fuel transformation		X	
1B1c	Other fugitive emissions from solid fuels		X	
1B2ai	Fugitive emissions oil: Exploration, production, transport	X		
1B2aiv	Fugitive emissions oil: Refining / storage	X		
1B2av	Distribution of oil products	X		
1B2b	Fugitive emissions from natural gas (exploration, production, processing, transmission, storage, distribution and other)	X		
1B2c	Venting and flaring (oil, gas, combined oil and gas)	X		X
1B2d	Other fugitive emissions from energy production	X		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which have and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

33. The IIR contains only a brief description on trends, methodology and the description of source categories. Information on recalculations and the uncertainty analysis are missing. The ERT encourages Azerbaijan to elaborate the description of trends, recalculations, methodology and uncertainty analysis to enhance transparency.

34. In several cases a misleading notation key was applied (see paragraphs 43, 46). The ERT encourages Azerbaijan to use the appropriate notation keys (e.g. "NO" where emissions are "Not Occurring", "NE" where emissions are "Not Estimates" and "IE" where emissions are "Included Elsewhere") for reporting where estimates are not available or necessary.

Completeness

35. Data is mostly provided from 1995 onwards, sometimes from 2007 onwards (e.g. emissions in sector 1A4bi), for other years and gaps in the time series, the notation key "NE" is applied (see paragraph 44). The ERT recommends Azerbaijan to provide the full time series for all relevant sources and years.

36. In several cases the notation key "NE" is applied where relevant emissions can be expected (see paragraphs 44, 45, 49).

37. The ERT encourages Azerbaijan to include all relevant sources to calculate emissions (see paragraph 42) in order to avoid underestimations.

Consistency including recalculation and time series

38. The ERT identified outliers in the time series for e.g. reported emissions from category 1A4bi (see paragraph 47). The ERT encourages Azerbaijan to provide a consistent time series for calculated emissions.

Comparability

39. Azerbaijan applies a Tier 1 method for the calculation of all identified key categories. The ERT recommends Azerbaijan to apply a higher tier method to calculate emissions from key categories.

Accuracy and uncertainties

40. The ERT encourages Azerbaijan to undertake an uncertainty analysis for the energy Sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

Improvement

41. ERT notes the Parties intention to improve emission data and covered categories. The ERT encourages Azerbaijan to include new information on trends, methodology and uncertainty and to implement planned improvements.

Potential Technical Corrections

42. The ERT notes that Azerbaijan is reporting significant inconsistencies in NFR category 1A1a. To a question raised by the ERT Azerbaijan stated, that only for the years 2015 and 2016 additionally to gaseous fuels also liquid fuels are included in the calculation of emissions from this source, and for the years 2007-2014 only gaseous fuels are included in the calculation of emissions. For all other years no activity data are available. **The ERT applied a technical correction for the years 2005, 2010 and 2016** using activity data reported by the party and activity data from the International Energy Agency for those years, where no activity data were reported by the Party.

43. The ERT strongly encourages Azerbaijan to include activity data of liquid fuels to calculate emissions from this source and to provide recalculated data for the whole time series for its next submission.

Sub-Sector Specific Recommendations

Category issue 1: 1.A.1.b Petroleum Refining – All Pollutants

44. The ERT identified that emissions from this category are only reported for the years 2010-2014, emissions from all other years are reported as not estimated (notation key “NE”). Table 4-1 of the IIR, page 17, states that emissions occur but are not estimated due to a lack of emission factors in methodology (2016 EMEP/EEA Guidebook). To a question raised by the ERT on why emissions are not calculated from this source for the whole time series, Azerbaijan replied that statistical data were only obtained for this period of time and not for the whole time series. Additionally the explanation in table 4-1 of the IIR for the notation key “NE” only applies to NH₃, HCB and PCBs due to the lack of methodology, for all other pollutants the reason for the notation key “NE” is the lack of statistical data. The ERT recommends Azerbaijan to correct the information provided in table 4-1 according to the explanation given by the Party and to collect statistical data on fuel consumption in refineries to estimate emissions from this source in for the whole time series its next submission.

Category issue 2: 1.A.1.c Manufacture of solid fuels and other energy industries – All pollutants

45. Azerbaijan reports emissions from category 1A1c as not estimated (notation key “NE”). As raised in the previous Stage 3 review report, the ERT identified that emissions from the consumption of fuels in connection with oil and gas exploration/production are considered to be relevant. Azerbaijan stated to a question asked by the ERT, that statistical data for this source was yet difficult to obtain. The Party will start an obtaining procedure involving all stakeholders and collaboration with the GHG inventory team to resolve this issue. The ERT recommends Azerbaijan to collect the relevant statistical data and to estimate emissions from this source for the next submission.

Category issue 3: 1.A.3.ei Pipeline transport - All Pollutants

46. Emissions from pipeline transport are reported as not applicable (notation key “NA”). Azerbaijan responded to a question raised by the ERT, that emissions from combustion in compressor stations are included under category 1A4ai (Commercial/institutional: stationary) as data used for calculations under this category covers fuel use for all commercial activity. The ERT recommends Azerbaijan to change the notation key from “NA” to “IE” for all relevant pollutants and describes in the IIR, where emissions from this source are included.

Category issue 4: 1.A.4.bi Residential stationary – All pollutants

47. During the review the ERT highlighted that Azerbaijan reports a decrease of emissions of all main pollutants, heavy metals, particulate matter and POPs in category 1A4bi (residential combustion) between -24% and -77% between 2015 and 2016. Only Hg and NO_x are not following this trend with an increase of emissions of +13% and +12%, respectively. Azerbaijan states in its IIR that emissions from this source are calculated with a Tier 1 method applying a default emission factor from the EEA/EMEP Guidebook 2016. The ERT recommends Azerbaijan to recalculate emissions from this source applying the methodology consistently for the whole time series for its next submission.

Category issue 5: 1.A.5.a Other stationary (including military) - All Pollutants

48. Emissions from stationary military plants are reported as not applicable (notation key “NA”) as noted in previous review reports. To a question raised by the ERT, Azerbaijan replied that military plants are considered as commercial and are included in categories 1A4ai and 1A4aii. The ERT recommends Azerbaijan to change the notation key in category 1A5a from “NA” for all relevant pollutants to “IE” and to describe in its IIR, where emissions from this source are included.

Category issue 6: 1.B.2.c Venting and Flaring – All pollutants

49. The ERT noted that for emissions from category 1B2c (Venting and Flaring) the notation key “NE” is applied. It was raised in former reviews that emissions from this source could be significant. To a question raised by the ERT, Azerbaijan responded that relevant activity data for this source is not available but it works on obtaining data to fill this gap. The ERT reiterates the recommendation to provide emission estimates from this source to enhance completeness.

TRANSPORT

Review Scope

Pollutants Reviewed		All		
Years		1990 – 2016		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
1A2gvii	Mobile Combustion in manufacturing industries and construction	X		
1A3ai(i)	International aviation LTO (civil)	X		
1A3ai(ii)	International aviation cruise (civil)	X		
1A3aii(i)	Domestic aviation LTO (civil)	X		
1A3aii(ii)	Domestic aviation cruise (civil)	X		
1A3bi	Road transport: Passenger cars	X		X
1A3bii	Road transport: Light duty vehicles	X		X
1A3biii	Road transport: Heavy duty vehicles and buses	X		X
1A3biv	Road transport: Mopeds & motorcycles	X		X
1A3bv	Road transport: Gasoline evaporation	X		
1A3bvi	Road transport: Automobile tyre and brake wear	X		X
1A3bvii	Road transport: Automobile road abrasion	X		
1A3c	Railways	X		
1A3di(ii)	International inland waterways	X		X
1A3dii	National navigation (shipping)	X		X
1A4aii	Commercial/institutional: Mobile	X		
1A4bii	Residential: Household and gardening (mobile)	X		X
1A4cii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	X		
1A4ciii	Agriculture/Forestry/Fishing: National fishing	X		
1A5b	Other, Mobile (including military, land based and recreational boats)	X		
1A3di(i)	International maritime navigation	X		
1A3	Transport (fuel used)	X		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which have and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

50. In the IIR there is only limited information provided on the methodologies, emissions factors and activity data used for calculating emissions from the transport sector. A Tier 1 methodology has been mainly used for the emissions calculations. The ERT therefore strongly encourages Azerbaijan to improve the inventory by using a higher tier methodology with more accurate vehicle fleet and activity data (e.g. split into main vehicle categories and fuels).

51. Azerbaijan reports “NE” (Not Estimated) for a number of subsectors whereas these should be actually “IE” (Included Elsewhere) as explained in the IIR. The ERT encourages Azerbaijan to use the appropriate notation keys and to make an effort to report emissions separately for as many subsectors as feasible.

52. The ERT noted that Azerbaijan has reported all activity data for solid fuels, gaseous fuels and biomass as “NE” (not estimated) whereas these should be reported as “NA” (not applicable). The ERT encourages Azerbaijan to use appropriate notation keys to improve the inventory.

Completeness

53. The ERT considers the transport sector not to be complete due to missing emissions of most heavy metals (except lead) and POP (except some PAH) emissions. The ERT recommends Azerbaijan to complete the inventory by estimating and reporting the missing emissions using methodologies provided in the 2016 EMEP/EEA Guidebook. The ERT also recommends that Azerbaijan further improves its inventory by estimating emissions from the sources currently not included (e.g. from the non-road mobile machinery).

Consistency including recalculation and time series

54. The ERT notes that the time series are not complete (e.g. the road transport sector time series begin in 1995 containing only passenger cars until 2007 when heavy duty vehicles are also included). The ERT encourages Azerbaijan to improve the inventory in order to provide a consistent time series.

Comparability

55. The ERT notes that no activity data are provided in the IIR and that it does not provide explanations for activity data and emissions trends. The ERT encourages Azerbaijan to provide information on the drivers behind the emission trends in the IIR.

Accuracy and uncertainties

56. Azerbaijan did not provide an uncertainty analysis. The ERT encourages Azerbaijan to undertake an uncertainty analysis and to use it as a tool for prioritizing improvements in the inventory and for providing an indication of the reliability of the inventory data.

57. Azerbaijan has provided only limited information in the IIR about the QA/QC procedures implemented for the entire inventory. The ERT encourages Azerbaijan to implement sector specific QA/QC procedures and to provide a description of the details and results of QA/QC in the IIR.

Improvement

58. The ERT notes the intention of Azerbaijan to improve the transport inventory by extending the calculations to cover more sectors and subsectors. The ERT encourages Azerbaijan to implement planned improvements and provide more detailed information on included and planned improvements.

Potential Technical Corrections

59. The ERT notes that Azerbaijan has not calculated any emissions for the pollutants SO_x, PM₁₀, TSP, and heavy metals (except Pb) for the sectors 1A3bi (Passenger cars) and 1A3biii (heavy duty vehicles). Azerbaijan has incorrectly indicated these emissions as "NA" (not applicable) although a methodology and emission factors are available in the EMEP/EEA Guidebook 2016.

60. The ERT notes that Azerbaijan has not calculated any emissions for the pollutants PM_{2.5}, PM₁₀ and TSP for the sector 1A3bvi (Automobile tyre and brake wear). Azerbaijan has incorrectly indicated these emissions as "NE" (not estimated) although a methodology and emission factors are available in the EMEP/EEA Guidebook 2016.

61. The ERT strongly recommends that Azerbaijan implements the technical corrections performed and suggested by the ERT.

Sub-Sector Specific Recommendations

Category issue 1: 1.A.3.b Road Transport - All Pollutants

62. The ERT noted that Azerbaijan has allocated all emissions from the use of gasoline and LPG fuels to passenger cars (1A3bi) and all emissions from the use of diesel fuel to heavy duty vehicles (1A3biii). The ERT encourages Azerbaijan to use appropriate notation keys and indicate emissions from light duty vehicles (1A3bii) and mopeds & motorcycles (1A3biv) as "IE" (included elsewhere) as these have actually been included in 1A3bi.

63. The ERT noted that Azerbaijan has reported emissions of Particulate Matter (except PM_{2.5}) and heavy metals (except Pb) from road transport as "NA" (not applicable), although road transport is a source of both particulate matter and heavy metals and there is a methodology and appropriate emission factors included in the Guidebook. The ERT encourages Azerbaijan to make an effort to estimate these emissions, e.g. by using the default values of table 3.77 of the Guidebook road chapter, or to use the correct notation key (in this case "NE").

64. The ERT noted that Azerbaijan has indicated in the IIR that gasoline and LPG fuels are used in passenger cars. In the NFR table an amount of gaseous fuels has been reported. The ERT believes that LPG fuel has been mistakenly reported as gaseous fuel (instead of liquid) and therefore encourages Azerbaijan to correctly allocate all amounts of fuels used for the calculation of emissions.

Category issue 2: 1.A.3d Navigation - All Pollutants

65. The ERT noted that emissions of NH₃, particulate matter, CO, and heavy metals reported by Azerbaijan from the national navigation sector for the year 2016 are not consistent with emissions reported in the previous years. For example, NH₃ emissions are reported as "NE" in all previous years, TSP emissions are the same as PM₁₀ emissions, etc. The ERT believes that all emission values in the NFR table

were shifted by one cell to the left and therefore encourages Azerbaijan to review and make any corrections as necessary to improve the inventory.

Category issue 2: 1.A.4.b.ii - Residential: Household and gardening (mobile) - NO_x

66. The ERT noted a sudden drop in NO_x emissions from mobile machinery used in the residential sector from 2014 to 2015 (three orders of magnitude. The ERT believes that this is due to a mistake in the units (reported in Mt instead of kt) and therefore encourages Azerbaijan to review 1A4bii NO_x emissions and to make any corrections as necessary to improve the inventory.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		All pollutants and activity data		
Years		1990 – 2016 + (Protocol Years)		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
2A1	Cement production	X		X
2A2	Lime production	X		X
2A3	Glass production	X		
2A5a	Quarrying and mining of minerals other than coal	X		
2A5b	Construction and demolition	X		
2A5c	Storage, handling and transport of mineral products	X		
2A6	Other mineral products	X		
2B1	Ammonia production	X		
2B2	Nitric acid production	X		
2B3	Adipic acid production	X		
2B5	Carbide production	X		
2B6	Titanium dioxide production	X		
2B7	Soda ash production	X		X
2B10a	Chemical industry: Other	X		
2B10b	Storage, handling and transport of chemical products	X		
2C1	Iron and steel production	X		X
2C2	Ferroalloys production	X		X
2C3	Aluminium production	X		
2C4	Magnesium production	X		
2C5	Lead production	X		
2C6	Zinc production	X		X
2C7a	Copper production	X		X
2C7b	Nickel production	X		
2C7c	Other metal production	X		
2C7d	Storage, handling and transport of metal products	X		
2D3b	Road paving with asphalt	X		
2D3c	Asphalt roofing	X		
2H1	Pulp and paper industry	X		X
2H2	Food and beverages industry	X		
2H3	Other industrial processes	X		
2I	Wood processing	X		
2J	Production of POPs	X		
2K	Consumption of POPs and heavy metals (e.g. electrical and scientific equipment)	X		
2L	Other production, consumption, storage, transportation or handling of bulk products	X		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

67. Azerbaijan has provided a detailed and generally transparent emission inventory, with estimates provided at the most detailed level for the most significant industrial processes sectors. Methodologies are described in the Party's IIR for the majority of sectors with emissions in this category, and are presented in separate chapters structured by the NFR code. The ERT commends the Party on the clarity and good structure of the IIR, however encourages Party to include more detail in the IIR including data tables and/or references to emission factors and activity wherever possible.

Completeness

68. The ERT considers the industrial processes sector to have a good level of completeness for some years, and would encourage the Party to expand existing methodologies to cover additional years wherever possible.

69. In particular the ERT noted that the highest level of completeness was in place for data reported for 2014, and that emissions of some pollutants from 2A3, 2B7, 2C2, 2C3, 2C6, 2C7a and 2H1 were reported in this year but not in subsequent years. The ERT would encourage Azerbaijan to include these sectors for the latest year in future submissions, or to provide explanations for their omission.

70. The ERT commends Azerbaijan for incorporating emissions of black carbon in recent submissions but noted that some years for which other particulates had been reported did not include black carbon. Azerbaijan has indicated that work is underway to improve completeness of the black carbon inventory, which the ERT commends.

Consistency including recalculation and time series

71. Azerbaijan has not recalculated its inventory for any pollutants, sectors or years in the latest submission. As a result the time-series is not consistent or comparable for a large number of pollutants and sectors.

Comparability

72. The ERT notes that Azerbaijan has in general used Tier 1 methodologies consistent with the 2016 EMEP/EEA Emission Inventory Guidebook, however in some sectors it was identified that emission factors from the 2013 version had been used. Sectors where this has been identified by the ERT are noted in the sub-sector specific recommendations, but the ERT would encourage the Party to carry out a review of sources for factors and to update to the latest Guidebook where appropriate. This information could further be used to improve transparency by including these references in future IIRs.

Accuracy and uncertainties

73. The ERT encourages Azerbaijan to undertake an uncertainty analysis for the industrial processes sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

74. The ERT identified a number of useful production statistics from the State Statistical Committee which could enable a Tier 2 approach to be adopted for some sectors. For example in sector 2B10a the Guidebook presents Tier 2 factors for specific chemical products such as ethylene, sulphuric acid and chlorine which are also disaggregated in production statistics. The ERT would encourage the Party to seek to move to a Tier 2 approach for key categories where possible as part of the ongoing inventory improvement programme.

Improvement

75. The ERT notes the intention of Azerbaijan to improve the emission inventory by extending the calculations to cover more sectors and subsectors. The ERT encourages Azerbaijan to implement planned improvements and to provide more detailed information on included and planned improvements.

Potential Technical Corrections

76. The ERT notes significant inconsistencies in the following NFR categories;

- (a) 2A1 & 2C3 – due to missing black carbon emissions for all years up to 2014
- (b) 2C6 & 2C7a – due to the use of 2013 Guidebook factors for all pollutants up to 2014
- (c) 2H1 – due to the misapplication of the Guidebook's black carbon fraction, in which the percentage of PM_{2.5} has been applied as an emission factor for all years up to 2014

Sub-Sector Specific Recommendations

Category issue 1: 2.A.2, 2.C.1, 2.C.7.a & 2.H.1 - BC

77. The ERT found that black carbon emissions reported for these sectors were not consistent with the percentage of PM_{2.5} specified in the EMEP/EEA Emission Inventory Guidebook. For 2A2, 2C1 & 2C7a the percentage in the Party's inventory is around 30-60% lower than the Guidebook indicates, whilst for 2H1 it is 167 times higher. The Party has indicated that this is a known error which will be addressed in future submissions.

Category issue 2: 2.A.1

78. The ERT noted that emissions of all pollutants in this sector were reported to be constant for the latest 2 years, however earlier emissions from earlier years were consistent with results of a Tier 1 methodology based on the 2016 EMEP/EEA

Guidebook following the trend of activity data reported for this sector. The ERT encourages Azerbaijan to investigate, and if necessary, correct emissions in this sector, or otherwise provide explanations for the discrepancies in future IIRs.

Category issue 3: 2.B.7 - All pollutants

79. The ERT notes that activity data for 2B7 “Soda ash production” submitted in the NFR tables is consistent with State Statistical Committee data for “Sodium hydroxide in aqueous solution”. If the latter classification is correct then the ERT considers that this is not appropriate activity data for this sector and the Party should if possible find production statistics instead for sodium carbonate in order to estimate emissions in 2B7.

Category issue 4: 2.C.1 & 2.C.2

80. The ERT notes that activity data for 2C2 is very similar to that of 2C1, and that both appear similar to State Statistical Committee data for tube cast steel, potentially resulting in a double counting of emissions. The ERT advises the Party to review this and remove any double-counted emissions if appropriate.

81. Furthermore the ERT noted that State Statistical Committee data include additional data for “Steel armature” and “Steel pipes”, which does not appear to have been included in activity data for 2C1. The ERT urges the Party to review whether these should be included for future submissions.

Category issue 5: 2.C.6 & 2.C.7.a – All pollutants

82. Utilising activity data and emissions from the NFR tables the ERT calculated implied emissions factors, and found that these appear to be consistent with the 2013 version of the EMEP/EEA Emission Inventory Guidebook for all years up to 2014. The ERT encourages the Party to adopt the updated emission factors of the 2016 Guidebook for these sectors.

Category issue 7: 2.H.1 - CO

83. The ERT noted that emissions of CO in this sector were reported to be constant for the latest three years, however other pollutants from this sector followed the declining trend of activity data submitted, consistent with results of a Tier 1 methodology based on the 2016 Guidebook. The ERT encourages Azerbaijan to investigate and if necessary correct emissions of CO in this sector, or otherwise provide explanations for the discrepancies in future IIRs.

SOLVENTS

Review Scope

Pollutants Reviewed		All pollutants and activity data		
Years		1990 – 2016 + (Protocol Years)		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
2D3a	Domestic solvent use including fungicides	X		X
2D3d	Coating applications	X		
2D3e	Degreasing	X		
2D3f	Dry cleaning	X		
2D3g	Chemical products	X		
2D3h	Printing	X		
2D3i	Other solvent use	X		
2G	Other product use	X		X
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

84. Azerbaijan has provided a detailed and generally transparent emission inventory, with estimates provided at the most detailed level for the most significant solvent sectors. Methodologies are described in the Party's IIR for the majority of sectors with emissions in this category, and presented in separate chapters structured by NFR code. The ERT commends the Party on the clarity and good structure of the IIR, however encourages Party to include more detail in the IIR including data tables and/or references to emission factors and activity wherever possible.

Completeness

85. The ERT considers the solvents sector to have a good level of completeness in some years, and encourages the Party to expand existing methodologies to cover additional years wherever possible.

86. In particular the ERT noted that the highest level of completeness was for data reported for 2014, and that emissions of Hg from 2D3a were reported in this year but not in subsequent years. The ERT encourages Azerbaijan to include this sector for the latest year in future submissions, or to provide explanations for the omission.

Consistency including recalculation and time series

87. Azerbaijan has not recalculated its inventory for any pollutants, sectors or years in the latest submission. As a result the time-series is not consistent or comparable for a large number of pollutants and sectors.

Comparability

88. The ERT notes that Azerbaijan has in general used Tier 1 methodologies consistent with the 2016 EMEP/EEA Emission Inventory Guidebook, however in some sectors it was identified that factors from the 2013 version had been used. Sectors where this has been identified by the ERT are noted in the sub-sector specific recommendations, but the ERT encourages the Party to carry out a review of the sources for emission factors and update to the latest Guidebook where appropriate. This information could further be used to improve the transparency by including these references in future IIRs.

Accuracy and uncertainties

89. The ERT encourages Azerbaijan to consider an uncertainty analysis for the solvents sector to provide an indication of the reliability of the inventory data.

Improvement

90. The ERT commends Azerbaijan for its improvement in the temporal and sectoral scope of its inventory over recent years, as well as Azerbaijan's expressed intention to continue its ongoing improvement plan. The IIR identifies a number of key areas for improvement, and the ERT commends this expression and concurs with the areas identified.

Potential Technical Corrections

91. The ERT notes significant inconsistencies in the following NFR categories;

- (a) 2D3a – due to the use of 2013 Guidebook factors for VOC emissions up to 2014, as well as missing Hg emissions in 2016.
- (b) 2D3b – due to missing black carbon emissions for all years up to 2014

Sub-Sector Specific Recommendations

Category issue 1: 2.D.3.a - NMVOC

92. Utilising activity data and emissions from the NFR tables the ERT calculated implied emissions factors, and found that these appear to be consistent with the 2013 version of the EMEP/EEA Emission Inventory Guidebook for all years before 2015. The ERT encourages the Party to adopt the updated emission factors of the 2016 Guidebook for these sectors.

Category issue 6: 2.G – All pollutants

93. The ERT notes that the Guidebook Tier 1 factor for sector 2G, in units of kg/Mg of the product used, is used to estimate emissions from solvents used in tobacco curing using activity data in units of "Tobacco produced [kt]". The ERT considers that this is likely to significantly overestimate emissions in this sector, and encourages the Party to find activity data directly representing the solvent use in this sector if possible.

AGRICULTURE

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		1990 – 2016 + (Protocol Years)		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
3B1a	Dairy cattle	X		X
3B1b	Non-dairy cattle	X		X
3B2	Sheep	X		X
3B3	Swine	X		X
3B4a	Buffalo	X		X
3B4d	Goats	X		X
3B4e	Horses	X		X
3B4f	Mules and asses	X		X
3B4gi	Laying hens	X		X
3B4gii	Broilers	X		X
3B4giii	Turkeys	X		X
3B4giv	Other poultry	X		X
3B4h	Other animals	X		X
3Da1	Inorganic N-fertilizers (includes also urea application)	X		X
3Da2a	Animal manure applied to soils	X		X
3Da2b	Sewage sludge applied to soils	X		X
3Da2c	Other organic fertilisers applied to soils (including compost)	X		X
3Da3	Urine and dung deposited by grazing animals	X		X
3Da4	Crop residues applied to soils	X		
3Db	Indirect emissions from managed soils	X		
3Dc	Farm-level agricultural operations including storage, handling and transport of agricultural products	X		X
3Dd	Off-farm storage, handling and transport of bulk agricultural products	X		
3De	Cultivated crops	X		X
3Df	Use of pesticides	X		
3F	Field burning of agricultural residues	X		X
3I	Agriculture other	X		
11A	Volcanoes	X		
11B	Forest fires	X		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns).				

General recommendations on cross cutting issues

94. Azerbaijan has calculated and reported emissions of NO_x, NH₃, NMVOC, PM₁₀ and PM_{2.5} for most of the sources in the agriculture sector. The activity data are also reported in the NRF tables for most of the agriculture sources. The ERT commends Azerbaijan for the reporting done and encourages Azerbaijan to continue to improve the completeness of the reporting in the NRF tables.

95. In the general section of the IIR, the categories are listed as “NE” (not estimated) and “IE” (included elsewhere). The ERT commends Azerbaijan for including this information and encourages Azerbaijan to continue to improve the transparency of the reporting in the IIR.

96. In the agriculture section of the IIR, information is provided only for manure management. Azerbaijan mentions that the calculation is carried out at Tier 1 level using the 2016 EMEP/EAA Guidebook, for dairy cattle, sheep, buffalo, goats, horses, mules and asses, other poultry and camels. However, no further information is given concerning the activity data (livestock number), the source of the data and the choice of the EFs used (useful as different Tier 1 EFs are provided in the 2016 EMEP/EAA Guidebook). The ERT recommends that Azerbaijan reports livestock numbers and EFs for each livestock class with a summary of the methodology applied, including also references to the data sources used. This recommendation was already included in the 2015 review.

97. In the agriculture section of the IIR, no information is provided concerning other sources. The ERT recommends that Azerbaijan reports data concerning the use of N fertilizers (quantity, types of fertilizers), the total cultivated area, the EFs used for each source with a summary of the methodology applied, including also the source of the data used. This recommendation was already included in the 2015 review.

98. Azerbaijan has included trends for the main pollutants for 3B in the IIR, however no explanation is provided. The ERT recommends that Azerbaijan includes trends for all the agriculture sources, with some explanations.

Completeness

99. Azerbaijan listed the categories as “NE” (not estimated) in the IIR. The categories listed as listed are: 3B4gii broilers (NH₃, NMVOC, NH₃, PM_{2,5} and PM₁₀), 3De cultivated crops (NMVOC, NH₃) and 3F field burning of agricultural residues (all). The ERT commends Azerbaijan for including this information and encourages Azerbaijan to continue to improve the transparency of the reporting in the IIR.

100. For 3B4gii broilers, Azerbaijan mentioned in paragraph 1.7.3 of the IIR that the emissions from broilers were included in 3B4giv other poultry. The ERT recommends that Azerbaijan clarifies the situation regarding broilers and prepares a plan to obtain activity data and EFs for this category, to calculate and report emissions separately. This recommendation was already included in the 2015 review.

101. For 3De cultivated crops, the ERT states that no NH₃ emissions are expected. For NMVOC, the ERT suggests a technical correction: the emissions were calculated by Azerbaijan but misreported. The ERT recommends that Azerbaijan reports the NMVOC emission in 3De and the notation key “NA” for NH₃ emissions.

102. For 3F Field burning of agricultural residues, the ERT encourages Azerbaijan to prepare a plan to obtain activity data and EFs to calculate and report emissions.

Consistency including recalculation and time series

103. Azerbaijan has not provided information on recalculations in the IIR. The ERT encourages Azerbaijan to provide detailed explanations of any recalculations, including the rationale, the impact on the sector and implications on trends for the agriculture sector. This recommendation was already included in the 2015 review.

104. The ERT noticed that for some emission sources, for some pollutants, the IEF varies in some years for some animals. More details are provided in the section for subsector recommendations. However, the ERT encourages Azerbaijan to include additional checks to notice when the IEFs vary, to correct differences or to add explanations in the IIR regarding the variation observed.

105. The ERT noticed that for some emission sources, activity data and related emissions are not provided for the whole time series. More details are provided in the section for subsector recommendations. However, the ERT recommends that Azerbaijan implements a methodology to fill the gaps when activity data are missing, to calculate emissions for the whole time series.

Comparability

106. In the IIR, Azerbaijan states that the emission calculations were carried out at Tier 1 level using the method described in the 2016 EMEP/EAA Guidebook. Even if the detailed methodologies applied are not developed in the IIR, the methods used seem to be consistent with the 2016 EMEP/EEA Guidebook. Thus, the ERT commends Azerbaijan for the implementation of the 2016 methods and encourages Azerbaijan to continue to implement these methods for the missing sources and to continue to improve the current methods for the estimated sources, for example by implementing Tier 2 methods for the key categories.

107. The ERT notices that the use of certain notation keys is not adequate in the NFR tables. To ensure comparability, it is important that Azerbaijan applies the correct notation keys for the subsectors. More details are provided in the section for subsector recommendations. The ERT recommends that Azerbaijan revises the different notation keys used, following the ERT recommendation listed in the subsector specific section.

108. The ERT notices that some emissions are calculated correctly but misreported. It is the case for NMVOC emissions from 3De which are reported under 3Da1 and also for PM₁₀ and PM_{2.5} emissions from 3Dc which are reported under 3Da1. The ERT recommends that Azerbaijan revises the reporting of those emissions for future submissions to attribute them to the correct categories.

Accuracy and uncertainties

109. No uncertainty analysis is provided in the IIR. The ERT recommends that Azerbaijan undertakes an uncertainty analysis for the agriculture sector to help inform the improvement process and to provide an indication of the reliability of the inventory data.

110. In the IIR, Azerbaijan mentions in section 1.6 that a quality management system has been established in order to ensure completeness, exactness, and transparency of submitted data, and that each calculation was checked and reviewed by the inventory group. The IIR does not indicate if there has ever been an extensive review of the key categories or if there is any periodic internal review of the inventory preparation. No sector specific information is provided. The ERT encourages Azerbaijan to implement sector specific QA/QC procedures for the agriculture sector and to provide more details on the QA/QC procedures.

Improvement

111. The ERT commends Party for its improvement in the agriculture sector, especially regarding the implementation of the 2016 methods and the key category analysis. The ERT notes the Party's intention to enhance the number of emission data and covered categories, to improve the calculation and use Tier 2 methods for key categories and to estimate uncertainties of the inventory. The ERT encourages Azerbaijan to incorporate the recommendations from this report into a more detailed improvement plan for the agriculture sector.

Potential Technical Corrections

112. The ERT notes that emissions and activity data from 3Da1 were missing for the years 1990 to 1994, 1996 to 1998 and 2015 to 2016. The ERT suggests a way to fill the gaps to present a complete time series. Furthermore, for NH₃ emissions, no information was provided regarding the EF applied. The ERT asked Azerbaijan during the review but did not receive any response. Thus, the ERT suggests the use of the Tier 1 EF from the 2016 EMEP/EAA Guidebook and recalculated the NH₃ emissions for the whole period. For NO_x emissions, no information was provided regarding the EF applied. The ERT asked Azerbaijan during the review but received no response. Thus, the ERT suggests the use of the Tier 1 EF from the 2016 EMEP/EAA Guidebook and recalculated the NO_x emissions for the whole period.

113. The ERT notes that NMVOC emissions are reported for 3Da1, however no emissions are expected under this subcategory. These emissions should be reported under 3De. The ERT suggests reporting the notation key "NA" for the 3Da1 subcategory for this pollutant.

114. The ERT notes that PM₁₀ and PM_{2.5} emissions were reported in 3Da1, using the Tier 1 EF from 3Dc. These emissions should be reported in 3Dc. As the Tier 1 EFs applied (from the 2016 GB) do not include emissions from fertilizers, the ERT suggests reporting "NE" for the 3Da1 subcategory for those pollutants.

115. The ERT notes that PM₁₀ and PM_{2.5} emissions from 3Dc were reported as "NA". However, Azerbaijan made the correct calculations, applying the Tier 1 EF from EMEP 2016, but reported those emissions in 3Da1. Furthermore, the emissions were provided only for 2000, thus the time series was not complete. The ERT found some data regarding the total area cultivated in Azerbaijan from FAO statistics and used these data as an indicator to complete the time series. The ERT recalculated the

PM₁₀ and PM_{2.5} emissions for the whole period applying the Tier 1 EF from the 2016 Guidebook.

116. The ERT notes that NMVOC emissions from 3De were reported as “NE”. However, Azerbaijan made the correct calculations, applying the Tier 1 EF from the 2016 Guidebook, but reported those emissions in 3Da1. Furthermore, the emissions were provided only for 2000, thus the time series was not complete. The ERT found some data regarding the total area cultivated in Azerbaijan from FAO statistics and used these data as an indicator to complete the time series. The ERT recalculated the NMVOC emissions for the whole period applying the Tier 1 EF from the 2016 Guidebook.

117. The ERT strongly recommends that Azerbaijan implements the technical corrections performed and suggested by the ERT.

Sub-Sector Specific Recommendations

Category issue 1: 3.B Manure management – Activity data

118. The ERT compared the number of animals provided by Azerbaijan in the NFR tables with data from the FAO. Important differences have been detected regarding cattle and buffaloes. The ERT asked Azerbaijan regarding the reference of the data used but received no answer. The ERT recommends that Azerbaijan reports livestock numbers in the IIR and the references of the data sources used.

119. The ERT noticed that activity data for swine for 2016 was reported as “NA”. Thus, no emissions were reported for 3B3 in 2016. The ERT recommends that Azerbaijan implements a method when activity data are missing, to provide a complete time series. For example, Azerbaijan could apply the trend of swine population from the past 5 years to estimate the swine population in 2016, instead of not estimating the emissions.

120. The ERT noticed that activity data for non-dairy cattle from 1990 to 2013 were reported as “NE”, and for 2014 as “IE”. The ERT understood from the IIR that the non-dairy cattle were accounted for in 3B1a together with dairy cattle, as the split between both categories was unknown. If this understanding is correct, the ERT recommends that Azerbaijan reports the notation key “IE” for 3B1b for the whole period.

Category issue 2: 3.B Manure management – NH₃, PM, NO_x and NMVOC

121. The ERT notices that there is activity data for 3B4h (Camels) for the whole period, but NO_x emissions for this category have only been reported for 2016, and NH₃ emissions have been reported for the whole period except for 2016. The ERT recommends that Azerbaijan calculates NH₃ and NO_x emissions from 3B4h for the whole period, as the activity data and EF are available.

122. The ERT encourages Azerbaijan to calculate and report emissions from non-dairy cattle (3B1), broilers (3B4gii), laying hens (3B4gi) turkeys (3B4giii) and other poultry (3B4giv) separately.

123. The ERT noticed, regarding NMVOC, NH₃, NO_x, PM₁₀ and PM_{2.5} emissions, that the IEFs vary for certain years and certain categories. The ERT asked Azerbaijan regarding these variations in the IEFs but received no answer. The ERT did not find any explanation for these variations. Thus, the ERT recommends that Azerbaijan recalculates the emissions using the same EFs per category per pollutant for the whole period, except if explanations are given regarding a justified change in the EF (abatement measures for example). The ERT also encourages Azerbaijan to implement QA/QC procedures on IEFs to detect early this kind of issues.

124. For 3B2 sheep, the ERT recalculated the EF used for NO_x by dividing the NO_x emissions by the population. The value obtained is 0.005 kg NO₂/head. Azerbaijan mentioned in the IIR that the calculations were carried out at Tier 1 level from the 2016 EMEP/EAA Guidebook. However, in the Guidebook, the value for sheep is 0.008 kg NO₂/head. As it is below the threshold of significance, no technical correction was suggested but the ERT recommends that Azerbaijan corrects the EF applied for NO_x emissions from 3B2 for future submissions.

125. For 3B4a buffalos, the ERT recalculated the EF used for NO_x by dividing the NO_x emissions with the population. The value obtained is 0,043 kg NO₂/head. Azerbaijan mentioned in the IIR that the calculations were carried out at Tier 1 level from the 2016 EMEP/EAA Guidebook. However, in the Guidebook, the value for buffalos is 0,066 kg NO₂/head. As it is below the threshold of significance, no technical correction was suggested but the ERT recommends that Azerbaijan corrects the EF applied for NO_x emissions from 3B4a for future submissions.

126. For 3B4d goats, the ERT recalculated the EF used for NO_x by dividing the NO_x emissions with the population. The value obtained is 0,005 kg NO₂/head. Azerbaijan mentioned in the IIR that the calculations were carried out at Tier 1 level from the 2016 EMEP/EAA Guidebook. However, in the Guidebook, the value for goats is 0,008 kg NO₂/head. As it is below the threshold of significance, no technical correction was suggested but the ERT recommends that Azerbaijan corrects the EF applied for NO_x emissions from 3B4d for future submissions.

127. For 3B4e horses, the ERT recalculated the EF used for NO_x by dividing the NO_x emissions with the population. The value obtained is 0,1310 kg NO₂/head. Azerbaijan mentioned in the IIR that the calculations were carried out at Tier 1 level from the 2016 EMEP/EAA Guidebook. However, in the Guidebook, the value for horses is 0,201kg NO₂/head. As it is below the threshold of significance, no technical correction was suggested but the ERT recommends that Azerbaijan corrects the EF applied for NO_x emissions from 3B4e for future submissions.

128. For 3B4f mules and asses, the ERT recalculated the EF used for NO_x by dividing the NO_x emissions with the population. The value obtained is 0,1310 kg NO₂/head. Azerbaijan mentioned in the IIR that the calculations were carried out at Tier 1 level from the 2016 EMEP/EAA Guidebook. However, in the Guidebook, the

value for mules and asses is 0,201kg NO₂/head. As it is below the threshold of significance, no technical correction was suggested but the ERT recommends that Azerbaijan corrects the EF applied for NO_x emissions from 3B4f for future submissions.

129. For 3B2 sheep, the ERT recalculated the EF used for PM₁₀ and PM_{2.5} by dividing the emissions with the population. The value obtained is 0,0778 kg PM₁₀/head and 0,01835 kg PM_{2.5}/head. Azerbaijan mentioned in the IIR that the calculations were carried out at Tier 1 level from the 2016 EMEP/EAA Guidebook. However, in the Guidebook, the value for sheep is 0,06 kg PM₁₀/head and 0,02 kg PM_{2.5}/head. As it is below the threshold of significance, no technical correction was suggested but the ERT recommends that Azerbaijan corrects the EF applied for PM₁₀ and PM_{2.5} emissions from 3B2 for future submissions.

130. For 3B4d goats, the ERT recalculated the EF used for PM₁₀ and PM_{2.5} by dividing the emissions with the population. The value obtained is 0,0556 kg PM₁₀/head and 0,0167 kg PM_{2.5}/head. Azerbaijan mentioned in the IIR that the calculations were carried out at Tier 1 level from the 2016 EMEP/EAA Guidebook. However, in the Guidebook, the value for sheep is 0,06 kg PM₁₀/head and 0,02 kg PM_{2.5}/head. As it is below the threshold of significance, no technical correction was suggested but the ERT recommends that Azerbaijan corrects the EF applied for PM₁₀ and PM_{2.5} emissions from 3B2 for future submissions.

131. For 3B4h other animals, here camels, the ERT noticed that Azerbaijan reported “NA” for PM₁₀ and PM_{2.5} emissions. No Tier 1 EF is provided in the 2016 EMEP/EAA Guidebook, but emissions can occur as for the other animals. Thus, the ERT suggests that Azerbaijan changes this notation key for future submissions and puts “NE” instead of “NA” for PM₁₀ and PM_{2.5} from 3B4h.

132. The ERT noticed that in 2010, emissions of arsenic have been reported in 3B4gi. The category is considered a key category for 2010 for As. However, no emission should be reported. The ERT strongly recommends that Azerbaijan corrects this point for future submissions.

WASTE

Review Scope

Pollutants Reviewed		all		
Years		1990 – 2016		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
5A	Solid waste disposal on land	X		X
5B1	Biological treatment of waste - Composting	X		X
5B2	Biological treatment of waste - Anaerobic digestion at biogas facilities	X		X
5C1a	Municipal waste incineration	X		X
5C1bi	Industrial waste incineration	X		X
5C1bii	Hazardous waste incineration	X		X
5C1biii	Clinical waste incineration	X		X
5C1biv	Sewage sludge incineration	X		X
5C1bv	Cremation	X		X
5C1bvi	Other waste incineration	X		X
5C2	Open burning of waste	X		X
5D1	Domestic wastewater handling	X		X
5D2	Industrial wastewater handling	X		X
5D3	Other wastewater handling	X		X
5E	Other waste	X		X
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross cutting issues

Introduction

133. During the review Azerbaijan did not provide answers to the questions raised by the ERT. Therefore important information for the ERT to carry out a comprehensive and detailed review was missing.

Transparency

134. In the previous Stage 3 Review Report (from 2015) the ERT recommended that Azerbaijan provides more detailed explanations for activity data and emission factors in the next submission. The ERT notes that this is still not done and reiterates its recommendation to include more information on activity data and emission factors in the next submission. Furthermore, the ERT recommended that Azerbaijan provides an explanation about the choice of notation keys in the next IIR. The ERT noted that Azerbaijan has included an explanation about the choice of notation keys and compliments Azerbaijan for this.

Completeness

135. The ERT considers that the inventory is not complete. In the previous Stage 3 Review Report (from 2015) the ERT recommended that Azerbaijan should complete

the time series and estimate emissions for other relevant categories within the waste sector.

In this submission data are still only available for the years from 2009 onwards for three subsectors and for one sector only for the years 2013 and 2014. So, the ERT reiterates its recommendation that Azerbaijan completes the time series and estimates emissions for other relevant categories within the waste sector for the next submission.

136. The ERT also notes that in Table 4-1 of the IIR 2018, the reason why some emission have not been estimated is explained. For some NFR codes the reason is that “Emissions occur, but have not been estimated due to a lack of statistical data”, while there are activity data from other reports available. For more information and recommendations see the “Sub-sector Specific Recommendations”.

137. The ERT notes that there are a lot of emission cells filled with “NE”. To avoid under-estimates, the ERT recommends that Azerbaijan includes plans to address missing emissions (“NE”) in its IIR, either by obtaining data allowing an emission estimate to be made, or by reporting the emissions as not applicable (“NA”).

Consistency, including recalculation and time series.

138. As already mentioned Azerbaijan did not provide a complete time series. But the activity data and EFs used to calculate emissions for the period 2009-2016 are consistent. The ERT recommends Azerbaijan to complete the time series and to estimate emissions for other relevant categories within the waste sector for the next submission.

139. The ERT notes that Azerbaijan has not performed recalculations for the source categories within the waste sector.

Comparability

140. The ERT notes that Azerbaijan submitted its emissions in the requested NFR format.

141. The ERT notes that emissions of waste incineration for the period 2009-2016 were estimated using activity data from the year book (2017) of the State Statistical Committee and emission factors from the Guidebook 2016. To improve comparability the ERT encourages Azerbaijan to estimate the missing years of the waste incineration sources and other relevant categories within the waste sector in the same way for the next submission.

Accuracy and uncertainties

142. Azerbaijan does not estimate uncertainties. In the previous Stage 3 Review Report (from 2015) the ERT encouraged Azerbaijan to estimate uncertainties in accordance with the Reporting Guidelines. In this submission Azerbaijan mentioned that in the coming years an estimation of uncertainties is planned to be realised in line with the EMEP guidelines. The ERT encourages Azerbaijan to implement this

action in future submissions in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

143. Furthermore the ERT notes that a quality management system has been established in order to ensure completeness, exactness, and transparency of submitted data. Each calculation was checked and reviewed by the inventory group. The ERT compliments Azerbaijan with this improvement.

Improvement

144. Azerbaijan did provide an IIR with a paragraph on planned improvements and the ERT compliments Azerbaijan for this.

Potential Technical Corrections

145. Due to the small sources compared to the national total, no technical corrections are recommended.

Sub-Sector Specific Recommendations

Category issue 1: 5.A Solid waste disposal on land – NMVOC, PM

146. Due to a lack of statistical data Azerbaijan does not report emissions for this category. The ERT notes that in the Third National Communication (Baku 2015) CH₄ emissions from solid waste disposal on land (NFR 5A) are included. This means that for this source activity data are available. The ERT reiterates its recommendation from the 2015 review that Azerbaijan uses available data about solid waste disposal to estimate emissions for the next submission.

Category issue 2: 5.C.1.a: Municipal waste incineration – All pollutants

147. The ERT notes that Azerbaijan only reports emissions for the years 2013 and 2014 and for the other years it reports “NE”. The ERT encourages Azerbaijan to also estimate emissions for the missing years of this time series.

Category issue 3: 5.C.1.b.i: Industrial waste incineration - NMVOC

148. The ERT notes that according to Table 3-2 NFR Code 5C1bi, industrial waste incineration is a key source for NMVOC. In the 2016 NFR table a NMVOC emission of 5.89484 kt and an amount of waste incinerated of 796.6 kt are included. Both values used the Tier 1 EF of 7.4 kg NMVOC/ton of waste incinerated from the 2016 Guidebook. The ERT encourages Azerbaijan to use more accurate EF (country- or plant specific) for this key source in the future.

Category issue 4: 5.D.1 Domestic wastewater handling - NMVOC

149. Due to a lack of statistical data Azerbaijan does not report emissions for this category. The ERT notes that in the Third National Communication (Baku 2015) N₂O emissions from domestic wastewater handling (NFR 5D1) are included. This means that for this source activity data are available.

The ERT reiterates its recommendation from the 2015 review that Azerbaijan should use the available data about domestic wastewater handling to estimate emissions for the next submission.

Category issue 5: 5.D.2 Industrial wastewater handling - NMVOC

150. Due to a lack of statistical data Azerbaijan does not report emissions for this category. The ERT notes that in the Third National Communication (Baku 2015) CH₄ emissions from industrial wastewater handling (NFR 5D2) are included. This means that for this source activity data are available.

The ERT reiterates its recommendation from the 2015 review that Azerbaijan should use the available data about industrial wastewater handling to estimate emissions for the next submission.

MATERIALS USED BY THE REVIEW TEAM

1. Annex 1 NFR tables; 1990– 2016, submission 0902018
2. Azerbaijan Stage 1 report 2018
5. Stage 2 S&A report
6. AZE - IIR 2018, submitted 27.3.2018
7. Azerbaijan Stage 3 review report 2015
8. Data and tools developed by CEIP (<http://unece-stage3.wikidot.com/data-analysis>)

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. Response to preliminary questions raised prior to the review (wiki)
2. Response to questions raised during the review (wiki)

ANNEX I POTENTIAL TECHNICAL CORRECTIONS

152. Technical corrections have been proposed by the ERT during the review week for the energy, transport, industry and solvent use and agriculture sectors. Detailed related information is provided separately in the 4 Excel files:

- TC-AZ-2018-Energy-1.xlsx
- TC-AZ-2018-Transport-1.xlsx
- TC-AZ-2018-Industry and Solvents-1.xlsx
- TC-AZ-2018-Agriculture-1.xlsx

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