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Report on the technical review of the seventh national communication of Kazakhstan

Parties included in Annex I to the Convention were requested by decision 9/CP.16 to submit their seventh national communication to the secretariat by 1 January 2018. According to decision 15/CMP.1, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol are required to include in their national communications supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. This report presents the results of the technical review of the seventh national communication and relevant supplementary information under the Kyoto Protocol of Kazakhstan, conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" and the "Guidelines for review under Article 8 of the Kyoto Protocol".

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Contents

Abbreviations and acronyms

Annex II Party	Party included in Annex II to the Convention
BR	biennial report
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CTF	common tabular format
ERT	expert review team
ETS	emissions trading scheme
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
JSC	joint-stock company
KP2	second commitment period of the Kyoto Protocol
KZT	tenge
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NE	not estimated
NF_3	nitrogen trifluoride
NGO	non-governmental organization
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
N_2O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
reporting guidelines for supplementary information	"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol, Part II: Reporting of supplementary information under Article 7, paragraph 2"
SF_6	sulfur hexafluoride
UNFCCC reporting guidelines on NCs	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications"
WAM	'with additional measures'
WEM	'with measures'
WMO	World Meteorological Organization
WOM	'without measures'

I. Introduction and summary

A. Introduction

1. This is a report on the in-country technical review of the NC7 of Kazakhstan. The review was coordinated by the secretariat in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention", particularly "Part V: UNFCCC guidelines for the technical review of national communications from Parties included in Annex I to the Convention" (annex to decision 13/CP.20), and the "Guidelines for review under Article 8 of the Kyoto Protocol" (annex to decision 22/CMP.1 and annex I to decision 4/CMP.11).[1]

2. In accordance with the same decisions, a draft version of this report was transmitted to the Government of Kazakhstan, which provided comments that were considered and incorporated, as appropriate, with revisions into this final version of the report.

3. The review was conducted from 1 to 6 April 2019 in Nur-Sultan by the following team of nominated experts from the UNFCCC roster of experts: Ms. Gamze Celikyilmaz (Turkey), Mr. Giorgi Machavariani (Georgia), Mr. Stanford Mwakasonda (United Republic of Tanzania), Ms. Glasha Obrekht (Canada) and Ms. Natalya Parasyuk (Ukraine). Mr. Mwakasonda and Ms. Parasyuk were the lead reviewers. The review was coordinated by Mr. Davor Vesligaj (UNFCCC secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the NC7 of Kazakhstan in accordance with the UNFCCC reporting guidelines on NCs (decision 4/CP.5) and the reporting guidelines for supplementary information, in particular the supplementary information required under Article 7, paragraph 2, and on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol (annex to decision 15/CMP.1 and annex III to decision 3/CMP.11).

1. Timeliness

5. The NC7 was submitted on 31 December 2017, before the deadline of 1 January 2018 mandated by decision 9/CP.16.

2. Completeness, transparency of reporting and adherence to the reporting guidelines

6. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Kazakhstan in its NC7, including the supplementary information under the Kyoto Protocol, mostly adheres to the UNFCCC reporting guidelines on NCs.

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

Table 1

Assessment of completeness and transparency of mandatory information reported by Kazakhstan in its seventh national communication, including supplementary information under the Kyoto Protocol

Section of NC	*Completeness*	*Transparency*	*Reference to description of recommendations*	*Supplementary information under the Kyoto Protocol*	*Completeness*	*Transparency*	*Reference to description of recommendations*
Executive summary	Complete	Transparent		National system	Complete	Transparent	
National circumstances	Complete	Transparent		National registry	Not complete	_	Issue 1 in table 7
GHG inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	
PaMs	Mostly complete	Mostly transparent	Issues 3, 4, 7 and 8 in table 10	PaMs in accordance with Article 2	Mostly complete	Transparent	Issue 8 in table 10
Projections and the total effect of PaMs	Mostly complete	Mostly transparent	Issues 2, 3 and 4 in table 14	Domestic and regional programmes and/or arrangements and procedures	Not complete	_	Issues 1 and 2 in table 8
Vulnerability assessment, climate change impacts and adaptation measures	Mostly complete	Mostly transparent	Issues 1 and 2 in table 18	Information under Article 10[a]	Complete	Transparent	
Financial resources and transfer of technology[b]	NA	NA	NA	Financial resources[c]	NA	NA	NA
Research and systematic observation	Mostly complete	Mostly transparent	Issues 1 and 2 in table 19	Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	
Education, training and public awareness	Complete	Transparent					

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chapter III below. The assessment of completeness and transparency by the ERT in this table is based only on the "shall" reporting requirements.

[a] The assessment refers to information provided by the Party on the provisions contained in Article 4, paragraphs 3, 5 and 7, of the Convention reported under Article 10 of the Kyoto Protocol, which is relevant to Annex II Parties only. Assessment of the information provided by the Party on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example research and systematic observation.

[b] Kazakhstan is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention.

[c] Kazakhstan is not an Annex II Party and is therefore not obliged to provide information on financial resources under Article 11 of the Kyoto Protocol, including on "new and additional" resources.

3. Summary of reviewed supplementary information under the Kyoto Protocol

7. The supplementary information under Article 7, paragraph 2, of the Kyoto Protocol is incorporated in different sections of the NC7 and amendment to the NC7, and the supplementary information under Article 7, paragraph 1, of the Kyoto Protocol is reported in the national inventory report of the 2018 annual submission. Table 2 provides references to where the information is reported. The technical assessment of the information reported under Article 7, paragraphs 1 and 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 2
Overview of supplementary information under the Kyoto Protocol reported by Kazakhstan

Supplementary information	*Reference to section of NC7*
National system	3.3
National registry	3.4
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Amendment to NC7
PaMs in accordance with Article 2	4
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Amendment to NC7
Information under Article 10	3.3, 4, 7, 8, 9
Financial resources[a]	NA
Minimization of adverse impacts in accordance with Article 3, paragraph 14	Amendment to NC7

[a] Reporting on financial resources under the Kyoto Protocol is relevant to Annex II Parties. As Kazakhstan is not an Annex II Party, it does not have an obligation to provide information on financial resources under Article 11 of the Kyoto Protocol, including on "new and additional" resources.

II. Technical review of the information reported in the seventh national communication, including the supplementary information under the Kyoto Protocol

A. Information on national circumstances and greenhouse gas emissions and removals

1. National circumstances relevant to greenhouse gas emissions and removals

(a) Technical assessment of the reported information

8. The national circumstances of Kazakhstan explain the relationship between its historic and future emission trends and the climate change policy agenda. The changing nature of those circumstances defines the factors that affect the climate policy development and implementation of the Convention. The NC7 contains key data on legislation, population trends, geography and land use, climate and climate change, economic developments, energy, transport, the buildings sector, industry, trade, the services sector, agriculture, forestry, resource efficiency and wastewater.

9. The ERT noted that during the period 1990–2016, Kazakhstan's GDP per capita increased by 79.7 per cent, while GHG emissions per capita and GHG emissions per GDP unit decreased by 10.7 and 50.3 per cent, respectively. Table 3 illustrates the national

circumstances of Kazakhstan by providing some indicators relevant to emissions and removals.

Table 3
Indicators relevant to greenhouse gas emissions and removals for Kazakhstan for the period 1990–2016

						Change (%)	
Indicator	*1990*	*2000*	*2010*	*2015*	*2016*	*1990–2016*	*2015–2016*
GDP per capita (thousands 2011 USD using purchasing power parity)	13.05	9.95	20.10	23.52	23.45	79.7	–0.3
GHG emissions without LULUCF per capita (t CO_2 eq)	20.72	11.56	18.07	18.45	18.49	–10.7	0.2
GHG emissions without LULUCF per GDP unit (kg CO_2 eq per 2011 USD using purchasing power parity)	1.59	1.16	0.90	0.78	0.79	–50.3	0.5

Sources: (1) GHG emission data: Kazakhstan's 2018 GHG inventory submission, version 3; (2) population and GDP: World Bank.

Note: The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.

(b) Assessment of adherence to the reporting guidelines

10. The ERT assessed the information reported in the NC7 of Kazakhstan and identified an issue relating to transparency and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 4.

Table 4
Findings on national circumstances relevant to greenhouse gas emissions and removals from the review of the seventh national communication of Kazakhstan

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 8 Issue type: transparency Assessment: encouragement	Kazakhstan provided in its NC7 information on its national circumstances and how these national circumstances affect GHG emissions and removals. Some information on how national circumstances are relevant to factors affecting GHG emissions and removals was provided in the NC7. During the review, Kazakhstan provided additional information, particularly on developments in the energy sector and how they affect GHG emissions and removals. The ERT encourages Kazakhstan to provide concise relevant information about how its national circumstances are relevant to factors affecting GHG emissions and removals, including disaggregated indicators, to explain the relationship between national circumstances and emissions and removals.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

2. Information on greenhouse gas inventory arrangements, emissions, removals and trends

(a) Technical assessment of the reported information

11. Total GHG emissions[2] excluding emissions and removals from LULUCF decreased by 12.8 per cent between 1990 and 2016, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 8.6 per cent over the same period. Table 5 illustrates the emission trends by sector and by gas for Kazakhstan.

Table 5
Greenhouse gas emissions by sector and by gas for Kazakhstan for the period 1990–2016

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2015*	*2016*	*1990–2016*	*2015–2016*	*1990*	*2016*
Sector									
1. Energy	317 906.79	177 298.30	249 328.25	271 453.34	274 179.62	–3.8	1.0	82.1	81.1
A1. Energy industries	142 368.74	60 824.41	103 851.38	108 258.27	111 358.02	–21.8	2.9	36.8	33.0
A2. Manufacturing industries and construction	19 636.07	22 674.26	30 052.58	37 601.35	36 629.37	86.5	–2.6	5.1	10.8
A3. Transport	21 584.04	9 414.72	21 155.31	21 677.48	22 720.57	5.3	4.8	5.6	6.7
A4. and A5. Other	64 175.02	28 628.82	64 025.46	75 802.80	75 322.37	17.4	–0.6	16.6	22.3
B. Fugitive emissions from fuels	70 142.93	55 756.09	30 243.52	28 113.44	28 149.29	–59.9	0.1	18.1	8.3
C. CO_2 transport and storage	NA	NA	NA	NA	NA	NA	NA	NA	NA
2. IPPU	21 082.72	12 971.22	20 738.28	23 694.31	25 101.18	19.1	5.9	5.4	7.4
3. Agriculture	43 768.14	20 791.62	29 802.39	32 185.23	33 183.72	–24.2	3.1	11.3	9.8
4. LULUCF	–6 328.21	3 286.14	2 771.16	8 465.70	10 208.45	–261.3	20.6	NA	NA
5. Waste	4 608.56	4 080.70	4 747.32	5 330.10	5 457.73	18.4	2.4	1.2	1.6
6. Other	NO	NO	NO	NO	NO	NA	NA	NA	NA
Gas[a]									
CO_2	266 654.01	133 645.69	236 956.35	263 479.48	267 456.23	0.3	1.5	68.8	79.1
CH_4	103 637.87	71 216.40	52 548.93	52 519.57	53 561.16	–48.3	2.0	26.8	15.9
N_2O	17 074.33	10 099.10	13 877.99	15 404.19	15 620.76	–8.5	1.4	4.4	4.6
HFCs	NO, NA	180.65	623.15	664.92	651.85	NA	–2.0	NA	0.2
PFCs	NA, NO	NA, NO	608.10	592.80	630.18	NA	6.3	NA	0.2
SF_6	NA, NO	NA, NO	1.73	2.01	2.06	NA	2.4	NA	0.0
NF_3	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA	NA	NA	NA
Total GHG emissions without LULUCF	**387 366.21**	**215 141.85**	**304 616.25**	**332 662.98**	**337 922.24**	**–12.8**	**1.6**	**100.0**	**100.0**
Total GHG emissions with LULUCF	**381 037.99**	**218 427.98**	**307 387.41**	**341 128.68**	**348 130.69**	**–8.6**	**2.1**	**NA**	**NA**

Source: GHG emission data: Kazakhstan's 2018 annual submission, version 3.
[a] Emissions by gas without LULUCF and without indirect CO_2.

[2] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified. Values in this paragraph are calculated on the basis of the 2018 annual submission, version 3.

12. Between 1990 and 2016, Kazakhstan's emissions trajectory shows a significant decrease after the dissolution of the Soviet Union in 1991, with emissions reaching a trough in 1999 and then rapidly increasing owing to economic recovery and transformation and the discovery and large-scale production and export of oil and gas in the period 2000–2010. Since 2010, growth in emissions has slowed owing to a number of factors, including the world oil price collapse in 2014, the restructuring of Kazakhstan's economy and the transition to more fuel-efficient and less GHG-intensive technologies.

13. Between 1990 and 2016, GHG emissions from the energy sector decreased by 13.8 per cent (43,727 kt CO_2 eq), owing mainly to significant reductions in emissions from energy industries, in turn attributable to a downturn in economic activity, the replacement of old inefficient equipment and the introduction of controls on fugitive emissions.

14. The trend in GHG emissions from fuel combustion showed notable increases, attributable to emissions from transport (up by 5.3 per cent or 1,136.53 kt CO_2 eq), manufacturing industries and construction (up by 86.5 per cent or 16,993.3 kt CO_2 eq) and other sectors (up by 17.4 per cent or 11,147.35 kt CO_2 eq). Emissions from the transport sector followed a similar trend, declining after 1991 and recovering in 2000–2010; however, the growth in that sector has been faster than in others owing to a significant increase in the number of passenger vehicles per household concurrent with economic growth.

15. Between 1990 and 2016, GHG emissions from IPPU increased by 19.1 per cent (4,018.46 kt CO_2 eq). A significant reduction in the sector's GHG emissions occurred in the first half of the 1990s. On average, in the period 1994–1998, GHG emissions were about 60 per cent lower than base-year emissions, reaching a trough in 1996 owing to the stagnation of industrial production. Emissions from industry began to grow again in 1997, exceeding the base-year level by 19.1 per cent in 2016.

16. Between 1990 and 2016, GHG emissions from the agriculture sector decreased by 24.2 per cent (10,584.42 kt CO_2 eq). From 1991, GHG emissions from agriculture declined, reaching 47 per cent of the base-year level in 1998, chiefly owing to a reduction in livestock. Since 1998, livestock numbers and GHG emissions from agriculture have gradually grown but have yet to reach the base-year level.

17. The LULUCF sector went from being a net sink of GHG emissions in 1990 to a net source of 10,208.45 kt CO_2 eq in 2016, representing an increase of 16,536.66 kt CO_2 eq. This trend was driven mainly by an increase in, and a decline in the absorption of, GHG emissions from agricultural land over the period 1990–2016.

18. Between 1990 and 2016, GHG emissions from the waste sector increased by 18.4 per cent (849.17 kt CO_2 eq). Waste is the only sector in which GHG emissions continued to climb between 1990 and 2016, owing to both the gradual increase in the population and the growth in personal consumption.

19. CO_2 is the largest contributor to Kazakhstan's GHG emissions. On a CO_2 eq basis, CO_2 represented 79.1 per cent of total GHG emissions in 2016 compared with 68.8 per cent in 1990. In 2016, CO_2 emissions (excluding emissions and removals from LULUCF) were 0.3 per cent higher than the base-year level (267,426.23 kt CO_2 eq).

20. The share of CH_4 significantly decreased from 26.8 per cent of total GHG emissions in 2016, on a CO_2 eq basis and excluding LULUCF. Between 1990 and 2016, CH_4 emissions decreased by 48.3 per cent (50,076.71 kt CO_2 eq), owing mainly to a reduction in livestock population and the introduction of controls on fugitive CH_4 emissions.

21. In 2016, N_2O emissions represented 4.4 per cent of Kazakhstan's total GHG emissions. N_2O emissions decreased by 8.5 per cent between 1990 and 2016 (1,453.57 kt CO_2 eq). The share of fluorinated gases (HFCs, PFCs and SF_6) was 0.4 per cent in 2016. NF_3 emissions were not estimated.

22. The summary information provided on GHG emissions was consistent with the information reported in the 2017 annual submission at the time of preparation of the NC7 and BR3. However, the subsequent resubmission by Kazakhstan of the 2017 national inventory common reporting format tables led to inconsistencies in the inventory information reported in the NC7, BR3 and CTF tables. The ERT noted significant differences in the GHG

inventory figures reported in the NC7 and BR3, with especially large discrepancies for 1990 (the base year) affecting the calculation of Kazakhstan's targets. According to the 2017 inventory resubmitted in July 2017, between 1990 and 2015, Kazakhstan's total emissions excluding LULUCF decreased from 375,565.08 to 298,069.64 kt CO_2 eq (20.6 per cent), whereas, according to the inventory information reported in the NC7, they decreased from 389,104 to 300,921 kt CO_2 eq (22.7 per cent).

(b) Assessment of adherence to the reporting guidelines

23. The ERT assessed the information reported in the BR3 of Kazakhstan and identified an issue relating to completeness and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 6.

Table 6
Findings on greenhouse gas inventory information from the review of the seventh national communication of Kazakhstan

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 12 Issue type: completeness Assessment: encouragement	The Party did not provide a description of the factors underlying emission trends in its NC7. During the review, the Party provided a partial explanation of the factors underlying emission trends in its NC7. The ERT encourages Kazakhstan to provide information on key factors underlying emission trends (e.g. GDP and population growth, oil and gas production) in its next NC.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

3. National system for the estimation of anthropogenic emissions by sources and removals by sinks

(a) Technical assessment of the reported information

24. Kazakhstan provided in the NC7 a description of how its national system for the estimation of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol is performing the general and specific functions defined in the annex to decision 19/CMP.1. The description includes all of the elements mandated by paragraph 30 of the annex to decision 15/CMP.1. The ERT took note of the review of the changes to the national system reflected in the report on the individual review of the 2017 annual submission of Kazakhstan.

(b) Assessment of adherence to the reporting guidelines

25. The ERT assessed the information reported in the NC7 of Kazakhstan and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

4. National registry

(a) Technical assessment of the reported information

26. In the NC7, Kazakhstan did not provide information on how its national registry performs the functions in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and complies with the requirements of the technical standards for data exchange between registry systems. The ERT took note of the information provided in chapter 3.4 of the NC7 indicating that the creation of the national registry is in its early stages and that some preliminary activities have been undertaken.

(b) Assessment of adherence to the reporting guidelines

27. The ERT assessed the information reported in the NC7 of Kazakhstan and identified an issue relating to completeness. The finding is described in table 7.

Table 7
Findings on the national registry from the review of the seventh national communication of Kazakhstan

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 32 Issue type: completeness Assessment: recommendation	The Party did not report on any of the elements required by paragraph 32(a–j) of annex II to decision 15/CMP.1 in its NC7. During the review, Kazakhstan explained that the national registry is not operational; it is in the early stages of development, with only some preliminary activities having been undertaken. The ERT recommends that Kazakhstan report on all elements required by paragraph 32(a–j) of annex II to decision 15/CMP.1 in its next NC.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information. The reporting on the requirements not included in this table is considered to be complete and transparent.

B. Information on policies and measures and institutional arrangements

1. Domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol

(a) Technical assessment of the reported information

28. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, Kazakhstan committed to reducing its GHG emissions by 5.0 per cent below the base-year level.

29. The overall responsibility for implementation of climate policy lies with the Ministry of Energy, with a number of other bodies being involved, such as the Ministry of Agriculture, the Ministry of Investment and Development and agencies such as JSC Zhasyl Damu. After the Kyoto Protocol was ratified by Kazakhstan in 2009, the Ministry of Energy was appointed as the authorized body for coordination and implementation in respect of the Kyoto Protocol.

30. The NC7 does not describe the provisions put in place by Kazakhstan to make information on legislative arrangements and enforcement and administrative procedures publicly accessible.

31. Kazakhstan did not include information in its NC7 on the national legislative arrangements and administrative procedures in place that seek to ensure that the implementation of activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources.

(b) Assessment of adherence to the reporting guidelines

32. The ERT assessed the information reported in the NC7 of Kazakhstan and identified issues relating to completeness. The findings are described in table 8.

Table 8
Findings on domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol from the review of the seventh national communication of Kazakhstan

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 37	The Party did not provide information in its NC7 on domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures as stipulated by paragraph 37(a–c) of annex II to decision 15/CMP.1.
	Issue type: completeness	During the review, Kazakhstan provided additional information in an addendum to the NC7 but it was not relevant to domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures.
	Assessment: recommendation	The ERT recommends that Kazakhstan provide information on domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures, as stipulated by paragraph 37(a–c) of annex II to decision 15/CMP.1, in its next NC.
2	Reporting requirement specified in paragraph 38	The Party did not include information in its NC7 on national legislative arrangements and administrative procedures in place that seek to ensure that the implementation of activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources.
	Issue type: completeness	
	Assessment: recommendation	No further information was provided during the review.
		The ERT recommends that Kazakhstan provide in its next NC information on national legislative arrangements and administrative procedures in place that seek to ensure that the implementation of activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information. The reporting on the requirements not included in this table is considered to be complete and transparent.

2. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol

(a) Technical assessment of the reported information

33. Kazakhstan provided information on its package of PaMs implemented, adopted and planned, by sector and by gas, in order to fulfil its commitments under the Convention and its Kyoto Protocol. Kazakhstan reported on its policy context and legal and institutional arrangements put in place to implement its commitments and monitor and evaluate the effectiveness of its PaMs.

34. In response to a recommendation of the previous ERT, Kazakhstan, in its NC7, reported on PaMs in sectors other than energy, including IPPU, agriculture, LULUCF and waste. The Party also provided information on changes made since the previous submission to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target. The changes include the establishment of the third ETS National Allocation Plan 2016–2020, which covers the energy, oil and gas, coal mining and manufacturing sectors. Five-year cumulative allowance allocations are estimated on the basis of averages: the current cumulative limit for 140 enterprises over a five-year period equates to 746.5 Mt. The ETS was suspended from early 2016 to 2018 to improve its functioning.

35. Kazakhstan gave priority to implementing the PaMs that make the most significant contribution to its emission reduction efforts. Kazakhstan reported on how it periodically updates its PaMs to reduce greater levels of emissions and on the PaMs that have been discontinued since the previous submission.

36. Kazakhstan has in place a system of State planning with long-, medium- and short-term strategic and planning documents. Kazakhstan has adopted the long-term Strategy Kazakhstan 2050, of which one of the objectives is the country's transition to a low-carbon green economy. This objective is further defined in the "concept for transition of Kazakhstan to a green economy" and its action plan for the period 2013–2020. Kazakhstan's long-term strategy up to 2050 is implemented by means of 10-year strategic development plans and five-year sectoral action plans and industry programmes. The Strategic Development Plan 2020, adopted in 2010, lays the foundation for Kazakhstan's climate policy. The Plan identifies five key areas of development, including accelerating the diversification of the economy; integrates issues related to climate change; and includes both mitigation and adaptation. The Plan also provides for the inclusion of objectives, activities and targets to reduce GHG emissions, improve energy efficiency and develop renewable energy sources in the strategic plans of individual State bodies.

37. The main national legislative instrument regulating GHG emissions in Kazakhstan is the Environmental Code, which was adopted in 2007 and includes a chapter on the regulation of GHG emissions and removals, a list of GHGs subject to State regulation, the regulatory principles and legislative framework for the implementation of various measures, and the market mechanism for GHG emissions and removals of industry (the ETS).

38. In June 2017, Kazakhstan approved rules for GHG allowance allocation and created reserves of assigned amount and volume allowances for different facilities. Under this arrangement, facility operators apply to the authorized body for emission allowances.

39. The key overarching cross-sectoral policy reported by Kazakhstan is the ETS, launched in 2013, which is based on a cap-and-trade approach and covers 140 installations in the energy, oil and gas, coal and manufacturing sectors. The agency responsible for implementing the ETS on behalf of the Ministry of Energy is JSC Zhasyl Damu. In 2013, the pilot phase was implemented, and then, on the basis of lessons learned, modifications were made for the implementation phase in 2014–2015. The latter phase provided useful insights for the Government to further improve the system, and 35 amendments to the Environmental Code, which provides the legal basis for the ETS, are currently under discussion in Parliament. The amendments relate to, among other things, the allocation approach (benchmarking instead of grandfathering); the monitoring, reporting and verification framework; and the further clarification of target sectors. Emissions trading under the ETS was suspended from early 2016 to 2018 to adjust and improve the mechanism. At present, there is no clear link between the ETS and the emission reduction targets of the country. Table 9 provides a summary of the reported information on the PaMs of Kazakhstan.

Table 9
Summary of information on policies and measures reported by Kazakhstan

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*	*Estimate of mitigation impact by 2030 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	ETS (cap and trade)	NE	NE
Energy			
Energy supply	Fuel switching (coal to gas) in thermal power plants	NE	NE
Transport	Comprehensive development plan for the gas-engine fuel market of Kazakhstan until 2020	NE	NE
Renewable energy	Promotion of hydropower and wind power	2 014	NE
Energy efficiency	Replacement of old coal power plants with new ones with higher energy efficiency	3 000	10 000

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*	*Estimate of mitigation impact by 2030 (kt CO_2 eq)*
IPPU	Modernization of JSC ArcelorMittal Temirtau	2 000	2 800
	The Law on Energy Saving and Increasing Energy Efficiency	1 500	1 680
	Ban on exporting scrap and non-ferrous (precious) metals	600	1 200
Agriculture	Technology transfer for biogas generation	200	1 000
	Improvement of breeds of cattle, small ruminants and horses in agriculture	10	30
	Reducing energy intensity	NE	NE
LULUCF	Combating land degradation and desertification	13 000	25 000
	Increasing forest area and forest regeneration	250	300
	Wildfire suppression	250	300
Waste	Use of landfill gas in Nur-Sultan	37	NE
	Biogas plant in Shymkent city	3.7	NE

Note: The estimates of mitigation impact are estimates of emissions of CO_2 or CO_2 eq avoided in a given year as a result of the implementation of mitigation actions.

(b) Policies and measures in the energy sector

40. **Energy supply.** Energy supply issues in Kazakhstan are addressed in the Strategic Plan of the Ministry of Energy of the Republic of Kazakhstan for 2017–2021, approved in December 2016. The first strategic direction (development of electric power, the coal industry and nuclear energy use) emphasizes the full coverage of the economy's energy needs and infrastructure development as the main priority areas of electric power development. Work is in progress on constructing new combined heat and power facilities, rehabilitating existing power plants, modernizing the national electricity grid and constructing and rehabilitating regional electricity networks. In order to ensure energy security in the long term, there are plans to build nuclear power plants, thus diversifying power generation capacity in the energy sector and optimizing the use of available fossil fuel resources.

41. As a result of the Strategic Plan in the Electric Power Industry, wind and solar energy together are expected to represent 3 and 10 per cent of power generation by 2020 and 2030, respectively, and gas 20 and 25 per cent by 2020 and 2030, respectively. CO_2 emissions from power generation are expected to be equal to and 15 per cent lower than the 2012 level by 2020 and 2030, respectively.

42. **Renewable energy sources.** Kazakhstan set fixed tariffs for the supply of electrical energy from renewable sources in 2014 in accordance with Article 5, subparagraph 7-2, of the Law on Support for the Use of Renewable Energy Sources, adopted in July 2009. The fixed tariffs (excluding value added tax) are as follows: wind power plants, excluding Expo-2017 plants with a capacity of 100 MW: KZT 22.68/kWh; Expo-2017 wind power plants with a capacity of 100 MW: KZT 59.7/kWh; photovoltaic solar energy converters, excluding the fixed tariff for solar power: KZT 34.6168/kWh; small hydropower plants: KZT 16.71/kWh; and biogas plants: KZT 32.23/kWh.

43. In 2014, Kazakhstan established rules for the provision of targeted assistance to individual consumers for the purchase of renewable energy facilities, under which the State

reimburses 50 per cent of the purchase cost of renewable energy facilities with a total capacity of up to 5 kW. The reimbursement is made once the facility has been commissioned.

44. Target indicators for renewable energy development by 2020, approved in November 2016, are as follows: share of total power generation from renewable energy facilities: 3 per cent; and gross installed capacity of renewable energy facilities: 1,700 MW, including 467 MW from wind power plants, 290 MW from hydropower plants 10 MW from biogas plants.

45. **Energy efficiency.** The Law on Energy Saving and Increasing Energy Efficiency in Kazakhstan, adopted in 2012, introduced a number of requirements with respect to energy saving by State bodies, the compliance of newly constructed buildings with energy efficiency requirements, and the mandatory use of metering devices for the consumption of cold and hot water, electricity and heat in newly built residential dwellings. The new legislation focuses on the active use of energy management tools, expertise in energy saving and energy efficiency, the regulation of energy use, energy audits, and the monitoring and evaluation of energy efficiency for State bodies. It also establishes a special regulatory regime for entities that consume energy above certain levels and provides for the mandatory labelling of electrical devices.

46. Kazakhstan has put in place requirements for mandatory accounting and annual reporting on the implementation of energy saving and energy efficiency measures, applicable to all entities that consume 1,500 t fuel equivalent or more per year, and to State institutions, State-owned enterprises and national companies. Energy-saving assessments are mandatory for pre-design and design documentation for the construction of new, or the expansion of existing, buildings, structures and premises that consume 500 t fuel equivalent per year.

47. **Residential and commercial sectors.** Kazakhstan did not provide details in its NC7 of any specific residential and commercial sector PaMs, except on energy saving by State bodies, the compliance of newly constructed buildings with energy efficiency requirements, and the mandatory use of metering devices for the consumption of cold and hot water, electricity and heat in newly built residential dwellings.

48. **Transport sector.** The Law on Energy Saving and Increasing Energy Efficiency determines energy efficiency standards in the transport sector. The Comprehensive Development Plan for the Gas-engine Fuel Market of the Republic of Kazakhstan until 2020, approved in the same year, aims to increase the use of gas in the transport sector. The main priorities for the Party are developing gas-fuelling infrastructure and converting transport vehicle engines to run on compressed natural gas. The Party did not report on PaMs related to the transport sector in its NC7, or on numerical targets or expected overall results.

49. The NC7 does not include information on how Kazakhstan promotes and implements the decisions of ICAO and IMO to limit emissions from aviation and marine bunker fuels.

50. **Industrial sector.** The Party did not provide a brief description of the industrial sector in textual format, or any information on targets, sectors targeted, success factors or key results. However, it did provide a list of PaMs for the IPPU sector, with brief descriptions, mitigation impacts and implementation dates in tabular format (NC7, table 36). The table included, for example, information on the modernization of steel production plants in 2000, which led to a reduction in emissions from the production of pig iron and steel of 15 per cent. The ERT noted that table 36 cited, for the IPPU sector, PaMs covered by activities in other sectors, such as energy (e.g. obligatory energy audits, which are covered under the energy sector).

(c) Policies and measures in other sectors

51. **Industrial processes.** The main PaMs in the IPPU sector of Kazakhstan are as follows: modernizing JSC ArcelorMittal Temirtau (iron and steel production), adopting the Law on Energy Saving and Increasing Energy Efficiency, and banning the export of scrap and non-ferrous metals. The expected reductions in GHG emissions resulting from these PaMs are 4,100 and 5,680 kt CO_2 eq by 2020 and 2030, respectively. GHG emissions from industrial processes increased by approximately 19 per cent in the period 1990–2016.

52. **Agriculture.** Kazakhstan provided a description of the agriculture sector, including priorities and PaMs, in textual format. The Party also detailed its PaMs for the agriculture sector in tabular format. The main PaMs for the agriculture sector are technology transfer for

biogas generation, improving cattle, small ruminant and horse breeds, and reducing energy intensity. The expected resulting reductions in GHG emissions are 210 and 1,300 kt CO_2 eq by 2020 and 2030, respectively. GHG emissions from agriculture decreased by approximately 24 per cent between 1990 and 2016, owing mainly to economic recession.

53. **LULUCF.** Kazakhstan provided a description of the LULUCF sector, including priorities and PaMs, in textual format. The Party also detailed its PaMs for the LULUCF sector in tabular format. The main PaMs for the sector are combating land degradation and desertification, suppressing wildfires, and increasing forest area and forest regeneration. The expected resulting reductions in GHG emissions are 13,500 and 25,600 kt CO_2 eq by 2020 and 2030, respectively. In 2016, the LULUCF sector in Kazakhstan was a net source of GHGs owing to soil degradation. GHG emissions from the sector increased significantly from –6,328 kt CO_2 eq in 1990 to 10,208 kt CO_2 eq in 2016.

54. **Waste management.** Kazakhstan provided a description of the waste sector, including priorities and PaMs, in textual format. The Party did not detail its PaMs for the waste sector in tabular format, but stated that it had provided cross references to CTF table 3. The main PaMs for the waste sector are the use of landfill gas in Nur-Sultan and the construction of a biogas plant in Shymkent city. GHG emissions from the waste sector increased by 18 per cent in the period 1990–2016, chiefly owing to population growth and urbanization.

(d) Minimization of adverse impacts in accordance with Article 2 and Article 3, paragraph 14, of the Kyoto Protocol

55. In the NC7 Kazakhstan did not report on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts on other Parties, especially developing country Parties. In the addendum to the NC7, Kazakhstan reported that it is self-sufficient in, and a net exporter of, crude oil, oil products, natural gas, coal, electricity and energy-intensive metals. Therefore, climate-related actions taken by the Party, such as switching fuels and developing renewable energy, are not believed to have a negative effect on trading partners, including developing countries.

(e) Assessment of adherence to the reporting guidelines

56. The ERT assessed the information reported in the NC7 of Kazakhstan and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 10.

Table 10
Findings on policies and measures, including those in accordance with Article 2 of the Kyoto Protocol, from the review of the seventh national communication of Kazakhstan

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 14	In its NC7, Kazakhstan reported on the PaMs it had adopted, implemented and planned. The ERT noted, however, that the definition of the status of the PaMs (implemented, adopted or planned) did not always match the definitions in the UNFCCC reporting guidelines on NCs.
	Issue type: transparency	During the review, Kazakhstan explained that it would consistently apply those definitions in its next NC.
	Assessment: encouragement	The ERT encourages Kazakhstan to use the definitions for implemented, adopted and planned PaMs as provided in the UNFCCC reporting guidelines on NCs.
2	Reporting requirement[a] specified in paragraph 16	The ERT noted that Kazakhstan did not provide in its NC7 textual information on its policies and practices that encourage activities that lead to greater levels of anthropogenic GHG emissions than would otherwise occur.
	Issue type: completeness	

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Assessment: encouragement	During the review, the Party acknowledged this issue and explained that description of these policies and practices was not provided because of lack of relevant information on such activities in different sectors. The ERT reiterates the encouragement made in the previous review report that Kazakhstan report on its action taken to identify and periodically update its policies and practices that encourage activities that lead to greater levels of anthropogenic GHG emissions than would otherwise occur, if any, and provide the rationale for such action.
3	Reporting requirement[a] specified in paragraph 17 Issue type: transparency Assessment: recommendation	The ERT noted that the reporting of PaMs is not organized by sector and subdivided by gas in the NC7. During the review, Kazakhstan explained that PaMs are organized in the correct way in BR3 CTF table 3. The ERT reiterates the recommendation made in the previous review report that Kazakhstan enhance the transparency of its reporting by organizing the reporting of PaMs by sector and subdivided by gas. To the extent appropriate, the following sectors should be considered: energy, transport, industry/IPPU, agriculture, LULUCF and waste/waste management.
4	Reporting requirement[a] specified in paragraph 17 Issue type: transparency Assessment: recommendation	The ERT noted that Kazakhstan provided in its NC7 a concise textual description of principal PaMs in sectors other than energy, as recommended by the previous ERT. However, the ERT noted that for the IPPU sector, Kazakhstan provided information only in tabular format without elaborating on the information in a textual description, while, for the PaMs in the energy, transport and waste sectors, Kazakhstan did not provide tables to supplement the textual description of PaMs as required by the UNFCCC reporting guidelines on NCs. During the review, the Party explained to the ERT that it cross-referenced sectoral PaMs to BR3 CTF table 3 to avoid duplication of information presented in the NC. The ERT noted that Kazakhstan in its NC provided those cross-references to CTF table 3 for the waste sector but not specifically for the energy and transport sectors. The ERT recommends that Kazakhstan include in its next NC, for each sector, the textual description of the principal PaMs supplemented by the relevant table.
5	Reporting requirement[a] specified in paragraph 21 Issue type: completeness Assessment: encouragement	The Party did not report how the progress of its PaMs in mitigating GHG emissions is monitored and evaluated over time or on the institutional arrangements for monitoring GHG mitigation policy. During the review, the Party acknowledged this issue and indicated that this information will be included in the next NC. The ERT reiterates the encouragement made in the previous review report that Kazakhstan improve the completeness of its reporting by providing a description of how the progress of PaMs in mitigating GHG emissions is monitored and evaluated over time, and in this context, also providing information on the institutional arrangements for the monitoring and evaluation of PaMs.
6	Reporting requirement[a] specified in paragraph 23 Issue type: transparency Assessment: encouragement	The ERT noted that Kazakhstan has made progress since its NC6 by providing in its NC7 quantitative estimates of the impacts on GHG emissions for some individual PaMs. However, this information was not provided for all PaMs, and no explanation was provided as to why the impacts could not be estimated for those PaMs. During the review, Kazakhstan explained that, for some PaMs, estimating mitigation impacts is difficult owing to the lack of adequate data or methodologies. The ERT reiterates the encouragement made in the previous review report that Kazakhstan provide quantitative estimates of the impacts of individual PaMs, including a brief description of estimation methods, or clearly explain why it may not be feasible to provide such information due to its national circumstances.
7	Reporting requirement[a] specified in paragraph 25	The ERT noted that the NC7 does not include information on how Kazakhstan believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Issue type: completeness Assessment: recommendation	During the review, the Party indicated that progress will be made on reporting how Kazakhstan believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention in its next submission. The ERT reiterates the recommendation made in the previous review report that Kazakhstan improve the completeness of the reporting in its next NC by providing information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals.
8	Reporting requirement[b] specified in paragraph 35 Issue type: completeness Assessment: recommendation	The ERT noted that Kazakhstan did not report in its NC7 on the identification of the steps taken to promote and/or implement any decisions by ICAO and IMO to limit or reduce GHG emissions from aviation and marine bunker fuels. During the review, the Party acknowledged this issue and indicated that this information will be included in the next NC. The ERT reiterates the recommendation made in the previous review report that Kazakhstan improve the completeness of its reporting by including information on the identification of the steps taken to promote and/or implement any decisions by ICAO and IMO to limit or reduce GHG emissions from aviation and marine bunker fuels, in its next NC.

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

[a] Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs.

[b] Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information.

C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

1. Projections overview, methodology and results

(a) Technical assessment of the reported information

57. Kazakhstan reported updated projections for 2020 and 2030, but did not do so relative to actual inventory data for 2015 under the WEM scenario. The WEM scenario reported by Kazakhstan includes PaMs implemented and adopted before 2017.

58. In addition to the WEM scenario, Kazakhstan reported WAM and WOM scenarios. The WAM scenario includes planned PaMs, while the WOM scenario excludes all PaMs implemented, adopted or planned since 2010. According to the definitions provided by the Party, the WEM scenario includes policies for the gasification of combined heat and power generation facilities, renewable energy power plants, energy efficiency and the construction of a 1 GW nuclear power plant, while the WAM scenario covers additional renewable capacities, an additional 1 GW nuclear power plant and a system-wide carbon price of USD 10, USD 15 and USD 25 per tonne of CO_2 for 2020, 2025 and 2030, respectively. During the review, Kazakhstan explained that the carbon price under its ETS is not likely to reach these levels. The definitions indicate that the scenarios were prepared mostly according to the UNFCCC reporting guidelines on NCs, however, the ERT noted that more realistic assumptions should be made in the construction of the WAM scenario.

59. The projections are presented on a sectoral basis, using generally the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case) for 1990–2030. The projections are also provided in an aggregated format for each sector as well

as for a Party total using global warming potential values from the Fourth Assessment Report of the IPCC.

60. Kazakhstan did not report emission projections for indirect GHGs such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides.

61. Emission projections related to fuel sold to ships and aircraft engaged in international transport were not reported separately and were included in the totals.

(b) Methodology, assumptions and changes since the previous submission

62. The methodology used for the preparation of the projections is generally identical to that used for the preparation of the emission projections for the NC6, with the exception of the LULUCF sector. The TIMES-KZ model is used for the development of emission projections from fuel combustion and fugitive sources. The model uses a detailed economic process description of the power industry, and represents economic and technical system elements for other industries, including energy supply and demand, GHG emissions, explicit technologies represented as stepwise functions within the model. For projecting industrial process and other non-fuel combustion emissions, an Excel-based production forecast econometric model was used. For the forestry sector, Kazakhstan adapted the CBM-CFS3 model.[3]

63. To prepare its projections, Kazakhstan relied on key underlying assumptions of GDP, population, industry and transport growth. These variables and assumptions were reported in CTF table 5. The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections.

64. Kazakhstan provided information in CTF table 5 on assumptions, methodologies, models and approaches used and on the key variables and assumptions used in the preparation of the projection scenarios. To explain the changes, Kazakhstan provided supporting documentation. Kazakhstan did not provide information on sensitivity analyses.

2. Results of projections

65. The projected emission levels under different scenarios and information on the Kyoto Protocol targets and the quantified economy-wide emission reduction target are presented in table 11 and the figure below.

Table 11
Summary of greenhouse gas emission projections for Kazakhstan

	GHG emissions (kt CO_2 eq per year)	*Changes in relation to base-year[a] level (%)*	*Changes in relation to 1990 level (%)*
Kyoto Protocol base year[b]	371 295.11	NA	–4.6
Quantified emission limitation or reduction commitment under the Kyoto Protocol (2013–2020)	352 730.36	–5.0	–9.3
Quantified economy-wide emission reduction target under the Convention	NA	NA	NA
Inventory data 1990[c]	389 105.00	4.8	NA
Inventory data 2015[c]	300 921.00	–19.0	–22.7
WOM projections for 2020[d]	359 350.00	–3.2	–7.6
WEM projections for 2020[d]	334 127.00	–10.0	–14.1

[3] Carbon Budget Model of the Canadian Forest Sector.

	GHG emissions (kt CO_2 eq per year)	*Changes in relation to base-year[a] level (%)*	*Changes in relation to 1990 level (%)*
WAM projections for 2020[d]	323 458.00	–12.9	–16.9
WOM projections for 2030[d]	447 611.00	20.6	15.0
WEM projections for 2030[d]	372 810.00	0.4	–4.2
WAM projections for 2030[d]	333 449.00	–10.2	–14.3

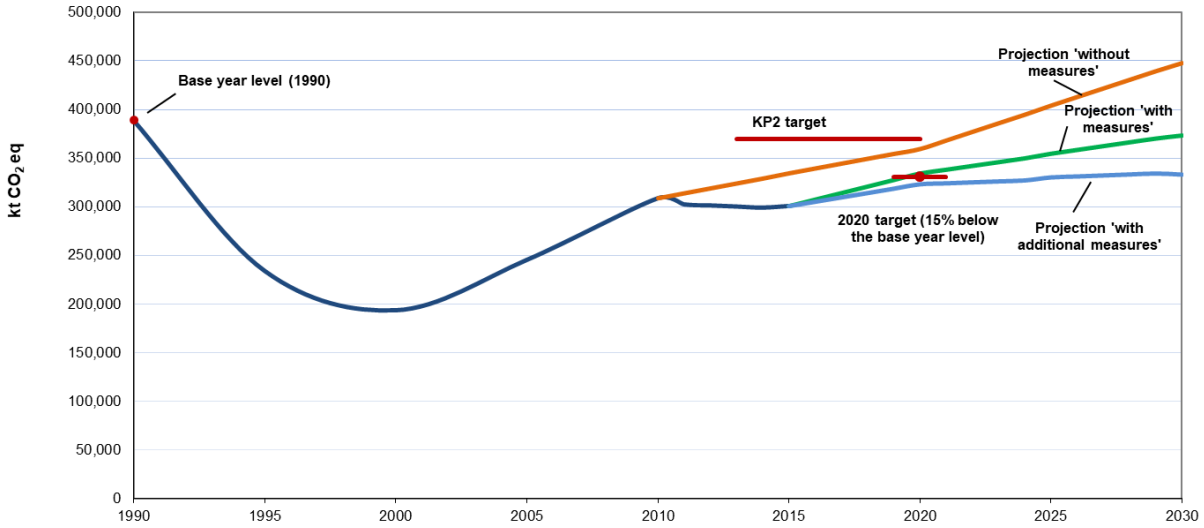
[a] "Base year" in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

[b] The Kyoto Protocol base-year level of emissions is provided in the initial review report, contained in document FCCC/IRR/2017/KAZ.

[c] From Kazakhstan's BR3 CTF table 6.

[d] From Kazakhstan's BR3 CTF table 6.

Greenhouse gas emission projections reported by Kazakhstan



Source: Data for 1990–2030: Kazakhstan's NC7 and BR3; total GHG emissions excluding LULUCF.

66. Kazakhstan's total GHG emissions excluding LULUCF are projected to be 334,127.00 and 372,810 kt CO_2 eq in 2020 and 2030, respectively, under the WEM scenario, which is a decrease of 14.1 and 4.2 per cent, respectively, below the 1990 level. Under the WAM scenario, emissions in 2020 and 2030, amounting to around 323,458 and 333,449 kt CO_2 eq, respectively, are projected to be lower than those in 1990 by 16.9 and 14.3 per cent, respectively.

67. The 2020 projections suggest that Kazakhstan may face challenges in achieving its 2020 target of 15 per cent below the 1990 level under the Convention under the WEM scenario; however, under the WAM scenario, Kazakhstan may expect to achieve its target.

68. Kazakhstan presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in table 12.

Table 12
Summary of greenhouse gas emission projections for Kazakhstan presented by sector

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	297 139	246 011	239 318	264 273	231 619	–17.2	–19.5	–11.1	–22.1
Transport	21 056	29 213	29 201	39 114	38 560	38.7	38.7	85.8	83.1
Industry/industrial processes	23 885	21 211	17 634	24 911	19 818	–11.2	–26.2	4.3	–17.0
Agriculture	42 249	31 077	30 730	36 679	36 272	–26.4	–27.3	–13.2	–14.1
LULUCF	–17 273	17 660	10 920	–4 224	–17 008	–202.2	–163.2	–75.5	–1.5
Waste	4 775	6 615	6 575	7 832	7 180	38.5	37.7	64.0	50.4
Total GHG emissions without LULUCF	**389 104**	**334 127**	**323 458**	**372 810**	**333 449**	**–14.1**	**–16.9**	**–4.2**	**–14.3**

Source: Kazakhstan's BR3 CTF table 6.

69. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy sector (not including transport), amounting to projected reductions of 51,128 kt CO_2 eq (17.2 per cent) between 1990 and 2020. However, transport sector emissions in 2020 are expected to exceed the 1990 level by 8,157 kt CO_2 eq (38.7 per cent). The pattern of projected emissions reported for 2030 under the WEM scenario generally remains the same, with the exception of the IPPU sector. By 2030, emissions from the IPPU sector are projected to exceed the 1990 level by about 1,026 kt CO_2 eq (4.3 per cent).

70. Under the WAM scenario, the patterns of emission reductions by 2020 and 2030 presented by sector and by gas remain largely the same, with the exception of the IPPU sector, where emissions by 2030 are projected to remain below the 1990 level, unlike under the WEM scenario.

71. Kazakhstan presented the WEM and WAM scenarios by gas for 2020 and 2030, as summarized in table 13.

Table 13
Summary of greenhouse gas emission projections for Kazakhstan presented by gas

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Gas	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2	274 871	263 869	254 646	298 255	263 677	–4.0	–7.4	8.5	–4.1
CH_4	98 484	57 492	56 088	58 154	53 523	–41.6	–43.0	–41.0	–45.7
N_2O	15 750	12 766	12 725	16 401	16 249	–18.9	–19.2	4.1	3.2
HFCs	NO, NA	NE	NE	NE	NE	NA	NA	NA	NA
PFCs	NO, NA	NE	NE	NE	NE	NA	NA	NA	NA
SF_6	NO, NA	0	0	0	0	NA	NA	NA	NA
NF_3	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NA	NA	NA	NA

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Gas	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Total GHG emissions without LULUCF	**389 104**	**334 127**	**323 458**	**372 810**	**333 449**	**–14.1**	**–16.9**	**–4.2**	**–14.3**

Source: Kazakhstan's BR3 CTF table 6.

72. Between 1990 and 2020, the most significant reductions are projected for CH_4 emissions (40,992 kt CO_2 eq (41.6 per cent)), followed by CO_2 emissions (11,002 kt CO_2 eq (4 per cent)).

73. By 2030, the most significant reductions are projected for CH_4 emissions (40,330 kt CO_2 eq (41 per cent)), whereas CO_2 emissions are projected to increase by 23,384 kt CO_2 eq (8.5 per cent) above the 1990 level owing to continued economic growth.

74. Under the WAM scenario, the patterns of emission reductions by 2020 presented by sector and by gas change slightly, bringing CO_2 emissions by 2030 down to 4.1 per cent below the 1990 level, owing to additional PaMs in the energy sector (shifting away from coal power generation and building new nuclear and renewable capacities).

3. Assessment of adherence to the reporting guidelines

75. The ERT assessed the information reported in the NC7 of Kazakhstan and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 14.

Table 14
Findings on greenhouse gas emission projections reported in the seventh national communication of Kazakhstan

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 30 Issue type: completeness Assessment: encouragement	The ERT noted that Kazakhstan did not report a sensitivity analysis for any of the projections in its NC7. No further information was provided during the review. The ERT encourages Kazakhstan to report a sensitivity analysis for its projections in its next NC.
2	Reporting requirement specified in paragraph 31 Issue type: transparency Assessment: recommendation	The ERT noted that Kazakhstan did not report emission projections relative to the actual inventory for the preceding years in its NC7. During the review, the Party clarified that emission projections relative to the actual inventory are provided in CTF table 6. The ERT recommends that Kazakhstan include historical inventory information alongside projections in its next NC.
3	Reporting requirement specified in paragraph 35 Issue type: completeness Assessment: recommendation	The ERT noted that Kazakhstan did not present emission projections on a gas-by-gas basis in its NC7. Moreover, HFCs and PFCs were not included at all in the projections. During the review, Kazakhstan acknowledged this issue and indicated that this information will be included in the next NC. The ERT recommends that Kazakhstan present emission projections on a gas-by-gas basis for the following GHGs: CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case).

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
4	Reporting requirement specified in paragraph 36	The ERT noted that Kazakhstan did not report separately emission projections related to fuel sold to ships and aircraft engaged in international transport in its NC7.
	Issue type: completeness	During the review, Kazakhstan explained that it is very difficult to separate energy statistics for international transport from domestic transport.
	Assessment: recommendation	The ERT recommends that Kazakhstan report separately, to the extent possible, emission projections related to fuel sold to ships and aircraft engaged in international transport in its next NC.
5	Reporting requirement specified in paragraph 37	The ERT noted that Kazakhstan did not present projections in a tabular format by sector and by gas for 2005, 2010, 2015 or 2020 in its NC7.
	Issue type: completeness	During the review, the Party clarified that the information was provided in a tabular format in CTF table 6.
	Assessment: encouragement	The ERT encourages Kazakhstan to improve the completeness of its reporting by presenting projections on a gas-by-gas and by sector together with actual data for the period 1990–2000 or the latest year available in its next NC.
6	Reporting requirement specified in paragraph 37	While the Party provided a description in its NC7 of the model and approaches used for developing projections, it did not describe the original purpose of the model and whether and how it was modified for climate change purposes; summarize the strengths and weaknesses of each model or approach used; or explain how the model or approach accounts for any overlap or synergies that may exist between different PaMs.
	Issue type: completeness	
	Assessment: encouragement	No further information was provided during the review.
		The ERT encourages Kazakhstan, in addition to describing each model or approach, to explain the original purpose of the model and whether and how it was modified for climate change purposes; to summarize the strengths and weaknesses of each model or approach used; and to explain how the model or approach accounts for any overlap or synergies that may exist between different PaMs.
7	Reporting requirement specified in paragraph 44	The ERT noted that Kazakhstan did not provide references to more detailed information related to the models used for developing emission projections in its NC7.
	Issue type: completeness	During the review, additional information about the models used for developing emission projections was provided.
	Assessment: encouragement	The ERT encourages Kazakhstan to provide references to more detailed information about the models used and the gases and sectors covered.
8	Reporting requirement specified in paragraph 45	The ERT noted that Kazakhstan did not report the main differences in the assumptions and methods employed and results of the projections between the NC7 and NC6.
	Issue type: completeness	During the review, the Party clarified that there had been no changes since the NC6 in the methods employed with the exception of the new model used for the forestry sector. No explanation of differences in assumptions between the NC7 and NC6 was provided.
	Assessment: encouragement	
		The ERT encourages Kazakhstan to provide in its next NC explanations of the main differences in the assumptions and methods employed and emission projection results between the current NC and those in earlier NCs.
9	Reporting requirement specified in paragraph 46	The ERT noted that Kazakhstan did not discuss the sensitivity of emission projections to underlying assumptions, either quantitatively or qualitatively, in its NC7.
	Issue type: completeness	No further information was provided during the review.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Assessment: encouragement	The ERT encourages Kazakhstan to discuss in its next NC the sensitivity of projections to underlying assumptions qualitatively and, where possible, quantitatively. This could be done by varying the assumptions regarding increases in GDP or oil prices and production levels.
10	Reporting requirement specified in paragraph 47	The ERT noted that Kazakhstan did not provide information in its NC7 on key underlying assumptions and values of variables such as GDP growth, population growth, tax levels and international fuel prices using table 2 of the UNFCCC reporting guidelines on NCs.
	Issue type: completeness	During the review, the Party provided additional information on key underlying assumptions and values of variables.
	Assessment: encouragement	The ERT encourages Kazakhstan to provide information on key underlying assumptions and values of variables in its next NC in accordance with information provided during the review.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

4. Assessment of the total effect of policies and measures

(a) Technical assessment of the reported information

76. In the NC7 Kazakhstan presented the estimated and expected total effect of implemented and adopted PaMs and an estimate of the total effect of its PaMs, in accordance with the WEM scenario, compared with a situation without such PaMs. Information is presented in terms of GHG emissions avoided or sequestered, by gas (on a CO_2 eq basis), in 2020 and 2030. It also presented relevant information on factors and activities for each sector for 1990–2030.

77. Kazakhstan reported that the total estimated effect of its adopted and implemented PaMs in 2020 is 25,223 kt CO_2 eq. According to the information reported in the NC7, PaMs implemented in the energy sector will deliver the largest emission reductions, followed by PaMs implemented in the industrial processes sector. Table 15 provides an overview of the total effect of PaMs as reported by Kazakhstan.

Table 15
Projected effects of Kazakhstan's planned, implemented and adopted policies and measures by 2020 and 2030

	2020		*2030*	
Sector	*Effect of implemented and adopted measures (kt CO_2 eq)*	*Effect of planned measures (kt CO_2 eq)*	*Effect of implemented and adopted measures (kt CO_2 eq)*	*Effect of planned measures (kt CO_2 eq)*
Energy (without transport)	17 201	6 693	61 902	32 654
Transport	2 000	12	6 358	554
Industrial processes	5 811	3 577	5 487	5 093
Agriculture	211	347	1 055	407
Land-use change and forestry	5 209	6 740	28 275	12 784
Waste management	0	40	0	652
Total (without LULUCF)	25 223	10 669	74 802	39 360

Source: Kazakhstan's BR3 CTF table 6.
Note: The total effect of implemented and adopted PaMs is defined as the difference between the WOM and the WEM scenario; the total effect of planned PaMs is defined as the difference between the WEM and the WAM scenario.

(b) Assessment of adherence to the reporting guidelines

78. The ERT assessed the information reported in the NC7 of Kazakhstan and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 16.

Table 16
Findings on the assessment of the total effect of policies and measures from the review of the seventh national communication of Kazakhstan

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 40 Issue type: completeness Assessment: encouragement	The ERT noted that the Party did not report in its NC7 the total effect of its PaMs for 2015. No further information was provided during the review. The ERT encourages Kazakhstan to provide an estimate of the total effect of its PaMs for 2015, calculated as the difference between the WEM and the WOM scenario in 2015.
2	Reporting requirement specified in paragraph 41 Issue type: transparency Assessment: encouragement	The Party did not explain, for each projection scenario in its NC7, from which year policies are assumed to have been implemented or not in making calculations for estimating the total effect of PaMs. During the review, the Party clarified that the WAM scenario includes PaMs planned as at 2017, while the WOM scenario excludes all PaMs implemented, adopted or planned since 2010. The ERT encourages Kazakhstan to clarify, in its next submission, as of which year onward it is assumed that PaMs are implemented or not implemented in making the calculations for estimating the total effect of PaMs.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

5. Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

(a) Technical assessment of the reported information

79. In the addendum to the NC7 Kazakhstan provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. The ERT noted that Kazakhstan does not plan to use the market-based mechanisms to meet its Kyoto Protocol target.

(b) Assessment of adherence to the reporting guidelines

80. The ERT assessed the information reported in the NC7 of Kazakhstan and recognized that the reporting is complete, transparent and adhering to the reporting guidelines for supplementary information. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

D. Provision of financial and technological support to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol

81. Kazakhstan is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, Kazakhstan provided information in the NC7 on support received and on its provision of support to developing country Parties. The ERT commends Kazakhstan for reporting this information and suggests that it continue to do so in future NCs.

82. In 2015, the Africa–Kazakhstan Partnership for the Sustainable Development Goals was launched to assist 45 African countries in implementing the Sustainable Development Goals. The budget for the programme amounted to USD 2 million. In 2016, Kazakhstan signed an agreement with the Caribbean Community to support member States in their climate change and sustainable development efforts. Under the agreement, Kazakhstan provided a grant of USD 770,000 to strengthen the capacity of the member States to engage in regional and international discussions on climate matters. Environmental and climate protection is one of the four basic principles of Kazakhstan's national policy for official development assistance. Since 2013, Kazakhstan has been working on the establishment of the Kazakhstan Agency for Development Aid and Technical Assistance.

E. Vulnerability assessment, climate change impacts and adaptation measures

1. Technical assessment of the reported information

83. In the NC7 Kazakhstan provided the required information on the expected impacts of climate change in the country and on a number of proposed adaptation measures covering regional, sectoral and cross-sectoral vulnerabilities and considerations, except for the required outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Kazakhstan provided a description of climate change vulnerability in and impacts on important sectors and areas such as agriculture, livestock, water resources and energy and highlighted several adaptation response options planned at different levels of government.

84. By virtue of its location in Central Asia, Kazakhstan is exposed to climate change impacts such as decreased precipitation, increased average temperatures, extreme weather events and flooding. These are liable to affect agriculture, livestock, freshwater resources, ecology, energy and human health. Adaptation measures have been determined for each of these sectors and areas but have been implemented only to a very limited extent.

85. While the NC7 sets out a number of climate change adaptation measures, information regarding the level of implementation of the measures is limited. The Ministry of Energy is preparing an adaptation action plan to address adaptation matters in the near future and to provide further direction to government agencies on enhancing preparedness for climate change. Although a nationwide adaptation plan has yet to be rolled out, some specific measures have already been implemented at the sectoral level. In the agriculture sector, zero- or minimal-tillage and direct seeding systems have been subsidized, more drip irrigation systems have been implemented, and efficient irrigation systems and crop rotation and green agriculture technologies have been rolled out in several parts of the country. The provision of pastureland to farmers for agricultural and livestock production and other purposes, within the framework of the Pasture Law, will help to maintain that land and create employment. In addition, under the aegis of the Ministry of Agriculture, JSC KazAgroGarant is planning to develop and offer insurance in the animal breeding sector. Early warning alerts for some extreme weather events are provided by Kazhydromet via mobile phone applications to increase preparedness.

86. The impacts of climate change include drought due to reduced precipitation and increased average temperatures; higher frequency and greater severity of extreme weather events such as rainstorms, windstorms, hailstorms and extreme heat and cold; and flooding in mountain areas following the sudden and premature melting of snow and glaciers. Table 17 summarizes the information on vulnerability and adaptation to climate change presented in the NC7 of Kazakhstan.

Table 17
Summary of information on vulnerability and adaptation to climate change reported by Kazakhstan

Vulnerable area	*Examples/comments/adaptation measures reported*
Agriculture	*Vulnerability*: The climate change impacts that are most detrimental to the agriculture sector are frost, drought, heavy rainfall, hail, and strong dry winds and dust storms. Climate change is expected to reduce agricultural productivity and jeopardize food

Vulnerable area	*Examples/comments/adaptation measures reported*
	security in several regions of Kazakhstan. Crop yield losses, including a 50 per cent decrease in grain yield, are expected in the West Kazakhstan, North Kazakhstan, Aktobe, Karaganda and Kostanay oblasts owing to the higher frequency of drought. *Adaptation*: In 2000, the International Maize and Wheat Improvement Centre, together with scientists and farmers of Kazakhstan, initiated the introduction of a zero- or minimal-tillage and direct seeding system to mitigate climate change impacts on wheat and corn. Since 2008, zero-tillage technology has been subsidized. Moreover, the use of drip irrigation systems is gradually increasing in several parts of Kazakhstan, covering up to 47,800 ha arable land in 2014 (up 49.9 per cent since 2013). The Party highlighted the existence of several agriculture measures, such as efficient irrigation systems, crop rotation and green agriculture technologies that are already in place in several parts of Kazakhstan. While these measures have not been implemented specifically for climate change adaptation, they contribute to adaptation in the agriculture sector. As stated during the review, a climate change adaptation plan is being prepared.
Livestock	*Vulnerability*: Livestock breeding is vulnerable to climate change impacts such as frost, heavy snowstorms, high snow cover, the formation of ice layers beneath snow, cold weather (which animals are vulnerable to after shearing), heavy downpours and hailstorms, excessive heat and drought, which increase livestock mortality. Infectious, parasitic and non-contagious diseases that are exacerbated by climate change also have negative impacts on livestock breeding. Any climatic condition that reduces fodder production and the number of grazing days creates environmental stress on livestock such as sheep and cattle in Kazakhstan. An increase in the number of drought days during the vegetation period, higher temperatures and less precipitation are expected to cause a decrease in pasture and cropland yields, which may lead to reduced livestock production. Over the past four years, meteorological conditions have been observed to be milder for winter pasturing, which has resulted in earlier spring periods for sheep shearing and tougher conditions for summer sheep pasturing in South Kazakhstan. *Adaptation*: The Pasture Management Plan, provided for by the Pasture Law, proposes the development and approval of a pasture rotation scheme and pasture load norms. The provision of pastureland to farmers for agricultural and livestock production, provided for by the same Law, will also help to maintain that land and create employment. While the Law is enforced, its implementation is still in the early stages. Under the aegis of the Ministry of Agriculture, JSC KazAgroGarant is planning to develop and offer insurance in the animal breeding sector.
Water resources	*Vulnerability*: A reduction in river run-off owing to reduced precipitation and higher temperatures and water demand from neighbouring countries is expected to limit freshwater resources. Some regions of Kazakhstan are also expected to face challenges in meeting the water demands of fishing, energy, navigation and other economic activities dependent on flow augmentation. Climate change impacts are expected to exacerbate the negative impacts of rising water demand and poor water management practices, such as extensive use of water in industry, inefficient use and distribution of water, and a lack of the necessary institutional and financial capacities and legislative frameworks to improve the system. *Adaptation*: The implementation of several measures for the adaptation of water resources to climate change has been suggested; however, the level of implementation of those measures is unclear. Measures have been taken in recent years to rescue the Aral Sea, such as saxaul planting and sand fixation, but these measures do not specifically concern climate change adaptation.
Ecology	*Vulnerability*: Ecological systems in Kazakhstan are reported to be vulnerable to climate change impacts primarily related to extreme weather events, such as heavier and more frequent windstorms, rainstorms and hailstorms, and increased aridity over the past decade. A reduction in freshwater resources is reported to have had negative impacts on ecological systems. *Adaptation*: No adaptation measures to address the impacts of climate change on ecology were reported in the NC7.

Vulnerable area	*Examples/comments/adaptation measures reported*
Human health	*Vulnerability*: According to the NC7, a higher frequency of heatwaves is expected to harm human health in Kazakhstan. *Adaptation:* Kazhydromet provides the public with early warning alerts of some extreme weather events via mobile phone applications.
Infrastructure and economy	*Vulnerability*: Extreme weather events such as heavier and more frequent windstorms, rainstorms and hailstorms over the past decade are reported to have damaged national infrastructure – including buildings, electricity grids and systems, and water networks – and economic activities in general. Extreme cold weather is also reported to have caused failures in heat and power systems. In the energy sector, in addition to the negative impacts of extreme weather conditions, reduced river run-off levels are reported to have limited Kazakhstan's hydropower generation capacity. *Adaptation*: No information on adaptation measures for the infrastructure and economic sectors was reported in the NC7.
Floods	*Vulnerability*: Sudden melting of snow and glaciers owing to rapidly increasing temperatures in spring together with ice jams in rivers have increasingly been causing flooding in the highland mountain regions and lowlands of Kazakhstan. The main regions that are vulnerable to river floods are the South Kazakhstan, Zhambyl, Almaty and East Kazakhstan oblasts. Increased urbanization in floodplain areas has reportedly increased exposure to river flooding. Climate change impacts such as river flooding due to melting snow and glaciers, together with extreme precipitation events, increase the flooding risk where dams and other such structures are old and insufficient and lack flood-prevention measures such as emergency spillways. *Adaptation*: Several adaptation measures have been suggested to increase resilience to floods; however, the level of the implementation of these measures is not clearly detailed in the NC7. With the help of WMO and the United States Agency for International Development, Kazakhstan is working on the establishment of the Regional Centre for Flood Prevention in Central Asia.

87. As a non-Annex I Party, Kazakhstan has made no commitment to cooperate with other non-Annex I Parties in preparing for adaptation. Kazakhstan has not reported any involvement in international cooperation activities on adaptation.

88. The ERT noted that information on impacts, vulnerabilities and adaptation was sometimes referred to in other chapters rather than in chapter 6 of the NC7. The ERT considers that the Party could improve the quality of its next NC by ensuring consistency among chapters and including all relevant information in the appropriate sections. The ERT also noted that the information on impacts, vulnerabilities and adaptation in chapter 6 was presented in a fragmented manner.

89. The ERT further noted that some of the terminology used in the NC7 is not consistent with the *IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations* (e.g. "floodplain" was used instead of "river basin").

2. Assessment of adherence to the reporting guidelines

90. The ERT assessed the information reported in the NC7 of Kazakhstan and identified issues relating to transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 18.

Table 18
Findings on vulnerability assessment, climate change impacts and adaptation measures from the review of the seventh national communication of Kazakhstan

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 49 Issue type: transparency Assessment: recommendation	In its NC7 Kazakhstan did not include an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation, though it reported some specific actions in particular sectors, such as the introduction of a zero- or minimal-tillage and direct seeding system in the agriculture sector to reduce the climate change impacts on wheat and corn. During the review, the Party explained that an adaptation action plan for Kazakhstan is under preparation. The ERT recommends that Kazakhstan include a comprehensive outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation.
2	Reporting requirement specified in paragraph 49 Issue type: transparency Assessment: encouragement	In its NC7 Kazakhstan reported the existence of vulnerabilities in some sectors and areas without providing any details on them, especially in areas such as ecology, biodiversity and human health and economic sectors such as fisheries, tourism and industry. During the review, the Party informed the ERT that more detailed information is not currently available for the sectors and areas that are vulnerable. The ERT encourages Kazakhstan to report on specific results of research regarding the particular vulnerabilities in each given vulnerable sector/area mentioned in the NC7.
3	Reporting requirement specified in paragraph 49 Issue type: transparency Assessment: encouragement	In the NC7, Kazakhstan used some terminology in chapter 6 that is not consistent with terminology in the *IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations* (e.g. “floodplain” was used instead of “river basin”). This jeopardizes the transparency of the report. During the review, the Party clarified some of the terminology used in the NC7, which enabled better understanding by the ERT. The ERT encourages Kazakhstan to use in chapter 6 of the NC the relevant terminology from the *IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations*.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

F. Research and systematic observation

1. Technical assessment of the reported information

91. Kazakhstan provided information on its funding sources and domestic activities relating to research and systematic observation. The NC7 does not contain information on participation in international activities, including contributions to the World Climate Programme, International Geosphere–Biosphere Programme, the Global Climate Observing System and the IPCC. During the review, the Party informed the ERT that no such activities were undertaken.

92. The NC7 also does not contain any information on the identification of opportunities for and barriers to free and open international exchange of data and information and on action taken to overcome such barriers. During the review, the Party informed the ERT that climate data are submitted to WMO through the Russian Federation, which creates an additional layer of administration for Kazhydromet. In addition, the different scenarios and models used by other countries in the Central Asia region create inconsistencies in the data produced and reported.

93. The NC7 contains information on Kazakhstan's policies and actions relating to research and systematic observation in the areas of meteorology, hydrology and the atmosphere. However, it does not include any information on policies and actions with respect to technological, technical, socioeconomic and other research. During the review, the Party provided information on the research activities of Al-Farabi Kazakh National University, Nazarbayev University, the Institute of Geography and the National Centre for Space Research, in addition to those of Kazhydromet. The Party stated that no information was available on technological, technical and socioeconomic research in Kazakhstan.

94. In terms of activities related to systematic observation, Kazakhstan reported on national plans, programmes and support for ground-based climate observing systems, including on the regular monitoring activities of 328 stations and the agrometeorological observations of 203 observation centres.

95. Kazakhstan participates in international and intergovernmental programmes and networks and is a member of such organizations as WMO, the Intergovernmental Council for Hydrometeorology of the Commonwealth of Independent States, and the North Eurasian Climate Centre. Kazhydromet is a member of the Coordinating Committee on Hydrometeorology and Pollution Monitoring of the Caspian Sea.

96. The ERT notes that, as a non-Annex I Party, Kazakhstan has not made any commitment to providing support to developing countries for research and systematic observation. Therefore, the NC7 does not reflect action taken to support capacity-building and the establishment and maintenance of observation systems and related data and monitoring systems in developing countries.

2. Assessment of adherence to the reporting guidelines

97. The ERT assessed the information reported in the NC7 of Kazakhstan and identified issues relating to completeness and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 19.

Table 19
Findings on research and systematic observation from the review of the seventh national communication of Kazakhstan

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 57	The Party did not communicate information pursuant to Article 4, paragraph 1(g), of the Convention on its actions relating to research, such as scientific and academic research.
	Issue type: completeness Assessment: recommendation	During the review, Kazakhstan provided information on the research activities of Al-Farabi Kazakh National University, Nazarbayev University, the Institute of Geography and the National Centre for Space Research, in addition to those of Kazhydromet. The Party stated that no information was available on technological, technical and socioeconomic research in Kazakhstan.
		The ERT recommends that Kazakhstan include in its next NC information pursuant to Article 4, paragraph 1(g), of the Convention on its actions relating to scientific and academic research.
2	Reporting requirement specified in paragraph 58	The NC7 does not contain information on domestic and international activities, for example, joint activities with the World Climate Programme, the International Geosphere–Biosphere Programme, the Global Climate Observing System, the IPCC and other such programmes and institutions.
	Issue type: completeness	During the review, Kazakhstan informed the ERT that it did not cooperate with those institutions or participate in such programmes.
	Assessment: recommendation	The ERT reiterates the recommendation made in the previous review report that Kazakhstan indicate in its next NC whether it is engaged in any domestic and international activities relating to research and systematic observation.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
3	Reporting requirement specified in paragraph 62 Issue type: completeness Assessment: encouragement	The Party did not report on opportunities for and barriers to free and open international exchange of data and information or on action taken to overcome such barriers. During the review, Kazakhstan informed the ERT that climate data are submitted to WMO through the Russian Federation, which creates an additional layer of bureaucracy for Kazhydromet. In addition, the different scenarios and models used by other countries in the Central Asia region create inconsistencies in the data produced and reported. The ERT encourages Kazakhstan to provide information in its next NC on opportunities for and barriers to free and open international exchange of data and information and to report on action taken to overcome such barriers.
4	Reporting requirement specified in paragraph 63 Issue type: completeness Assessment: encouragement	The Party did not report information on highlights, innovations and significant efforts made with regard to climate process and climate system studies, socioeconomic analysis, or research and development of mitigation and adaptation technologies. During the review, Kazakhstan informed the ERT that no paleoclimatic studies or socioeconomic analyses were conducted. Additional information was provided on research that contributes to climate change mitigation and adaptation. The ERT encourages Kazakhstan to provide its next NC information on highlights, innovations and significant efforts made with regard to climate process and climate system studies, socioeconomic analysis, and research and development of mitigation and adaptation technologies.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

G. Education, training and public awareness

1. Technical assessment of the reported information

98. In the NC7 Kazakhstan provided information on its actions relating to education, training and public awareness at the domestic level. The Party provided information on the general policy on education, training and public awareness; primary, secondary and higher education; public information campaigns; training programmes; education materials; resource or information centres; the involvement of the public and NGOs; and its participation in international activities.

99. Climate change is embedded in the education system of Kazakhstan at different levels. Examples of initiatives include the Green Planet Programme for pre-school children and geography and biology courses for secondary school students. An environmental consciousness course together with a textbook on ecology and sustainable development has been developed by the Zhandau Alemi Foundation to be taught to students in four cities in Kazakhstan. The “Climate box” course was developed in 2017 to be taught at Nazarbayev Intellectual Schools Autonomous Educational Organizations and city schools in Nur-Sultan. At the university level, there are academic courses on climate risks and their management (Korkyt Ata Kyzylorda State University) and on climate change and the green economy (Taraz State University and Almaty University). In terms of public awareness and access to information, the national report on the state of the environment and on the use of natural resources is compiled on an annual basis in order to inform the public about the environmental situation of the country and the measures taken to improve it. Kazakhstan is a Party to the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. In Kazakhstan, State institutions lead public information campaigns for stakeholder groups such as pupils of pre-schools, high schools, colleges and higher education institutions, as well as for the general public.

100. During the review, Kazakhstan informed the ERT that NGOs were involved in the preparation of the NC7; specifically, in data gathering and drafting certain sections. Kazakhstan's Climate Change Coordination Centre, an NGO working on climate change and ozone depletion, contributed to chapter 6, while the NGO "ECOM" was responsible for chapter 9.

2. Assessment of adherence to the reporting guidelines

101. The ERT assessed the information reported in the NC7 of Kazakhstan and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

III. Conclusions and recommendations

102. The ERT conducted a technical review of the information reported in the NC7 of Kazakhstan in accordance with the UNFCCC reporting guidelines on NCs. The ERT concludes that the reported information mostly adheres to the UNFCCC reporting guidelines on NCs and that the NC7 provides an overview of the national climate policy of Kazakhstan.

103. The information provided in the NC7 includes some of the elements of the supplementary information under Article 7 of the Kyoto Protocol, with the exception of information on the national registry and domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol was not provided by Kazakhstan in its 2018 annual submission.

104. Kazakhstan's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 12.8 per cent below its 1990 level, whereas total GHG emissions including LULUCF were 8.6 per cent below its 1990 level, in 2016. Between 1990 and 2016, the emissions trajectory of Kazakhstan was characterized by a significant decrease in total emissions after the dissolution of the Soviet Union in 1991, with emissions reaching a trough in 1999 and then rapidly increasing owing to economic recovery and transformation and the discovery, large-scale production and export of oil and gas in the period 2000–2010. Since 2010, growth in emissions has slowed owing to a number of factors, including the world oil price collapse in 2014, the restructuring of Kazakhstan's economy and the transition to more fuel-efficient and less GHG-intensive technologies.

105. Kazakhstan's main policy framework relating to energy and climate change, Strategy Kazakhstan 2050, provides the development framework for the country's transition to a low-carbon green economy, which is further defined in the "concept for transition of Kazakhstan to a green economy" and its action plan for the period 2013–2020. Key legislation supporting Kazakhstan's climate change goals includes the Environmental Code adopted in 2007, which includes the regulation of GHG emissions and removals, a list of GHGs that are subject to State regulation, the regulatory principles and legislative framework for the implementation of various measures, and the market mechanism of GHG emissions and removals for industry (the ETS). The most significant mitigation impacts are due to the energy supply Strategic Plan of the Ministry of Energy of the Republic of Kazakhstan for 2017–2021; the Law of the Republic of Kazakhstan incorporating the Rules for the Formation and Use of the Reserve Fund for the Use of Renewable Energy Sources; the 2014 Rules for Providing Targeted Assistance to Individual Consumers for the purchase of renewable energy facilities; and the 2012 Law on Energy Saving and Increasing Energy Efficiency.

106. The GHG emission projections provided by Kazakhstan include those under the WOM, WEM and WAM scenarios. In the three scenarios, emissions are projected to be 7.6, 14.1 and 16.9 per cent below the 1990 level in 2020, respectively. On the basis of the reported information, the ERT concludes that Kazakhstan may face challenges in

achieving its Convention target for 2020 (15 per cent reduction compared with the 1990 level by 2020) under the WEM scenario, but may expect to achieve its target under the WAM scenario.

107. The projections indicate that Kazakhstan can meet its Kyoto Protocol target for the second commitment period (5 per cent reduction compared with the 1990 level by 2020), even under the baseline scenario, and that GHG emissions are not expected to exceed the Kyoto Protocol target by 2020.

108. The NC7 contains information on how the Party's use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. Kazakhstan is not planning to make use of the Kyoto Protocol mechanisms to meet its Kyoto Protocol target.

109. Kazakhstan is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, Kazakhstan provided information on its provision of support to developing country Parties. In 2015, the Africa–Kazakhstan Partnership for the Sustainable Development Goals was launched to assist 45 African countries in implementing the Sustainable Development Goals. The budget for the programme amounted to USD 2 million. In 2016, Kazakhstan signed an agreement with the Caribbean Community to support member States in their climate change and sustainable development efforts. Under the agreement, Kazakhstan provided a grant of USD 770,000 to strengthen the capacity of the member States to engage in regional and international discussions on climate matters.

110. Kazakhstan provided a description of climate change vulnerability in and impacts on the most important sectors and areas. The major impacts of climate change were reported as decreased precipitation, increased average temperatures, extreme weather events and flooding. These are liable to affect agriculture, livestock, freshwater resources, ecology, energy and human health. Adaptation measures have been determined for each of these sectors and areas but have been implemented only to a very limited extent, and only in the areas of agriculture and livestock production. The Ministry of Energy is preparing an adaptation action plan to address adaptation matters in the near future and to provide further direction to government agencies on enhancing preparedness for climate change.

111. Kazakhstan provided information on its funding sources and domestic activities relating to research and systematic observation. The NC7 includes information on Kazakhstan's policies and actions relating to research and systematic observation in the areas of meteorology, hydrology and the atmosphere. In terms of activities related to systematic observation, Kazakhstan reported on national plans, programmes and support for ground-based climate observing systems, including on the regular monitoring activities of 328 stations and the agrometeorological observations of 203 observation centres. Kazakhstan participates in international and intergovernmental programmes and networks and is a member of such organizations as WMO, the Intergovernmental Council for Hydrometeorology of the Commonwealth of Independent States, and the North Eurasian Climate Centre. Kazhydromet is a member of the Coordinating Committee on Hydrometeorology and Pollution Monitoring of the Caspian Sea.

112. In the NC7 Kazakhstan provided information on its actions relating to education, training and public awareness at the domestic level. The Party provided information on the general policy on education, training and public awareness; primary, secondary and higher education; public information campaigns; training programmes; education materials; resource or information centres; the involvement of the public and NGOs; and its participation in international activities. The Party stated that NGOs had been involved in data gathering and drafting certain sections during the preparation of the NC7.

113. In the course of the review, the ERT formulated the following recommendations for Kazakhstan to improve its adherence to the UNFCCC reporting guidelines on NCs and its reporting of supplementary information under the Kyoto Protocol:[4]

(a) To improve the completeness of its reporting by:

(i) Providing information on all elements of its national registry as required by paragraph 32(a–j) of annex II to decision 15/CMP.1 (see issue 1 in table 7);

(ii) Providing information on domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures, as stipulated by paragraph 37(a–c) of annex II to decision 15/CMP.1 (see issue 1 in table 8);

(iii) Providing information on national legislative arrangements and administrative procedures in place that seek to ensure that the implementation of activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources (see issue 2 in table 8);

(iv) Providing information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals (see issue 7 in table 10);

(v) Including information on the identification of the steps taken to promote and/or implement any decisions by ICAO and IMO to limit or reduce GHG emissions from aviation and marine bunker fuels (see issue 8 in table 10);

(vi) Presenting emission projections on a gas-by-gas basis for the following GHGs: CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case) (see issue 3 in table 14);

(vii) Reporting, to the extent possible, emission projections related to fuel sold to ships and aircraft engaged in international transport separately and not included in the total (see issue 4 in table 14);

(viii) Providing information pursuant to Article 4, paragraph 1(g), of the Convention on its actions relating to scientific and academic research (see issue 1 in table 19);

(b) To improve the transparency of its reporting by:

(i) Organizing the reporting of PaMs by sector and subdivided by gas (see issue 3 in table 10);

(ii) Ensuring that for each sector the textual description of the principal PaMs is supplemented by the relevant table (see issue 4 in table 10);

(iii) Including historical inventory information alongside projections (see issue 2 in table 14);

(iv) Including a comprehensive outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation (see issue 1 in table 18).

IV. Questions of implementation

114. During the review, the ERT assessed the NC7, including the supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, and the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, with regard to timeliness, completeness and transparency. No questions of implementation were raised by the ERT during the review.

[4] The recommendations are given in full in the relevant sections of this report.

Annex

Documents and information used during the review

A. Reference documents

2017 GHG inventory submission of Kazakhstan. Available at https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/submissions/national-inventory-submissions-2017.

2018 GHG inventory submission of Kazakhstan. Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2018.

BR3 of Kazakhstan. Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports-annex-i-parties/third-biennial-reports-annex-i.

BR3 CTF tables of Kazakhstan. Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports-annex-i-parties/third-biennial-reports-annex-i.

Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention. Available at https://unfccc.int/topics/mitigation/workstreams/pre-2020-ambition/compilation-of-economy-wide-emission-reduction-targets-to-be-implemented-by-parties-included-in-annex-i-to-the-convention.

"Guidelines for review under Article 8 of the Kyoto Protocol". Annex to decision 22/CMP.1. Available at http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf.

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

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications". FCCC/CP/1999/7. Available at http://unfccc.int/resource/docs/cop5/07.pdf.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Annex to decision 15/CMP.1. Available at http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Annex III to decision 3/CMP.11. Available at http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf.

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

IPCC. 1994. *IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations*. T Carter, M Parry, H Harasawa, et al. (eds.). London and Tsukuba, Japan: University College London and Center for Global Environmental Research National Institute for Environmental Studies. Available at https://www.ipcc.ch/site/assets/uploads/2018/03/ipcc-technical-guidelines-1994n-1.pdf.

NC7 of Kazakhstan. Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/national-communications-and-biennial-reports-annex-i-parties/seventh-national-communications-annex-i.

Report on the individual review of the annual submission of Kazakhstan submitted in 2016. FCCC/ARR/2016/KAZ. Available at https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories/greenhouse-gas-inventory-review-reports-2016.

Report on the review of the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of Kazakhstan. FCCC/IRR/2016/KAZ. Available at https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-kyoto-protocol/second-commitment-period/initial-reports.

Report of the technical review of the second biennial report of Kazakhstan. FCCC/TRR.2/KAZ. Available at https://unfccc.int/node/66151.

Report on the technical review of the sixth national communication of Kazakhstan. FCCC/IDR.6/KAZ. Available at https://unfccc.int/node/66151.

Revisions to the guidelines for review under Article 8 of the Kyoto Protocol. Annex I to decision 4/CMP.11. Available at http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf.

"UNFCCC biennial reporting guidelines for developed country Parties". FCCC/SBSTA/2014/INF.6. Annex I to decision 2/CP.17. Available at http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Gulmira Sergazina (Ministry of Energy of Kazakhstan), including additional material.