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Report on the technical review of the seventh national communication of New Zealand

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 New Zealand, 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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Abbreviations and acronyms

AR[4]	[Fourth] Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CTF	common tabular format
ECV	Essential Climate Variable
ERT	expert review team
FAO	Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
GCF	Green Climate Fund
GCOS	Global Climate Observing System
GDP	gross domestic product
GHG	greenhouse gas
GRA	Global Research Alliance on Agricultural Greenhouse Gases
HFC	hydrofluorocarbon
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MfE	Ministry for the Environment
NA	not applicable
NC	national communication
NE	not estimated
NF ₃	nitrogen trifluoride
NIR	national inventory report
NIWA	National Institute of Water and Atmospheric Research
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
NZD	New Zealand dollars
NZ ETS	New Zealand Emissions Trading Scheme
N ₂ O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
QA	quality assurance
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
TPES	total primary energy supply
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’
WOM	‘without measures’

I. Introduction and summary

A. Introduction

1. This is a report on the in-country technical review of the NC7 of New Zealand. 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 New Zealand, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

3. The review was conducted from 18 to 23 February 2019 in Wellington by the following team of nominated experts from the UNFCCC roster of experts: Ms. Diana Harutyunyan (Armenia), Ms. Guadalupe Martinez (Uruguay), Ms. Sekai Ngarize (IPCC), Mr. Erik Rasmussen (Denmark) and Mr. Michael Strogies (Germany). Ms. Harutyunyan and Mr. Rasmussen 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 New Zealand 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 21 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 New Zealand 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, New Zealand had submitted its instrument of acceptance of the Doha Amendment; however, 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 New Zealand in its seventh national communication, including supplementary information under the Kyoto Protocol

<i>Section of NC</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendations</i>	<i>Supplementary information under the Kyoto Protocol</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendations</i>
Executive summary	Complete	Transparent		National system	Complete	Transparent	
National circumstances	Complete	Transparent		National registry	Complete	Transparent	
GHG inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	
PaMs	Mostly complete	Transparent	Issue 1 in table 7	PaMs in accordance with Article 2	Complete	Mostly transparent	Issue 3 in table 7
Projections and the total effect of PaMs	Mostly complete	Transparent	Issue 3 and 6 in table 11; issue 1 in table 13	Domestic and regional programmes and/or arrangements and procedures	Complete	Transparent	
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent		Information under Article 10 ^a	Complete	Transparent	
Financial resources and transfer of technology	Complete	Mostly transparent	Issue 1 in table 15	Financial resources	Complete	Transparent	
Research and systematic observation	Complete	Transparent		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 Parties included in Annex II to the Convention 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.

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 annex B to the NC7. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol is reported in chapters 11–15 in the NIR 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 New Zealand

<i>Supplementary information</i>	<i>Reference to the section of NC7</i>
National system	Annex B to the NC7
National registry	Annex B to the NC7
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Annex B to the NC7
PaMs in accordance with Article 2	Annex B to the NC7
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Annex B to the NC7
Information under Article 10	Annex B to the NC7
Financial resources	Annex B to the NC7
Minimization of adverse impacts in accordance with Article 3, paragraph 14	Annex B to the NC7

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 New Zealand explain the relationship between its historical 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 New Zealand's geographic profile, population profile, climate, government structure, buildings and urban infrastructure, economy, energy, transport, agriculture, fisheries, forestry and waste, and on New Zealand's dependent territory Tokelau.

9. New Zealand's emission profile includes a high proportion of emissions from the agriculture sector (i.e. 49.2 per cent of total GHG emissions without LULUCF in 2016, dominantly CH₄ and N₂O). Agriculture in New Zealand is dominated by pastoral farming of dairy cattle, beef cattle, sheep and deer. As at June 2016, the country had 6.6 million dairy cattle, 3.5 million beef cattle, 27.6 million sheep and 0.84 million deer. Owing to New Zealand's temperate climate, the majority of animals are fed on grass outside all year round

and are rarely housed inside. New Zealand's pastures have four primary sources of nitrogen: nitrogen fixed by legumes; nitrogen from fertilizer; nitrogen from external supplementary feeds; and nitrogen from atmospheric sources. New Zealand's farming systems have changed over the past few decades; for example, there was an approximately seven-fold (623 per cent) increase in the use of nitrogen fertilizers on agricultural soils between 1990 and 2015. The climate is generally favourable for agriculture, but droughts do occur and can result in reduced pasture production, lower livestock performance and the need to reduce livestock numbers and, consequently, lower GHG emissions. In 2015 emissions from the agriculture sector decreased slightly (by 1.1 per cent) compared with 2014, which is attributed to the combination of a drought in 2014 and 2015 and a fall in milk prices.

10. New Zealand's TPES was 907 PJ in 2015, an increase of 0.6 per cent compared with 2014. This figure is calculated as domestic production plus imports, less exports and energy used for international transport. Renewable energy contributed 40.1 per cent of the 2015 TPES, the highest level on record. The remainder of the TPES was dominated by oil (32 per cent) and gas (21 per cent). The energy sector (including transport) is the second-largest contributor to New Zealand's gross GHG emissions, at approximately 40.5 per cent in 2015. Since 1990, New Zealand's GDP has grown at a greater rate than the amount of energy used by consumers and, as a result, the overall energy intensity of the economy improved by 1.2 per cent on average per year between 1990 and 2015. New Zealand's total energy self-sufficiency was 81.0 per cent in 2015. New Zealand meets all of its gas, renewables and waste heat needs through domestic production.

11. In the transport sector, international aviation and shipping are critical due to New Zealand's isolated location in the Pacific Ocean and the importance of primary industry exports and tourism to the economy. Domestically, road transport is the central element of the Party's transport system, reflecting New Zealand's small but widely distributed population and long, narrow geography. Owing to its sparse population and rural-based economy, New Zealand's domestic transportation emissions per capita are relatively high. The Party has one of the highest rates of car ownership globally. As a result, transport in New Zealand is energy intensive and relies on fossil fuels. In 2015 transport contributed 18.4 per cent of New Zealand's gross domestic GHG emissions, an increase of 68.4 per cent since 1990. The vast majority (90.0 per cent) of these emissions are from road transport.

12. The ERT noted that the main drivers of emission trends in New Zealand are population growth and the resulting demand for transport, and international demand for agricultural products. During the period 1990–2016, New Zealand's GDP per capita increased by 51.1 per cent, while GHG emissions per GDP unit and GHG emissions per capita decreased by 48.3 and 15.1 per cent, respectively.

13. New Zealand's economy was affected by a widespread drought in the first half of 2013 that affected the whole country. It had a major impact on the agriculture industry, in particular dairy farming, where the volume of milk produced fell. The economic impact of the drought was offset by an increased demand for milk powder from China, which caused prices of whole-milk powder to increase significantly, resulting in 44.0 per cent growth in GDP for the agriculture sector between 2013 and 2014. A significant contributor to New Zealand's economic growth since 2012 has been the construction industry, mainly because of two factors. First, population growth averaged about 1.3 per cent annually between 2012 and 2016, which increased demand for housing and infrastructure. The second contributor to construction growth was a series of earthquakes, in particular the Canterbury earthquakes in 2010 and 2011. These earthquakes caused significant damage to housing, other buildings and infrastructure. Real average annual growth for construction has been 5.1 per cent since 2012. The value of building consents attributed to the Canterbury earthquakes and issued in the Canterbury region between September 2010 and May 2017 was NZD 4.1 billion, with approximately NZD 2.6 billion from residential construction and NZD 1.5 billion from non-residential construction. Table 3 illustrates the national circumstances of New Zealand by providing some indicators relevant to emissions and removals.

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

Indicator	1990	2000	2010	2015	2016	Change (%)	
						1990–2016	2015–2016
GDP per capita (thousands 2011 USD using purchasing power parity)	23.67	27.62	32.12	35.31	35.78	51.1	1.3
GHG emissions without LULUCF per capita (t CO ₂ eq)	19.77	19.73	18.08	17.56	16.77	–15.1	–4.5
GHG emissions without LULUCF per GDP unit (kg CO ₂ eq per 2011 USD using purchasing power parity)	0.83	0.71	0.56	0.50	0.47	–48.3	–5.7

Sources: (1) GHG emission data: New Zealand’s 2018 GHG inventory submission, version 1.0; (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

14. The ERT assessed the information reported in the NC7 of New Zealand and identified an issue relating to transparency. 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 New Zealand

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	Chapter 2 of the NC7 provides information on New Zealand’s national circumstances but not those related to industry. During the review, New Zealand informed the ERT that information on industry is provided in other parts of the NC7. The ERT encourages New Zealand to improve the transparency of the NC and include information on national circumstances relevant to industry (e.g. on structure of industry) in chapter 2 of 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.

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

(a) Technical assessment of the reported information

15. Total GHG emissions¹ excluding emissions and removals from LULUCF increased by 19.6 per cent between 1990 and 2016, whereas total GHG emissions including net emissions or removals from LULUCF increased by 54.2 per cent over the same period. Table 5 illustrates the emission trends by sector and by gas for New Zealand.

¹ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq excluding LULUCF, unless otherwise specified. Values in this paragraph are calculated on the basis of the 2018 annual submission, version 1.0.

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

Sector	GHG emissions (kt CO ₂ eq)					Change (%)		Share (%)	
	1990	2000	2010	2015	2016	1990–2016	2015–2016	1990	2016
1. Energy	23 785.21	30 009.88	32 178.88	32 386.58	31 307.96	31.6	–3.3	36.1	39.8
A1. Energy industries	6 003.90	6 462.11	6 807.62	5 286.38	4 162.54	–30.7	–21.3	9.1	5.3
A2. Manufacturing industries and construction	4 760.25	6 352.83	5 590.07	6 808.90	6 906.24	45.1	1.4	7.2	8.8
A3. Transport	8 772.25	12 425.21	14 150.15	14 762.80	15 027.78	71.3	1.8	13.3	19.1
A4. and A5. Other	2 911.69	3 128.34	2 989.76	3 345.49	3 202.75	10.0	–4.3	4.4	4.1
B. Fugitive emissions from fuels	1 337.12	1 641.39	2 641.28	2 183.02	2 008.67	50.2	–8.0	2.0	2.6
C. CO ₂ transport and storage	NO	NO	NO	NO	NO	NA	NA	NA	NA
2. IPPU	3 585.09	3 462.57	4 647.95	5 315.28	4 853.42	35.4	–8.7	5.4	6.2
3. Agriculture	34 581.88	38 239.78	37 712.02	39 136.62	38 727.34	12.0	–1.0	52.5	49.2
4. LULUCF	–29 539.50	–32 089.92	–31 067.15	–24 861.08	–22 773.66	–22.9	–8.4	NA	NA
5. Waste	3 862.62	4 390.02	4 133.21	3 864.52	3 838.20	–0.6	–0.7	5.9	4.9
6. Other	NO	NO	NO	NO	NO	NA	NA	NA	NA
Gas ^a									
CO ₂	25 453.57	32 359.16	35 010.70	35 837.11	34 462.93	35.4	–3.8	38.7	43.8
CH ₄	32 277.18	35 079.99	33 815.20	34 078.95	33 684.82	4.4	–1.2	49.0	42.8
N ₂ O	7 154.12	8 329.42	8 624.76	9 151.44	9 126.21	27.6	–0.3	10.9	11.6
HFCs	NO, NA	246.51	1 151.16	1 560.25	1 386.98	NA	–11.1	NA	1.8
PFCs	909.95	67.61	47.41	58.59	48.69	–94.6	–16.9	1.4	0.1
SF ₆	19.97	19.56	22.84	16.67	17.29	–13.4	3.7	0.0	0.0
NF ₃	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total GHG emissions without LULUCF	65 814.79	76 102.25	78 672.07	80 703.01	78 726.92	19.6	–2.4	100.0	100.0
Total GHG emissions with LULUCF	36 275.29	44 012.33	47 604.92	55 841.93	55 953.26	54.2	0.2	NA	NA

Source: GHG emission data: New Zealand's 2018 annual submission, version 1.0.

^a Emissions by gas without LULUCF and without indirect CO₂.

16. The increase in total emissions was driven mainly by factors such as the growth in CH₄ emissions due to the increase in the size of the national dairy cattle herd; the growth in CO₂ emissions from increased road transport activities and the increase in energy consumption in manufacturing industries and construction (especially in the categories chemicals, food processing, beverages and tobacco) due to economic growth and population increase; the growth in N₂O emissions from fertilizer application and dairy cattle excreta; and the increased use of HFCs as replacements for ozone-depleting substances.

17. Between 1990 and 2016, GHG emissions from the energy sector increased by 31.6 per cent (7,522.75 kt CO₂ eq) owing mainly to an increase in road transport as well as an increase in energy consumption in manufacturing industries and construction. The trend in GHG emissions from fuel combustion showed notable increases in transport, by 71.3 per cent (6,255.53 kt CO₂ eq), and energy use in manufacturing industries and construction, by 45.1 per cent (2,145.99 kt CO₂ eq), while emissions from energy industries decreased by 30.7 per cent (1,841.36 kt CO₂ eq) mainly due to the cessation of synthetic gasoline production in

1997, combined with the falling dependence on coal and gas for public electricity generation and the increased share of renewable energies (40 per cent of energy supply and 85 per cent of electricity generation in 2016). Since 1990, New Zealand's GDP has grown at a greater rate than the energy demand and, as a result, the overall energy intensity of the economy has improved by 1.2 per cent on average per year. The improving trend has been mainly driven by higher economic growth in the commercial sector, which is much less energy intensive than other sectors.

18. Between 1990 and 2016, GHG emissions from IPPU increased by 35.4 per cent (1,268.33 kt CO₂ eq) owing mainly to the increase in emissions from product uses as substitutes for ozone-depleting substances due to the introduction of HFCs to replace ozone-depleting substances in refrigeration and air conditioning, and to the increased use of household and commercial air conditioning. CO₂ emissions also increased as a result of increased production of cement, metals and ammonia, but at a slower rate. Between 1990 and 2016, GHG emissions from the agriculture sector increased by 12.0 per cent (4,145.46 kt CO₂ eq), owing mainly to an increase in N₂O emissions from agricultural soils and an increase in CH₄ emissions from enteric fermentation. The main drivers for this change in emissions are an increase in the application of synthetic nitrogen fertilizer of over 600 per cent since 1990 and a 92.4 per cent increase in the dairy herd population. The LULUCF sector was a net sink of 22,773.66 kt CO₂ eq in New Zealand in 2016; net GHG removals have decreased by 6,765.84 kt CO₂ eq since 1990. The trend was mainly driven by the increase in the harvesting rate in plantation forests as a larger proportion of the estate is at harvest age compared with the 1990 rate. Between 1990 and 2016, GHG emissions from the waste sector decreased by 0.6 per cent (24.42 kt CO₂ eq) owing mainly to ongoing improvements in the management of solid waste disposal at municipal landfills, particularly increased CH₄ recovery.

19. New Zealand has a unique emission profile compared with other Parties included in Annex I to the Convention, with agriculture contributing 49.2 per cent of its total GHG emissions in 2016 owing to the large share of agricultural exports. CH₄ emissions (excluding LULUCF) accounted for 42.8 per cent of total GHG emissions in 2016 and arise mainly from enteric fermentation. Between 1990 and 2016, CH₄ emissions grew by 4.4 per cent from the 1990 level. The main driver for this change is an increase of 92.4 per cent in the dairy herd population. In New Zealand, CO₂ emissions (excluding LULUCF) contributed 43.8 per cent of total GHG emissions in 2016. Most of the CO₂ emissions resulted from the combustion of fossil fuels. The N₂O emissions arise mainly from agricultural soil management and accounted for 9,126.21 kt CO₂ eq or 11.6 per cent of New Zealand's total GHG emissions in 2016. N₂O emissions in 2016 exceeded the 1990 level by 27.6 per cent. The growth in N₂O emissions resulted from emissions due to dairy cattle excreta and an increase in the application of synthetic nitrogen fertilizer of over 600 per cent since 1990. Emissions of F-gases (HFCs, PFCs and SF₆) constituted 1.9 per cent of total GHG emissions in 2016.

20. The summary information provided on GHG emissions was consistent with the information reported in the 2017 annual submission.

(b) Assessment of adherence to the reporting guidelines

21. The ERT assessed the information reported in the NC7 of New Zealand 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.

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

(a) Technical assessment of the reported information

22. New Zealand 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 elements mandated by paragraph 30 of the annex to decision 15/CMP.1. The NC7 also contains a reference to the

description of the national system provided in the NIR of the 2017 annual inventory submission. The ERT took note of the review of the national system reflected in the report on the individual review of the 2017 annual submission of New Zealand, stating that no issues have been identified related to the overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements and related to the performance of the national system functions.

23. Following the recommendation in the previous review report, New Zealand provided a diagram (figure B.2) in annex B to the NC7, mapping data flows and relevant role players in the national system, including an indication of where quality control activities take place. Although QA activities are described in the text, it is not clear from figure B.2 where in the inventory planning and preparation process the QA activities take place. During the review, New Zealand clarified that QA activities are performed throughout the inventory planning and preparation process, including as a starting point for the whole process, and suggested that “QA” could be added to the first box in figure B.2 to the existing text (“Intrinsic sectoral planning”). The ERT considers that transparency of reporting could be improved by including information in the diagram mapping data flows and relevant role players in the national system.

(b) Assessment of adherence to the reporting guidelines

24. The ERT assessed the information reported in the NC7 of New Zealand 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

25. In the NC7 New Zealand provided 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. In the report on the individual review of the 2017 annual submission of New Zealand no issues were identified in relation to the national registry as regards the overall functioning of the national registry, the performance of the functions of the national registry, the technical standards for data exchange, the reporting of information on emission reduction units, certified emission reductions, assigned amount units and removals units, and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, taking into consideration any findings or recommendations contained in the standard independent assessment report. The ERT took note of the review of the national registry reflected in the report on the individual review of the 2017 annual submission of New Zealand.

(b) Assessment of adherence to the reporting guidelines

26. The ERT assessed the information reported in the NC7 of New Zealand 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.

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

27. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, New Zealand has no target inscribed in the Doha Amendment to the Kyoto Protocol.² New Zealand has set an unconditional target to reduce emissions by 5 per cent below the 1990 level by

² See https://unfccc.int/files/kyoto_protocol/application/pdf/kp_doha_amendment_english.pdf.

2020. This unconditional target is equivalent to a quantified emission limitation or reduction objective of 96.8 per cent of the level of emissions in 1990 over the period 2013–2020. New Zealand expects to meet this target using the rules applicable to the second commitment period of the Kyoto Protocol. New Zealand reported that the conditions for implementing the conditional target of reducing GHG emissions by between 10 and 20 per cent below the 1990 level by 2020 have not yet been met.

28. New Zealand reported that the cost of further mitigation by New Zealand is likely to be higher than in other developed countries due to New Zealand's emission profile, dominated by GHG emissions from the agriculture and transport sectors. New Zealand reported that its target will be met through a mixture of reducing domestic emissions, removing carbon through forests, participating in international carbon markets and recognizing the surplus achieved during the first commitment period of the Kyoto Protocol.

29. After extensive analysis and stakeholder consultation in 2015, New Zealand established its first nationally determined contribution under the Paris Agreement, which is to reduce emissions to 30 per cent below the 2005 level by 2030. This target is equivalent to 11 per cent below the 1990 level by 2030. The target is expressed in the nationally determined contribution as an absolute reduction target to be managed using an emission budget for the period 2021–2030.

30. According to the NC7, New Zealand's long-term target is to reduce emissions to 50 per cent below the 1990 level by 2050. This target was notified in the *New Zealand Gazette*³ in March 2011. The long-term target was reported to be in line with the IPCC conclusions and the goal of the Paris Agreement of holding global average temperature rise to well below 2 °C above pre-industrial levels. This target provides long-term direction for New Zealand's domestic policies.

31. Implementation of the Kyoto Protocol by New Zealand is underpinned by the Climate Change Response Act 2002, which established the legal framework to enable New Zealand to meet its obligations under both the Convention and its Kyoto Protocol. The Climate Change Response Act 2002 includes powers for the Minister of Finance to manage New Zealand's holdings of units, which represent New Zealand's target allocation for GHG emissions under the Kyoto Protocol. It also enables the Minister of Finance to trade those units on the international market, establishes a register to record holdings and transfers of units and establishes a national inventory agency to record and report information relating to GHG emissions in accordance with New Zealand's international obligations.

32. The overall responsibility for climate change policymaking lies with MfE, and a number of national institutions are involved in the implementation of this policy. MfE is responsible for the coordination of climate change policy across government and for advising the Government on the NZ ETS and the development of allocation plans and regulations under the scheme. The implementation of specific climate change policies is frequently led by other relevant departments, such as the Ministry for Primary Industries on agriculture and forestry policy, including the administration of forestry under the NZ ETS; the Ministry of Business, Innovation and Employment on energy policy; the Energy Efficiency and Conservation Authority on energy efficiency programmes; the Environmental Protection Authority on the administration of the NZ ETS; the Ministry of Transport on transport policy; and the Treasury on the financial and economic perspective of policies, including budgetary considerations.

33. The Climate Change Response (Emissions Trading) Amendment Act 2008 amended the Act to establish the New Zealand Emissions Trading Scheme. The Amendment Act describes the legal details of the NZ ETS. Regulations relating to the NZ ETS were also established under the Climate Change Response Act 2002. The NZ ETS is described in more detail in chapter 4 of the NC7.

34. New Zealand has legislative arrangements and administrative procedures in place to make information publicly accessible, such as a climate change website that was established

³ The *New Zealand Gazette* is New Zealand's official government newspaper and journal of constitutional record.

in 2003.⁴ The website is the key source of information provided by the Government. It also acts as a portal to a number of other governmental and non-governmental organizations involved in climate change work. Additional websites managed by ministries also provide information on mitigation programmes, reports, and actual and projected GHG emissions by sources and removals by sinks. All legislated obligations and requirements related to legal acts are publicly accessible via the national website dedicated to publishing information on legislation in New Zealand.⁵

35. New Zealand has 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. This is obtained through the exclusion of land that was natural forest in 1990 and subsequently converted to planted forest from the accounting of afforestation and reforestation activities under Article 3, paragraph 3, of the Kyoto Protocol; the Permanent Forest Sink Initiative; the East Coast Forestry Project established in 1992; the Sustainable Land Management Hill Country Erosion Programme; the imposition by NZ ETS of deforestation liabilities on any deforestation of pre-1990 forest and harvesting of post-1989 plantation forest; the Forests Amendment Act 1993 covering the majority of privately owned natural forests; the South Island Landless Natives Act 1906; and the Conservation Act 1987 covering the remainder of New Zealand's natural forests, which are publicly owned and not permitted to be deforested (approximately two thirds of New Zealand's total natural forests). In addition, no timber is legally harvested from natural forests in publicly owned conservation estates other than in exceptional circumstances where legislation allows, such as the West Coast Wind-blown Timber (Conservation Lands) Act 2014, which was created to allow restricted removal of timber from trees that were irreversibly damaged by Cyclone Ita, but without allowing timber removal from ecological areas or national parks.

(b) Assessment of adherence to the reporting guidelines

36. The ERT assessed the information reported in the NC7 of New Zealand 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.

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

(a) Technical assessment of the reported information

37. New Zealand provided information on its package of PaMs implemented, by sector and by gas, in order to fulfil its commitments under the Convention and its Kyoto Protocol. New Zealand also 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. During the review, New Zealand provided the ERT with information on additional PaMs under adoption or in the planning phase, such as Hydrogen Vision, Moving towards 100 per cent renewable electricity and the Process Heat in New Zealand initiative. In a few cases, New Zealand reported on its plan to update an implemented policy or measure.

38. New Zealand provided information on a set of PaMs similar to those previously reported (20 in total), with a few exceptions, such as 7 new, additional PaMs, as well as 4 PaMs no longer in place. New Zealand also provided information explaining that since the previous submission 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 have not changed significantly.

39. New Zealand gave priority to implementing the PaMs that make the most significant contribution to its emission reduction efforts. New Zealand did not provide information on

⁴ www.mfe.govt.nz.

⁵ www.legislation.govt.nz.

how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention. The Party reported on its plans to update certain PaMs with a view to improving their effectiveness in reducing GHG emissions. It also reported on the PaMs that have been discontinued since the previous submission.

40. The key overarching cross-sectoral policy reported by New Zealand is the NZ ETS. In addition, the Electric Vehicles Programme, vehicle fuel economy labelling, ENERGYWISE, the Efficient Products Programme, GRA, the National Policy Statement for Freshwater Management, the Erosion Control Funding Programme and the National Environmental Standard for Landfill Methane provide the framework for New Zealand's climate policy and for New Zealand to meet its emission reduction target for 2020. The mitigation effect of the NZ ETS is the most significant. Other policies that have delivered significant emission reductions are the Erosion Control Funding Programme and the National Environmental Standard for Landfill Methane. Table 6 provides a summary of the reported information on the PaMs of New Zealand.

Table 6

Summary of information on policies and measures reported by New Zealand

<i>Sector</i>	<i>Key PaMs</i>	<i>Estimate of mitigation impact by 2020 (kt CO₂ eq)</i>
Policy framework and cross-sectoral measures	NZ ETS	2 930 ^a
Energy		
Transport	Vehicle fuel economy labelling	41
Renewable energy	ENERGYWISE	28
Energy efficiency	Efficient Products Programme	312
IPPU	NZ ETS	2 930 ^a
Agriculture	GRA	NE
	National Policy Statement for Freshwater Management	274
LULUCF	Erosion Control Funding Programme	1 435
	Afforestation Grant Scheme	491
	Permanent Forest Sink Initiative	197
	Sustainable Land Management Hill Country Erosion Programme	161
	NZ ETS	2 930 ^a
Waste	National Environmental Standard for Landfill Methane	711
	NZ ETS	2 930 ^a

Note: The estimates of mitigation impact are estimates of emissions of CO₂ or CO₂ eq avoided in a given year as a result of the implementation of mitigation actions.

^a Total effect of the NZ ETS.

(b) Policies and measures in the energy sector

41. **Energy supply.** Some of the standard mitigation options applied in many Parties included in Annex I to the Convention, such as increasing the share of renewable energy in electricity production, have limited impacts on New Zealand's emissions as the share of renewable energy (mainly hydropower) in the fuel mix is very high. Heating in the residential and commercial sectors is electricity based and therefore the potential for further significant mitigation effects is rather limited. Thus, the implemented PaMs indirectly affect energy supply and are focused on increasing energy efficiency, improvements in planning of energy infrastructure and raising public awareness.

42. **Renewable energy sources.** New Zealand's electricity generation is widely based on renewable sources (80.8 per cent in 2015). In 2015, hydropower generation provided 55.5 per cent of New Zealand's electricity. A further 17.8 per cent came from geothermal, 5.3 per cent from wind, 1.4 per cent from biomass and 0.2 per cent from solar. The remaining 19.8 per cent was provided by fossil fuel thermal generation plants using gas, coal and oil. Currently, there are no government subsidies for new electricity generation in New Zealand because renewable energy is currently considered cost-competitive compared with fossil fuels; however, the NZ ETS is intended to send a clear price signal and create a competitive advantage for renewable generation. The Ministry of Business, Innovation and Employment is currently funding renewable energy research projects to support the sustainable and efficient use of natural resources. One of the goals of the New Zealand Energy Efficiency and Conservation Strategy 2017–2022 is to increase the share of electricity generated from renewable sources to 90 per cent by 2025, provided that security of supply is maintained. The Government's aim is for New Zealand to generate 100 per cent of its electricity using renewable sources by 2035, under normal hydrological conditions. The Government tasked the Interim Climate Change Committee with gathering evidence and analysis on moving towards 100 per cent renewable electricity. The Committee delivered its report to the Government on 30 April 2019. The Government will take the findings of this report into consideration before deciding on policies. Also, the Government is in the process of developing a vision for the use of hydrogen in New Zealand that could play an important role in decarbonising parts of New Zealand's economy.

43. **Energy efficiency.** The New Zealand Energy Efficiency and Conservation Strategy 2017–2022 was launched on 27 June 2017, superseding the New Zealand Energy Efficiency and Conservation Strategy 2011–2016. The strategy focuses on three priority areas that will provide the most cost-effective opportunities for energy savings and emission reductions: process heat, transport and electricity. ENERGYWISE is the Energy Efficiency and Conservation Authority's consumer information programme, which helps consumers to improve their use of energy by providing well-evidenced, accessible advice on energy efficiency, energy conservation and renewable energy, and provides authoritative advice via its website, digital media and television advertising. New Zealand and Australia have a joint Equipment Energy Efficiency (E3) programme to align energy efficiency regulation across both markets. This supports the Trans-Tasman Mutual Recognition Arrangement between the countries, which allows any product produced in, or imported into, one country to be legally sold in the other. Since 2002 there has been ongoing development of mandatory labels and performance standards for a range of commonly used residential, commercial and industrial electrical products, allowing both countries to set consistent standards and measures for energy efficiency. Twenty-five product classes are regulated and further regulation is being considered for five product areas under the current E3 Prioritisation Plan. The programme aims to reduce emissions from electricity consumption. It achieves this aim by regulating minimum energy performance levels for certain product classes, and through mandatory energy performance labelling.

44. **Residential and commercial sectors.** New Zealand has implemented a number of measures to reduce energy consumption in the buildings sector. New Zealand's Building Code contains energy efficiency provisions for residential and commercial buildings. Commercial buildings in New Zealand are to be designed, built and managed to maximize energy efficiency opportunities, primarily through electricity efficiency. Since 2009 the Warm Up New Zealand Programme has insulated and improved the thermal performance of more than 300,000 homes.

45. **Transport sector.** The transport sector was responsible for 19.1 per cent of New Zealand's total GHG emissions in 2016, mostly caused by road transportation. The application of the NZ ETS has been extended in order to harness this potential for significant emission reductions to mitigate GHG emissions from the transport sector. In addition, since 2008 New Zealand has been implementing a vehicle fuel economy labelling scheme.

46. In 2016, New Zealand announced the Electric Vehicles Programme to increase the uptake of electric vehicles. This includes an exemption from road user charges for light and heavy electric vehicles, a contestable fund of up to USD 6 million per year to encourage innovative low-emission vehicle projects, improvements in charging infrastructure, and

investments of USD 1 million annually for a nationwide electric vehicle information and promotion campaign over five years. It set a target of 64,000 electric vehicles by the end of 2021.

47. The NC7 includes updated but very limited information on how New Zealand promotes and implements the decisions of ICAO and IMO to limit emissions from aviation and marine bunker fuels.

48. **Industrial sector.** The main energy consumption in the industrial sector is from steel and aluminium production, cement and lime production, methanol production and fertilizer (urea) production. Process heat used in manufacturing offers one of the best opportunities to improve energy efficiency and reduce energy emissions. The Ministry for Business, Innovation and Employment and the Energy Efficiency and Conservation Authority are working on the Process Heat in New Zealand initiative. This initiative is looking into the opportunities for, and barriers to, improving the energy efficiency of process heat and increasing the input of renewable energy. The Government released a technical paper on the barriers to reducing process heat emissions and switching fuels in January 2019. It plans to develop initiatives for addressing these barriers taking into account industry feedback on this technical paper.

(c) **Policies and measures in other sectors**

49. **Industrial processes.** Process emissions and the relevant energy consumption emissions are covered under the NZ ETS. Currently, there is no manufacture of HFCs and PFCs in New Zealand. Therefore, specifically for bulk importers of F-gases, there is an obligation to surrender New Zealand units equivalent to the amount of HFCs and PFCs imported or SF₆ emitted through use. In addition, a levy is applied to imported goods and motor vehicles containing synthetic GHGs (HFCs and PFCs). The levy is linked to the price of carbon in the NZ ETS and varies between items to reflect the amount of gas, the specified gas and its global warming potential. As a consequence of the entry into force of the Kigali Amendment to the Montreal Protocol the Government of New Zealand has started work on regulating the imports of HFCs using a permitting system.

50. **Agriculture.** Supporting research and development activities at the domestic and international level to develop measures to reduce GHG emissions from agriculture is the focus of New Zealand's policy approach in this sector. In practice, these activities are carried out via GRA, the New Zealand Agricultural Greenhouse Gas Research Centre, the Greenhouse Gas Inventory Research Fund, the Pastoral Greenhouse Gas Research Consortium, the Primary Growth Partnership, the Sustainable Land Management and Climate Change Plan of Action and the Sustainable Farming Fund.

51. Examples of such activities include the work under the Dairy Action for Climate Change, initiated in 2017 and led by the dairy industry, whose purpose is to develop a framework for the dairy sector to tackle CH₄ and N₂O emissions and contribute to meeting New Zealand's first nationally determined contribution. The Ministry for Primary Industries is supporting activities designed to raise awareness of climate change among dairy farmers and demonstrate the potential for emission reductions via changes to farm systems. In addition, New Zealand provides increasing financial and capacity-building support to agricultural GHG mitigation research under GRA, in addition to the funding already committed to the New Zealand Agricultural Greenhouse Gas Research Centre. Currently, approximately 48 countries have joined GRA. The New Zealand Agricultural Greenhouse Gas Research Centre was created to build on existing research, working with existing organizations to create an effective, trusted partnership to bring cost-effective, simple solutions to New Zealand farms, and contribute world leading results to the international science community.

52. The ERT noted the wealth of research collaborations and initiatives undertaken by New Zealand to reduce GHG emissions from the agriculture sector. It noted that the implemented measures do not contain any quantitative estimates of the effect of PaMs on GHG emissions.

53. **LULUCF.** The LULUCF sector plays an important role in New Zealand's strategy to achieve its 2020 target. All activities to increase sinks through afforestation measures are strongly promoted.

54. New Zealand has five principal measures to promote afforestation (for several reasons, including carbon sequestration, erosion and water quality) and provide incentives to maintain forests: the NZ ETS, the Permanent Forest Sink Initiative, the Sustainable Land Management Hill Country Erosion Programme, the Erosion Control Funding Programme and the Afforestation Grant Scheme. Between 1990 and 2015 these initiatives led to the sequestering of an estimated additional 24,812 kt CO₂ eq from the atmosphere. The predicted effect of carbon sequestration for 2020 will be around 2,284 kt CO₂ eq.

55. The NZ ETS is the main policy instrument to encourage afforestation and reduce deforestation for climate change purposes. The forests planted since 1 January 1990 and covered under the NZ ETS are eligible to earn emission units that represent the carbon sequestered by the forest since the start of the current mandatory emissions return period but are also liable for repaying units if there is a reduction in carbon stock.

56. The Sustainable Land Management Hill Country Erosion Programme helps to protect New Zealand's estimated 1.4 million hectares of pastoral hill country that is classified as erosion-prone. It provides USD 2.2 million of targeted funding support annually to regional and unitary councils. Initiated in 2008 in response to significant storm events in previous years, the purpose of the programme is to speed up the rate of treatment of erosion-prone land. Projects under the programme deliver sustainable land management treatments, including wide-spaced poplar and willow planting and small-scale afforestation, treating over 3,500 hectares each year. The programme also supports catchment facilitation work and capability-building initiatives.

57. The Permanent Forest Sink Initiative promotes the establishment of permanent forests on land that was unforested before 1 January 1990. It offers landowners with land registered with the Permanent Forest Sink Initiative the opportunity to earn emission units for the carbon sequestered by their forests since the start of the last mandatory emissions return period. In return, participants have a legal covenant. The covenant is in perpetuity, even if the land is sold, although there is an option to terminate it after 50 years. Landowners are responsible for establishing and maintaining the forest. Limited harvesting is allowed on a continuous forestry cover basis. In 2016, 15,464 hectares of forest was registered in the Permanent Forest Sink Initiative, of which over 70 per cent was natural forest.

58. The Erosion Control Funding Programme was implemented in 1992 to address soil erosion in the Gisborne district. The programme aims to encourage tree planting on severely eroding or erodible land. Landowners are eligible for government grants, which help to fund the cost of establishing and managing erosion treatments on such land. Around 41,000 hectares has been treated through the programme to date. In 2016 the scope of the programme was broadened to address erosion issues at the community and regional level and to deliver wider environmental, social and economic benefits.

59. Through the Afforestation Grant Scheme NZD 19.5 million will be invested between 2015 and 2020 to encourage and support the planting of new forests. This builds on the success of a previous scheme carried out from 2008 to 2013 that resulted in the planting of almost 12,000 hectares of new forest. Applications under the Afforestation Grant Scheme are prioritized, if necessary, according to their contribution to environmental outcomes. The scheme is expected to result in 15,000 hectares of new forest planting by 2020. Under the Afforestation Grant Scheme, landowners can receive a government grant of NZD 1,300 per hectare for establishing new forests on eligible land. Recipients of the grant own the forests while the Government retains the Kyoto Protocol removals 'credit' (and liabilities) generated during the 10-year period of the grant agreement. The Government committed funding to establish new forests on 12,450 hectares by 2018. It announced the One Billion Trees Programme in 2017. This aims to see one billion trees planted over the decade to 2027, of which approximately half will be replanting of existing forest. A new grants scheme was introduced in late 2018 to support delivery of this programme. The One Billion Trees Fund, which is funded for three years, intends to establish approximately 50,000 hectares of new forest through planting and natural regeneration. The Afforestation Grant Scheme ran its final

funding round in 2018 and this resulted in the full allocation of available funding for that scheme. The grant rates for the final round were increased in line with the new grants scheme and the Government will retain removal units for a six-year period for *Pinus radiata* (the predominant commercial species).

60. **Waste management.** The major legislation governing waste management in New Zealand is the Waste Minimisation Act 2008. The Act sets out the Government's long-term priorities and places a levy of NZD 10 on each tonne of waste going to disposal facilities for household waste to fund local authorities for activities in their waste management plans and for waste minimization initiatives for reduction, reuse and recycling. The legislation is supported by the New Zealand Waste Strategy, which was revised in 2010 (replacing the 2002 strategy) and replaces the previous targets with two high-level goals: to reduce the harmful effects of waste; and to improve the efficiency of resource use. The National Environmental Standard on Landfill Gas mandates the use of landfill gas collection on certain landfills, which has had the largest impact on reducing emissions in the waste sector. The waste management sector is also required to report on its emissions and is obliged to surrender emission units under the NZ ETS. Future developments for the waste sector include the definition of new landfill classes; updated consenting requirements for non-municipal landfills; updates for the solid waste analysis standard; the possible extension of the waste levy to additional sites; and a possible streamlining of the NZ ETS requirements to better incentivize landfill gas utilization.

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

61. In the NC7 New Zealand reported information 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. The main measures are public consultation processes and intergovernmental consultations and are focused broadly on the Pacific region.

62. The NC7 underlines that the Government of New Zealand has established the New Zealand Aid Programme⁶ and organizes consultations with members of the public as well as regular official development assistance talks with partner country governments, at which the public and partners have the opportunity to raise concerns about any adverse impacts and to ask for priority assistance to deal with those impacts. No specific concerns have been raised about any negative impact of New Zealand's climate change response policies. Based on these discussions, New Zealand also works closely with the partner country to prepare a country strategic framework for development. These engagement frameworks are relatively long term (5 or 10 years) and convey New Zealand's development assistance strategy in each country in which it provides aid. They are aligned with the priorities and needs of the partner country, while also reflecting New Zealand's priorities and policies. On many of the issues related to the implementation of Article 3, paragraph 14, of the Kyoto Protocol, New Zealand gives priority to working with countries broadly in the South Pacific region. This includes supporting the Framework for Resilient Development of the Pacific, which draws together the areas of climate change and disaster risk reduction. New Zealand reported that it ensures that both developed and developing countries can maximize opportunities in New Zealand's market regardless of the response measures undertaken. The ERT considers the reported information to be complete and transparent.

63. Further information on how New Zealand strives to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties was reported in chapter 15 of the 2018 annual inventory submission. New Zealand reported on market imperfections, fiscal incentives, tax and duty exemptions and subsidies; removal of subsidies; technological development of non-energy uses of fossil fuels; development of carbon dioxide capture and storage technology; improvements in fossil fuel efficiencies; and assistance to non-Annex I

⁶ <https://www.mfat.govt.nz/en/aid-and-development/>.

Parties that are dependent on the export and consumption of fossil fuels for diversifying their economies.

(e) Assessment of adherence to the reporting guidelines

64. The ERT assessed the information reported in the NC7 of New Zealand and identified issues relating to completeness and transparency. The findings are described in table 7.

Table 7

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 New Zealand

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	<p>Reporting requirement^a specified in paragraph 25</p> <p>Issue type: completeness</p> <p>Assessment: recommendation</p>	<p>The ERT noted that New Zealand did not provide information in its NC7 on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention.</p> <p>During the review, in response to a question raised by the ERT, New Zealand provided an overview table indicating the expected overall effect of the PaMs in place up to 2030. The table also contains the historical emission reduction effect for the individual PaMs as currently reported. The expected overall effect is a reduction of 4,554 kt CO₂ eq in total GHG emissions (without LULUCF) by 2030.</p> <p>The ERT reiterates the recommendation made in the previous review report that New Zealand provide in its next NC information on how the Party believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention.</p>
2	<p>Reporting requirement^a specified in paragraph 23</p> <p>Issue type: transparency</p> <p>Assessment: encouragement</p>	<p>The ERT noted that New Zealand made progress compared with its NC6 by providing in its NC7 quantitative estimates of the impacts on GHG emissions for some of its individual PaMs, particularly in the LULUCF sector and for the housing programme. However, this information was not provided for all PaMs, and an explanation as to why the impacts could not be estimated was not explicitly provided.</p> <p>During the review, New Zealand explained that there are various reasons why a quantified amount of reductions cannot be directly associated with particular PaMs. Some of these activities (e.g. the Transition Hub, the Agricultural Greenhouse Gas Research Centre) are research and information efforts and have no role in directly achieving emission reductions. Others (e.g. the Waste Minimisation Act) are legislation and strategies which incentivize emission reductions only indirectly, through other programmes. New Zealand acknowledged that the issue of estimating emission impacts of PaMs prior to implementation and monitoring them during implementation needs to be addressed for individual PaMs. Therefore, MfE is developing a Climate Implications of Policy Assessment toolkit, which will support officials in estimating the emission impacts of policies and assist ministers in considering the potential climate change impacts of policy proposals when taking decisions. The ERT is of the view that there are certain PaMs which could have been quantified in terms of their emission reductions, such as the Electric Vehicle Programme (even when newly implemented).</p> <p>The ERT reiterates the encouragement made in the previous review report that New Zealand provide quantitative estimates of the impacts of its individual PaMs or clearly explain why it may not be feasible to provide such information due to its national circumstances.</p>
3	<p>Reporting requirement^b specified in paragraph 35</p> <p>Issue type: transparency</p> <p>Assessment: recommendation</p>	<p>In its NC7 New Zealand provided only general information about its participation in the relevant work of ICAO and IMO in order to limit or reduce emissions of GHGs not controlled by the Montreal Protocol from aviation and marine bunker fuels.</p> <p>During the review, New Zealand provided additional information on the steps it has taken to promote and/or implement any decisions by ICAO and IMO (e.g. on an ongoing public consultation process on a decision related to the International Convention for the Prevention of Pollution from Ships). The ERT, taking into account the importance of international transportation and New Zealand's active participation in ICAO and IMO, is of the opinion that more detailed information could be provided.</p>

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
		The ERT reiterates its recommendation that New Zealand further increase transparency in its next NC by reporting on the steps it has taken to promote and/or implement any decisions by ICAO and IMO in order to limit or reduce emissions of GHGs not controlled by the Montreal Protocol, particularly in relation to the implementation of the Carbon Offsetting and Reduction Scheme for International Aviation and the initial IMO strategy on the reduction of GHG emissions from ships as well as other adopted PaMs aimed at controlling GHG emissions from international shipping.

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

65. New Zealand reported updated projections for 2020 and 2030 relative to actual inventory data for 2015 under the WEM scenario. The WEM scenario reported by New Zealand includes implemented and adopted PaMs until July 2017.

66. In addition to the WEM scenario, New Zealand reported the WOM scenario. The WOM scenario excludes all PaMs implemented, adopted or planned. Table 5.13 of the NC7 includes information on the starting year that PaMs were included and when they were concluded in the projections. The emission projections for the NZ ETS for the IPPU and waste sectors are identical under both the WEM and the WOM scenario, and thus there is no need to define a starting year for those PaMs.

67. New Zealand provided a definition of its scenarios, explaining that its WEM scenario projections are based on a ‘business as usual’ scenario that includes only key quantifiable climate change PaMs currently implemented; specifically, it includes the effect of the NZ ETS for the energy, transport and LULUCF sectors, the Efficient Products Programme, ENERGYWISE homes, Energy Efficiency and Conservation Authority business programmes, vehicle fuel economy labelling, the National Policy Statement for Freshwater Management, the Erosion Control Funding Programme, the Afforestation Grant Scheme, the Sustainable Land Management Hill Country Erosion Programme, the Permanent Forest Sink Initiative, the National Environmental Standards for Air Quality and the waste disposal levy. New Zealand also reported a WOM scenario, which excludes all PaMs implemented, adopted or planned that were included in the WEM scenario.

68. The definitions indicate that the scenarios were prepared according to the UNFCCC reporting guidelines on NCs.

69. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO₂, CH₄, N₂O, PFCs, HFCs and SF₆ (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 AR4.

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

71. Emission projections related to fuel sold to ships and aircraft engaged in international transport were not reported.

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

72. The methodology used for the preparation of the projections is mostly identical to that used for the preparation of the emission projections for the NC6. New Zealand reported supporting information further explaining the methodologies, updates and the changes made since the NC6. Specifically, various scenario assumptions have been updated, but there have been no significant modifications to the models and methodologies used. Across all sectors, differences in modelling approaches include making improvements or corrections to errors in inventory reporting; including GHG emissions for 2014 and 2015, as reported in the 2017 NIR submission; applying the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*; and using global warming potential values from the AR4. Tables 5.10 and 5.11 of the NC7 set out the differences in emission projections for 2020 and 2030 as reported in the BR2. Appendix C.3 to the NC7 lists the differences in emission projections compared with the NC6. The ERT notes that the detailed information provided by New Zealand regarding the changes since previous submissions has significantly enhanced reporting transparency.

73. To prepare its projections, New Zealand relied on the following key underlying assumptions: GDP growth rate, NZ ETS carbon prices (for forestry and non-forestry projections), population, oil price, the currency exchange rate, gas supply from new discoveries, agricultural and forestry parameters, transport fleet information and total solid waste disposal. These variables and assumptions were reported in CTF table 5. New Zealand provided supporting documentation to explain the changes since the NC6. The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections. The main model used for the projections of GHG emissions from the energy sector is the Supply and Demand Equilibrium Model, which is a partial equilibrium model run in conjunction with more detailed subsector models for electricity, oil and gas production, and transport. The projections are based on the 'mixed renewables' scenario from the 2016 electricity demand and generation scenarios published by the Ministry of Business, Innovation and Employment. However, the carbon price assumed follows a different trajectory from the 'mixed renewables' scenario. In addition, the NZ ETS measures for stationary energy participants are assumed to continue. GDP growth, crude oil price, coal price, exchange rates, gas discoveries and population growth assumptions are, however, the same as those in the 'mixed renewables' scenario.

74. The ERT noted that the New Zealand Government has reconfirmed a target of achieving 90 per cent renewable electricity generation by 2025. However, the 'mixed renewables' scenario on which the WEM scenario was based predicted a rate below 90 per cent of electricity generated from renewable resources by 2050. During the review week, New Zealand explained that this target is not legally binding and the share of renewable energy is not an input or assumption to the model. The ERT suggests that New Zealand include this information in its next NC submission as well as information on the approach taken to achieve the renewable electricity target.

75. The main model used for the projections of GHG emissions from the road transport sector is the Vector Finite Element Method. The assumptions for the road transport estimates included fleet size, engine technology and energy intensity per type of vehicle. During the review week, New Zealand provided additional information related to the average engine size for light passenger vehicles and a detailed share of the different types of vehicles per fuel type. The ERT suggests that New Zealand include this information in its next NC submission.

76. Energy demand for, and emissions from, the energy and transport sectors are considered inelastic to fuel and carbon prices because of the current lack of viable substitutions, as indicated in the sensitivity analysis reported in the NC7.

77. The ERT noted that the NC7 did not include information related to the model and assumptions used for the projections of GHG emissions from national navigation, aviation and rail transport and activities for F-gases. During the review week, New Zealand provided information on models and assumptions and relevant factors and information for those categories.

78. The main model used for the projections of agricultural activity is the pasture supply response model, which projects animal numbers and animal performance (milk yield and animal weight), the key drivers of emissions from agriculture. These are forecast by type of animal and are primarily driven by commodity prices for agricultural products, days of soil moisture deficit (which is a measure of drought) and the returns on agricultural land relative to returns in the forestry sector. The inventory tier 2 model is then used to convert agricultural activity into emissions for New Zealand's four major livestock species (dairy cattle, non-dairy cattle, sheep and deer). The ERT notes that the detailed information provided by New Zealand in annex C.2 to the NC7 on the analysis and advanced models used for the projections for the agriculture sector significantly enhances reporting transparency.

79. The projected emissions and removals from the LULUCF sector are calculated using methodologies consistent with those used for the NIR, with activity data and emission factors used in the NIR covering the historical time series 1990–2015. The LULUCF sector is especially sensitive to the underlying assumptions used. Uncertainty has been included in the projections using scenarios that represent low, mid-point and upper levels of removals, reflecting estimates of future rates of afforestation, deforestation, harvesting, pre-1990 natural forest sequestration, harvested wood products and carbon prices from 2016 to 2030. The three forestry scenarios incorporate assumptions to address uncertainties relating to future rates of afforestation, deforestation, harvesting rates, rotation ages and carbon prices. The projected afforestation scenarios factor in a range of drivers, including government forestry initiatives (such as the Afforestation Grant Scheme, the Permanent Forest Sink Initiative, the Sustainable Land Management Hill Country Erosion Programme and the East Coast Funding Programme), wood product returns, carbon prices, relative land-use economics, and land costs and availability.

80. As a result of New Zealand's fast-growing production forests and high levels of afforestation in the late 1980s and early 1990s, the LULUCF projections are particularly sensitive to production forest harvest age, levels and timing. As such, the three removal scenarios incorporate this sensitivity and attempt to capture variations in production forest harvest levels and timing.

81. Emissions from solid waste disposal are projected by assuming a constant level of solid waste disposal per capita, which is based on the most recent national survey. National population projections have been used as a key driver to estimate total domestic and commercial wastewater treated and the resulting emissions from wastewater treatment. The ERT noted that the mitigation effect of waste management policies was not clearly considered in the future levels of solid waste disposal per capita or in possible changes in waste composition. The ERT suggests that New Zealand evaluate the inclusion of these parameters in the waste sector projection model for its next submission.

82. Sensitivity analyses were conducted for several important assumptions, such as energy demand, dairy commodity prices and the waste disposal levy rate.

83. For the high-demand scenario of the energy sector, an average increase in electricity demand of 1.3 per cent per annum from 2015 is estimated to increase emissions by 1,130 kt CO₂ eq in 2020 (or 3.5 per cent) and by 5,084 kt CO₂ eq (or 17.3 per cent) in 2030. For the low-demand scenario (representing closure of an aluminium smelting operation in New Zealand), electricity demand is estimated to result in a decrease in emissions of 2,071 kt CO₂ eq in 2020 (or 6.4 per cent) and 659 kt CO₂ eq (or 2.3 per cent) in 2030.

84. A sensitivity analysis conducted for the agriculture sector suggests that dairy emissions are relatively unresponsive to changes in dairy commodity prices.

85. Relative to the current waste disposal levy rate, a rate increase to assist in reducing solid waste disposal at landfills could generate a further reduction in CH₄ emissions of up to 0.4 per cent in 2020, 4.2 per cent in 2025 and 8.6 per cent in 2030. Removing the levy rate could generate an increase in CH₄ emissions of up to 1 per cent in 2020, 1.4 per cent in 2025 and 1.6 per cent in 2030. The ERT commends New Zealand for considering the encouragements of the previous review reports and including a sensitivity analysis for the agriculture, energy and waste sectors.

(c) Results of projections

86. 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 8 and the figure below.

Table 8

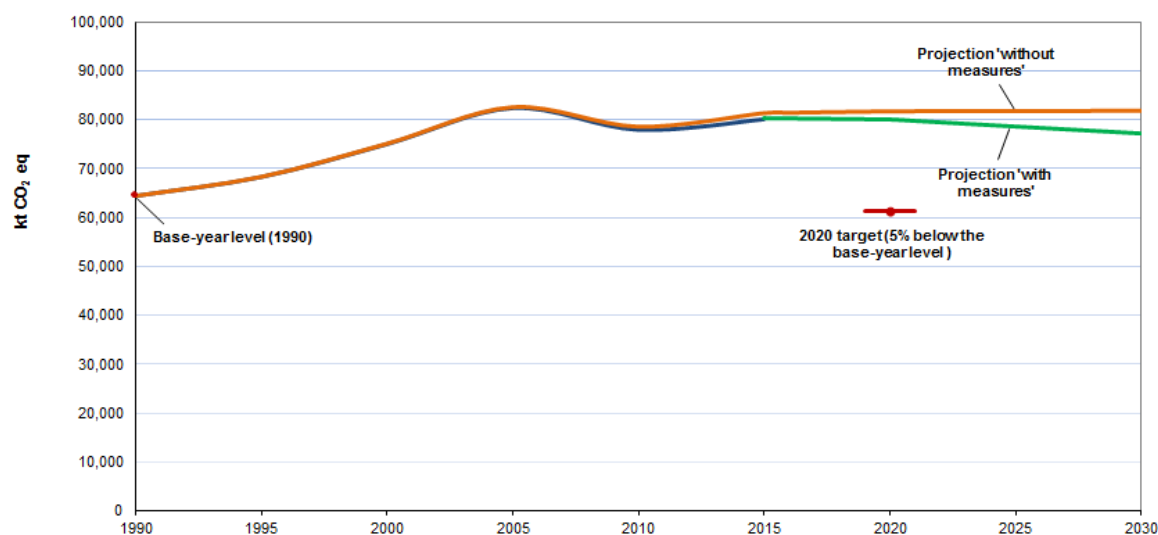
Summary of greenhouse gas emission projections for New Zealand

	<i>GHG emissions (kt CO₂ eq per year)</i>	<i>Changes in relation to base-year^a level (%)</i>	<i>Changes in relation to 1990 level (%)</i>
Kyoto Protocol base year ^b	65 828.38	NA	1.9
Quantified emission limitation or reduction commitment under the Kyoto Protocol (2013–2020)	NA	NA	NA
Quantified economy-wide emission reduction target under the Convention	NA	NA	NA
Inventory data 1990 ^c	64 573.84	–1.9	NA
Inventory data 2015 ^c	80 206.32	21.8	24.2
WOM projections for 2020 ^c	81 682.29	24.1	26.5
WEM projections for 2020 ^c	79 958.30	21.5	23.8
WOM projections for 2030 ^c	81 792.25	24.3	26.7
WEM projections for 2030 ^c	77 238.60	17.3	19.6

^a “Base year” in this column refers to the base year used for the targets 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/2016/NZL.

^c From New Zealand’s NC7.

Greenhouse gas emission projections reported by New Zealand

Sources: (1) data for 1990–2015: New Zealand’s NC7; total GHG emissions excluding LULUCF; (2) data for 2015–2030: New Zealand’s NC7; total GHG emissions excluding LULUCF.

Note: New Zealand is expected to meet its 2020 target by using removals from LULUCF activities and surplus units from the first commitment period of the Kyoto Protocol. For more information see <https://www.mfe.govt.nz/climate-change/climate-change-and-government/emissions-reduction-targets/reporting-our-targets-0>.

87. New Zealand’s total GHG emissions excluding LULUCF are projected to be 79,958.30 and 77,238.60 kt CO₂ eq in 2020 and 2030, respectively, under the WEM scenario, which is an increase of 23.8 and 19.6 per cent, respectively, above the 1990 level.

88. The 2020 projections suggest that New Zealand may face challenges in achieving its 2020 target under the Convention without the use of Kyoto Protocol units. According to New Zealand's 2020 net position report, the Party will recognize 26.1 million Kyoto Protocol units from the first commitment period to meet its 2020 target.

89. New Zealand presented the WEM scenario by sector for 2020 and 2030, as summarized in table 9.

Table 9

Summary of greenhouse gas emission projections for New Zealand presented by sector

Sector	GHG emissions and removals (kt CO ₂ eq)			Change (%)	
	1990	2020	2030	1990–2020	1990–2030
		WEM	WEM	WEM	WEM
Energy (not including transport)	14 984	16 418	14 324	9.6	–4.4
Transport	8 765	15 303	15 014	74.6	71.3
Industry/industrial processes	3 584	5 487	6 185	53.1	72.6
Agriculture	33 123	37 888	37 737	14.4	13.9
LULUCF	–30 122	–15 694	–4 043	–47.9	–86.6
Waste	4 118	3 976	3 978	–3.4	–3.4
Total GHG emissions without LULUCF	64 574	79 958	77 239	23.8	19.6

Source: New Zealand's NC7.

90. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the waste sector, amounting to projected reductions of 142 kt CO₂ eq (3.4 per cent).

91. The pattern of projected emissions reported for 2030 under the same scenario is significantly different owing to additional emission reductions expected to occur in the energy sector (660 kt CO₂ eq, or 4.4 per cent). The remaining coal-fired power plant in New Zealand is expected to be decommissioned by 2022, thereby reducing emissions from coal.

92. According to the projections, New Zealand's LULUCF sector trend is a decline in annual removals as extensive plantation forests established in the late 1980s and early 1990s reach maturity and are harvested for timber production. The Party explained that, given the cyclical emission and removal profile of plantation forests, the LULUCF sector is expected to revert to an increasing net carbon sink during the 2030s once the forests harvested in the 2020s are replanted.

93. New Zealand presented the WEM scenario by gas for 2020 and 2030, as summarized in table 10.

Table 10

Summary of greenhouse gas emission projections for New Zealand presented by gas

Gas	GHG emissions and removals (kt CO ₂ eq)			Change (%)	
	1990	2020	2030	1990–2020	1990–2030
		WEM	WEM	WEM	WEM
CO ₂	25 429	35 467	32 250	39.5	26.8
CH ₄	32 522	34 159	33 899	5.0	4.2
N ₂ O	5 693	8 372	8 357	47.1	46.8
HFCs	0	1 915	2 697	NA	NA
PFCs	910	24	12	–97.4	–98.7
SF ₆	20	23	23	13.4	13.4
NF ₃	NA	NA	NA	NA	NA

	GHG emissions and removals (kt CO ₂ eq)			Change (%)	
	1990	2020	2030	1990–2020	1990–2030
		WEM	WEM	WEM	WEM
Gas					
Total GHG emissions without LULUCF	64 574	79 958	77 239	23.8	19.6

Source: New Zealand's NC7.

94. For 2020 the most significant reductions are projected for PFC emissions: 886 kt CO₂ eq (97.4 per cent) between 1990 and 2020. For 2030 the most significant reductions are also projected for PFC emissions: 898 kt CO₂ eq (98.7 per cent) between 1990 and 2020.

(d) Assessment of adherence to the reporting guidelines

95. The ERT assessed the information reported in the NC7 of New Zealand and identified issues relating to completeness and transparency. The findings are described in table 11.

Table 11

Findings on greenhouse gas emission projections reported in the seventh national communication of New Zealand

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement ^a specified in paragraph 28 Issue type: completeness Assessment: encouragement	New Zealand did not report projections for a WAM scenario in its NC7. During the review, New Zealand acknowledged the issue and provided information describing the difficulty of producing a WAM scenario that includes PaMs under development or approval and as such could change their status and/or scope during the preparation of projections. The ERT reiterates the encouragement to the Party to include a WAM scenario in its next submission and indicate the cut-off date for planned PaMs included in the WAM scenario.
2	Reporting requirement ^a specified in paragraph 35 Issue type: completeness Assessment: encouragement	The Party did not report projections for indirect GHGs. During the review, New Zealand acknowledged the issue and stated that it will consider including such projections in its next submission. The ERT reiterates the encouragement to the Party to include in its next submission emission projections for indirect GHGs.
3	Reporting requirement ^a specified in paragraph 36 Issue type: completeness Assessment: recommendation	New Zealand did not report the emission projections related to fuel sold to ships and aircraft engaged in international transport. During the review, New Zealand stated that it will include those projections in its next submission. The ERT recommends that New Zealand include in its next submission the emission projections related to fuel sold to ships and aircraft engaged in international transport, to the extent possible, and report them separately and not included in the totals.
4	Reporting requirement ^a specified in paragraph 43 Issue type: completeness Assessment: encouragement	In its NC7, New Zealand did not provide information on strengths or weaknesses of the models or approach used for the projections, or on how the approach accounts for any overlap or synergies that may exist between different PaMs. During the review, New Zealand provided detailed information on the waste and transport and energy models used for the projections, including on their strengths and weaknesses. The ERT encourages the Party to provide, in its next NC and BR, brief information on the strengths and weaknesses of the models or approach used and on how the approach accounts for any overlap or synergies, such as the information provided during the review.

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
5	Reporting requirement ^a specified in paragraph 46 Issue type: transparency Assessment: encouragement	In its NC7, New Zealand did not include discussions of the sensitivity of the projections to underlying assumption for LULUCF sector and the climatic effects on hydroelectric generation in the energy sector, as encouraged by the previous ERT. During the review, New Zealand explained that for the LULUCF sector the focus to date has been sensitivity within the activity data themselves, rather than an overall uncertainty assessment of the model or modelling results. New Zealand stated that it will consider including a sensitivity analysis for the LULUCF sector and climatic effects in the energy sector in its next submission. The ERT reiterates the encouragement made to New Zealand in the previous review report to include, in its next submission, qualitative and, where possible, quantitative information on the sensitivity of the projections to the underlying assumptions for the LULUCF sector and the climatic effects on hydroelectric generation in the energy sector.
6	Reporting requirement ^a specified in paragraph 48 Issue type: completeness Assessment: recommendation	The Party did not provide relevant information on factors and activities for F-gases in the IPPU sector, national navigation, aviation and rail transport. During the review, New Zealand provided additional information on factors and activities for national navigation, aviation, rail transport and F-gases. The ERT recommends that New Zealand include relevant information on factors and activities for F-gases in the IPPU sector, national navigation, aviation and rail transport in its next submission.

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 and the “UNFCCC biennial reporting guidelines for developed country Parties”.

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

2. Assessment of the total effect of policies and measures

(a) Technical assessment of the reported information

96. In the NC7 New Zealand 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 sector (on a CO₂ eq basis), in 2020 and 2030. The total effect of PaMs was not explicitly reported by gas (on a CO₂ eq basis).

97. New Zealand reported that the total estimated effect of its adopted and implemented PaMs is 6,690 kt CO₂ eq and 9,946 kt CO₂ eq for 2020 and 2030, respectively. According to the information reported in the NC7, PaMs implemented in the forestry sector will deliver the largest emission reductions, followed by PaMs implemented in the waste management and energy sectors. Table 12 provides an overview of the total effect of PaMs as reported by New Zealand.

Table 12
Projected effects of New Zealand’s planned, implemented and adopted policies and measures by 2020 and 2030

Sector	2020		2030	
	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)	531	–	1 601	–
Transport	102	–	123	–
Industrial processes	NE	–	NE	–
Agriculture	354	–	1 824	–

Sector	2020		2030	
	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)
Land-use change and forestry	4 966	–	5 392	–
Waste management	737	–	1 006	–
Total	6 690	–	9 946	–

Source: New Zealand's NC7 and/or BR3.

Note: The total effect of implemented and adopted PaMs is defined as the difference between the WOM and the WEM scenario.

(b) Assessment of adherence to the reporting guidelines

98. The ERT assessed the information reported in the NC7 of New Zealand and identified issues relating to completeness. The findings are described in table 13.

Table 13

Findings on the assessment of the total effect of policies and measures from the review of the seventh national communication of New Zealand

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: recommendation	The Party did not report the total effects of PaMs in terms of GHG emissions avoided or sequestered, by gas (on a CO ₂ eq basis, non-cumulative) for 1995 and 2000. During the review, New Zealand acknowledged the issue and provided information describing the difficulty of estimating the total effects (non-cumulative) of PaMs for historical years. The ERT recommends that New Zealand include the total effects of PaMs for 1995 and 2000, in terms of GHG emissions avoided or sequestered, by gas on a CO ₂ eq basis.
2	Reporting requirement specified in paragraph 40 Issue type: completeness Assessment: encouragement	The Party did not report the total effects of PaMs for 2005, 2010, 2015 and 2020 in terms of GHG emissions avoided or sequestered, by gas (on a CO ₂ eq basis, non-cumulative). During the review, New Zealand acknowledged the issue and provided this information in addition to describing the difficulty of estimating the total effects (non-cumulative) of PaMs for historical years. New Zealand stated that it will consider including in its next submission the total effects of PaMs for projected years, by gas on CO ₂ eq basis (non-cumulative). The ERT encourages New Zealand to report the effects of PaMs for 2005, 2010, 2015 and 2020 in terms of GHG emissions avoided or sequestered, by gas (on a CO ₂ eq basis) in tabular format.

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

(a) Technical assessment of the reported information

99. In the NC7 New Zealand provided information explaining that it will not make use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol in the second commitment period as New Zealand's target for 2013–2020 is pledged under the Convention.

(b) Assessment of adherence to the reporting guidelines

100. The ERT assessed the information reported in the NC7 of New Zealand 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

1. Financial resources, including under Article 11 of the Kyoto Protocol

(a) Technical assessment of the reported information

101. New Zealand reported information on the provision of financial support required under the Convention and its Kyoto Protocol, including on financial support provided, committed and pledged, allocation channels and annual contributions.

102. The New Zealand Aid Programme is the main mechanism through which New Zealand provides public support to developing countries, hosted by the Ministry of Foreign Affairs.

103. New Zealand included and reported all climate-related support that is defined as “new and additional”. The Party provided details of the financial resources it has provided and clarified how it has determined such resources as being “new and additional”. New Zealand’s definition of “new and additional” has not changed since the NC6. It considers that, in the absence of an international definition of “new and additional”, the transparent and appropriate communication of new resources provided for the reporting period is the most relevant approach. New Zealand’s climate-related support is an increasing part of the country’s growing aid budget. For the 2013–2016 reporting period around 22 per cent of the financial support provided by the New Zealand Aid Programme had a climate component.

104. New Zealand specifies all funding as “provided” to indicate that the funding has been transferred to the recipients, including multilateral organizations. The annual contributions for the reporting period 2013–2016 are expressed in New Zealand dollars and United States dollars.

105. New Zealand described how its resources address the adaptation and mitigation needs of non-Annex I Parties. It also described how those resources assist non-Annex I Parties to mitigate and adapt to the adverse effects of climate change, facilitate economic and social response measures, and contribute to technology development and transfer and capacity-building related to mitigation and adaptation. New Zealand reported information on the assistance that it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them to meet the costs of adaptation to those adverse effects. New Zealand’s total financial assistance for the reporting period was NZD 454.60 million, which is an overall increase of approximately NZD 145.92 million compared with the previous reporting period. The financial assistance is provided through bilateral, regional and other multilateral channels, including the Global Environment Facility, the World Bank, the Asian Development Bank, the United Nations Development Programme, the Trust Fund for Supplementary Activities, the Secretariat of the Pacific Community and the Pacific Islands Forum Secretariat.

106. New Zealand provided information on how it has provided capacity-building support that responds to the existing and emerging capacity-building needs related to challenges of the partner countries in accessing GCF grants. In 2016 New Zealand launched the Technical Assistance for Pacific Access programme providing rapid deployment of technical support to partner countries in accessing GCF grants, and funded national GCF workshops in Kiribati, Tuvalu, Tonga and Niue, aimed at bolstering national capacities and understanding of the GCF.

107. With regard to the most recent financial contributions aimed at enhancing the implementation of the Convention by developing countries, New Zealand reported that its climate-related finance to developing countries is provided primarily as public finance in the form of grants and has been allocated on the basis of priority areas identified by recipient countries and reflected in their national plans.

108. The major share of the support provided is to increase access to affordable, reliable and clean energy resources, and to adapt to the impacts of climate change through building capacity, stronger and resilient infrastructure, and strengthened disaster preparedness systems. New Zealand is also supporting low-emission agricultural development, including through GRA. A large proportion of New Zealand's climate-related support is delivered through bilateral channels managed by the New Zealand Aid Programme in accordance with the strategic plan for 2015–2019. During this reporting period, New Zealand's bilateral support maintained a strong focus on small island developing States in the Pacific region. The support is also provided to partner countries in Africa and the Caribbean and to member countries of the Association of Southeast Asian Nations. Table 14 includes some of the information reported by New Zealand on its provision of financial support.

Table 14

Summary of information on provision of financial support by New Zealand in 2013–2016

(Millions of United States dollars)

Allocation channel of public financial support	Year of disbursement			
	2013	2014	2015	2016
Official development assistance	458.73	674.98	451.86	569.86
Climate-specific contributions through multilateral channels, including:	0	1.39	2.53	0.26
GCF	0	0.07	2.09	0
Trust Fund for Supplementary Activities	0	0	0.09	0.16
Financial institutions, including regional development banks	0	0	0	0.28
Other	0	1.32	0.35	0.10
Climate-specific contributions through bilateral, regional and other channels	23.77	49.68	40.27	34.61
Other	0	0	0	0

Sources: (1) Query Wizard for International Development Statistics, available at <http://stats.oecd.org/qwids/>; (2) NC7 tables 7.3a–7.3d; (3) BR3 CTF tables.

Note: In addition, New Zealand provided USD 49.89 million in 2013, USD 53.12 million in 2014, USD 41.79 million in 2015 and USD 46.79 million in 2016 in core/general contributions through multilateral channels, including for climate change mitigation and adaptation activities.

109. The bilateral contributions reported by the Party to address climate change are assessed as being either “principal” or “significant”, while contributions to regional and multilateral organizations, with the exception of funding provided to GRA, are not monitored at a level that tracks climate change actions.

(b) Assessment of adherence to the reporting guidelines

110. The ERT assessed the information reported in the NC7 of New Zealand 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.

2. Technology development and transfer, including information under Article 10 of the Kyoto Protocol

(a) Technical assessment of the reported information

111. New Zealand provided information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries. The Party provided examples of support provided for the deployment and enhancement of the endogenous capacities and technologies of non-Annex I Parties. During the reporting period, New Zealand delivered its technology transfer related support through the New Zealand Aid Programme and practical assistance and cooperative actions through GRA.

112. The ERT took note of the information provided in tables 7.6 and 7.7 of the NC7 on technology transfer support, mostly provided as a combination of ‘hard’ and ‘soft’ technology. The number of recipient countries supported by the New Zealand Aid Programme has increased; although the main recipient target group remained small island developing States in the South Pacific, New Zealand reported on projects to provide support to Afghanistan and to countries in Africa, the Caribbean and East Asia. The technology transfer supported mitigation activities that are mainly aimed at promoting renewable energy applications, ensuring access to clean energy sources and mitigating GHG emissions from livestock production. Adaptation projects are aimed at transfer of knowledge and measures for reducing risks related to droughts and extreme weather events, increasing resilience of infrastructure and improving food security.

113. The technology transfer delivered through GRA promotes and facilitates endogenous and non-endogenous technologies and capacities in the agriculture sector, improving national GHG inventories and agricultural development strategies that aim to reduce GHG emissions and vulnerability to climate change. In its NC7, New Zealand emphasized the importance of sharing its expertise related to mitigation actions in the agriculture sector to decouple emissions from food production; a series of workshops and training sessions was held in South East Asia and Africa aimed at improving agriculture sector strategies and increasing the quality of GHG inventory reporting.

114. The ERT noted that New Zealand reported on success stories in relation to technology transfer, in particular on measures taken to promote, facilitate and finance the transfer and deployment of climate-friendly technologies. The success of technology transfer activities is ensured through adhering to recipient country ownership and alignment with the country’s strategies and priorities, donor harmonization and focusing on the results. Recognizing the importance of private sector finance, New Zealand also provided assistance in ‘soft’ technologies such as support in creating conditions for reducing risks of private sector investment in renewable energy in the Asia–Pacific region.

115. New Zealand’s Pacific Partnership with the European Union mobilized commitment for private investments for renewable energy in the Pacific region in the amount of around NZD 2 billion, up to 2024.

116. New Zealand provided information on steps taken to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity in order to facilitate implementation of Article 10 of the Kyoto Protocol. The support provided to climate-related agriculture initiatives during the period 2015–2016 was aimed at supporting non-Annex I Parties in decoupling emissions from food production.

117. In its BR3 New Zealand provided information in textual and tabular format on examples of key mitigation, adaptation, disaster risk management and resilience-building, and ‘soft’ and ‘hard’ technology transfer activities. Mitigation projects are mainly aimed at building a supportive environment for reducing existing and perceived risks to investments for renewable energy, while adaptation projects are focused more on building infrastructure resilience through grant resources provided.

(b) Assessment of adherence to the reporting guidelines

118. The ERT assessed the information reported in the NC7 of New Zealand and identified issues relating to completeness and transparency. The findings are described in table 15.

Table 15

Findings on technology development and transfer, including information under Article 10 of the Kyoto Protocol, from the review of the seventh national communication of New Zealand

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement ^a specified in paragraph 55 Issue type: transparency Assessment: recommendation	In its NC7 New Zealand reported that the development principles applied to the support provided can be considered as factors that led to success, without providing an explicit example. During the review, New Zealand acknowledged the lack of explicit success and failure stories related to technology transfer and indicated that it would strive to provide such information, where feasible, in future submissions. The ERT reiterates the recommendation made in the previous review report that New Zealand improve the transparency of its reporting by including in its next NC, where feasible, success and failure stories in relation to technology transfer, using table 6 of the UNFCCC reporting guidelines on NCs.

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.

E. Vulnerability assessment, climate change impacts and adaptation measures

1. Technical assessment of the reported information

119. In the NC7 New Zealand provided the required information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. New Zealand provided a description of climate change vulnerability and impacts for both the whole country and the Antarctica region and highlighted the adaptation response actions taken and planned at the national, regional and local level. Climate change adaptation is integrated into relevant policies, legislation, strategy/policy statements and road maps both within and across relevant sectors.

120. Since the NC6, New Zealand has continued to broaden the scope and understanding of climate risks through increased research, capacity-building, awareness-raising and strengthening the legal and policy institutional arrangements in tackling climate risks, and adaptation measures. The ERT notes the establishment of the Climate Change Adaptation Technical Working Group during the reporting period, which has provided options for how New Zealand can adapt to the effects of climate change. During the review, the Party indicated that there were plans to respond to the core recommendations of the Climate Change Adaptation Technical Working Group, including a key recommendation on the development of a national adaptation plan together with the monitoring and evaluation of the implementation of the plan, as part of the planned Zero Carbon Bill.

121. New Zealand provided a description of climate change vulnerability and impacts on agriculture and forestry, biodiversity and natural ecosystems, coastal zones, freshwater and glaciers, human health, infrastructure and economy, the marine environment and fisheries and cultural heritage and highlighted the adaptation response actions taken and planned at different levels of government. The importance of adaptation to New Zealand was highlighted by the establishment of a national system for monitoring, reporting and evaluation across several sectors. Activities include the work of the national Marine Environmental Monitoring Programme, which examines the impacts of climate change on New Zealand's marine resources, including the development of a suite of ecological indicators by the Department of Conservation as part of an outcomes-based framework for monitoring marine protected areas; annual monitoring conducted by NIWA of 50 South Island glaciers in New Zealand during the period 1977–2017; the Government's Conservation and Environment Science Roadmap (2017), which identifies improved

monitoring and modelling of observed and expected changes and their environmental, social and economic impacts; the development of mitigation and adaptation options; and the development of tools and approaches to reduce emissions.

122. New Zealand identified the four most vulnerable areas, and explained that relevant adaptation measures have been established through research programmes and policy instruments that have either been undertaken or are planned. These include work to identify vulnerabilities in the tourism and transport sectors, as well as support to address community vulnerability, resilience and adaptation to climate change in areas affected by warmer temperatures, more intense flooding and significant sea level rise, and support to tackle primary sector risks and develop opportunities for seafood and fish industries. New Zealand also reported on monitoring programmes; coastal monitoring of planning and construction of housing in low-lying flood-prone areas; ocean acidification; and terrestrial observations and initiatives to facilitate risk reduction and natural hazard management, such as civil defence protection, emergency planning, emergency management, including the requirements of the Sendai Framework for Disaster Risk Reduction 2015–2030, and management of floods and sea level rise.

123. The ERT notes that New Zealand has improved the reporting of the approach to modelling climate change impacts for the projections on adaptation in line with the latest scientific developments and consistent with the model data contained in the AR5. New Zealand provided extensive information on future climate change scenarios as contained in an MfE report *Climate Change Projections for New Zealand* (2016). Details of scenario definitions are outlined in the projections report. The principal source of modelling information for climate change impacts in New Zealand is provided by NIWA. During the review, the Party explained that the modelling emphasis of NIWA shifted from statistical downscaling (reported by MfE in the NC6) to dynamical downscaling (reported by MfE in the NC7). New Zealand reported that the information on the pattern of changes described in the NC6 and NC7 was relatively consistent. For example, in both periods, the climate projections indicated an increase in westerly winds in the six-month winter–spring period, with an accompanying increase in rainfall in the west of the country and a decrease in the east and north of the country. However, the Party highlighted that the magnitudes of these changes, including changes in temperature, differed somewhat between the AR4 and the AR5.

124. According to *Climate Change Projections for New Zealand*, New Zealand will experience temperature increases of between around 0.7 °C (low-emissions scenario) and 1.0 °C (high-emissions scenario) by 2040 and around 0.7 °C (low-emissions scenario) and 3.0 °C (high-emissions scenario) by 2090, but the rise in temperature is still projected to be less than the global average. Projected rainfall and wind patterns show a marked seasonality and regional differences between the North and South Islands. Global sea level is projected to rise by 0.2–0.4 metres by 2060 and by 0.3–1.0 metres by 2100, depending on the emissions scenario. However, the collapse of parts of the Antarctic ice sheets could substantially increase this range. Sea level in the New Zealand region is expected to rise slightly faster than the global average. Under the high-emissions scenario, by 2100 the mean sea-surface temperature in the New Zealand region is expected to increase by 2.5 °C.

125. Furthermore, the Party reported that by 2100 the pH of surface water is expected to decline by 0.33 under the high-emissions scenario. Other changes expected are: decreased frost risk; increased frequency of high temperatures; increased frequency of extreme daily rainfalls; increased frequency of dry days; decreased seasonal snow cover; increased frequency and intensity of droughts; and a possible increase in strong winds. During the review, the Party explained that the range of climate variables was considered, including hydrological variables, and the projections also focus on regional climate modelling rather than a statistical approach. The ERT noted the importance of New Zealand transparently reporting on the methodological changes in the approach used for modelling climate change impacts based on the most recent AR5 climate change scenarios.

126. Impetus has been given to addressing adaptation matters with the adoption of the Resource Legislation Amendment Act 2017, which introduced “the management of significant risks from natural hazards” as a new matter of national importance in section 6 of the Resource Management Act 1991. The Resource Management Act 1991 sets the

legislative framework for how New Zealand manages the environment, including climate change, as part of the wider management of natural hazards, and establishes natural hazard management as a function of local authorities.

127. The ERT notes that New Zealand has provided a more comprehensive and overarching framework for current and future activities on climate change and adaptation response by implementing a number of actions, including policy statements in various sectors, such as the National Policy Statement for Freshwater Management (2014), which sets limits for managing water bodies at the regional level; research programmes addressing the expected socioeconomic and ecological impacts of climate change in several sectors; and updated information and guidance on climate change in the form of technical guidance manuals, which provide detailed information on climate change impacts and help local government, engineers, businesses and other decision makers to plan for climate change impacts. Examples of such information and guidance include *Coastal Hazards and Climate Change: Guidance for Local Government* (2017), which has been updated in line with the latest science and relevant legislation; information on sea level rise from the *State of the Environment Report 2015*; new pathways to adaptive planning when there is uncertainty about future physical conditions affecting the coastal environment; the introduction of new material on hazard, risk and vulnerability assessments; and collaborative approaches with the engagement of communities. Another key technical guidance manual is *Tools for Estimating the Effects of Climate Change on Flood Flow: A Guidance Manual for Local Government in New Zealand* (2010), which describes techniques for including climate change in flood planning and tools for estimating the effect of climate change flood flow.

128. New Zealand reported additional research work undertaken since the NC6 and relevant adaptation measures to address specific vulnerable sectors such as tourism (in particular the ski industry) and transport (road, rail, ports and coastal shipping), as well as community vulnerability and resilience, including the adaptive capacity of Maori communities, rural communities and communities in low-lying coastal and floodplain areas. The ERT noted the importance of such efforts.

129. The ERT also notes that in the NC7 New Zealand provided information on cross-sectoral considerations, namely: risks to coastal margins, flooding from rivers, availability of and competition for freshwater, changes to surrounding oceans, the threat to New Zealand’s unique ecosystems and flow-on effects from climate change impacts and responses elsewhere.

130. New Zealand presented this information by sector focusing on agriculture and forestry, biodiversity and native ecosystems, coastal zones, emergency management (consistent with the Sendai Framework for Disaster Risk Reduction), freshwater, marine environment and fisheries, human health, infrastructure and economy, tourism and transport. The reporting of these measures has provided further direction to government agencies in enhancing preparedness for climate change. During the review, the Party indicated that this work programme is facilitated by the Community Resilience Group and focuses on an integrated approach to adaptation and disaster risk reduction for New Zealand. The ERT notes the importance of New Zealand’s efforts in establishing an integrated approach to managing climate impacts for adaptation and disaster preparedness. Table 16 summarizes the information on vulnerability and adaptation to climate change presented in the NC7 of New Zealand.

Table 16
Summary of information on vulnerability and adaptation to climate change reported by New Zealand

Vulnerable area	Examples/comments/adaptation measures reported
Agriculture and forestry	<i>Vulnerability:</i> Adverse impacts of climate change and extreme weather events on patterns and productivity of crops/pasture (changes in broad acre cropping quantity and yield and horticulture species such as apple, kiwifruit and grapes), livestock (dairy, sheep and beef), pestilence, pollinators, water resources and forest productivity. Increased impact of pests on forest health, habitat loss and unstable land, soil ecosystem services, erosion, pest and disease incidence, droughts and fire incidence, extreme winds, flood and frost incidence, biocontrol systems and subtropical grass boundaries.

Vulnerable area	Examples/comments/adaptation measures reported
Biodiversity and natural ecosystems	<p><i>Adaptation:</i> Continued implementation of the integrated package of measures for land-based sectors through the Sustainable Land Management and Climate Change plan of action; implementation of a five-year climate change technology transfer programme to promote more resilient farming practices; toolbox to help land managers to respond to climate change; establishment of a nationwide rural support trust programme to help families during and after extreme weather or environmental events; Irrigation Acceleration Fund to help to realize irrigated agriculture’s potential to contribute to sustainable economic growth throughout New Zealand; and establishment of Crown Irrigation Investment Limited, which manages funding for investment in the construction of regional-scale irrigation schemes (the scheme now includes funding for two managed aquifer recharge trials that are investigating infrastructure for underground storage of water when rain is plentiful). Additional measures are being undertaken to address wider social and economic implications, including rural water infrastructure, global trade and farm finance systems, and farmer resilience.</p> <p><i>Vulnerability:</i> Given the high percentage of endemic species in the terrestrial, freshwater and marine environments, there is an increased risk of extinction of species at the local, regional and national level and a shift in the location of species. Key drivers of change are both direct (direct effects are difficult to establish due to lack of data) and indirect impacts of climate change, including increased pressure from and range of invasive species, weeds and pest species (e.g. ship rats, hedgehogs), in particular the invasion of tropical and subtropical species, new diseases and disease vectors, increased mast seeding, which may alter biodiversity and ecosystem functions, and increased pressure from changes in land use and management practices. Impacts on marine ecosystems include increased smothering of coastal and estuarine habitats from terrestrial sedimentation due to increased rainfall and land coastal erosion. These impacts will lead to ecosystem disruption and direct negative impacts on communities, while loss of species will have implications for fisheries and biodiversity functions.</p> <p><i>Adaptation:</i> Development of a framework for conservation of terrestrial native biodiversity in New Zealand by the Department of Conservation (2014), which seeks, among other things, to manage the full range of New Zealand’s ecosystems and species to implement and encourage resilience against climate change impacts; incorporate climate change risks into national park plans and natural hazard assessments; and implement the “Battle for Birds” initiative to control beech forests in response to mast-seeding events.</p>
Coastal zones	<p><i>Vulnerability:</i> Increased coastal erosion, more frequent and extensive coastal inundation; higher storm surge flooding; increased drainage problems in adjacent low-lying areas; seawater reaching further inland in estuaries and coastal aquifers; changes in surface water quality, groundwater characteristics and sedimentation; increases in seawater temperatures; and changes in seawater acidity towards a lower pH (acidification).</p> <p><i>Adaptation:</i> A key measure is the Coastal Policy Statement, which provides policy direction to local government on the management of activities in the coastal environment, including the management of coastal hazards and the effects of climate change and the development of a guidance manual for local government on coastal hazards and climate change. Other measures include the technical guidance developed by the Department of Conservation on natural hazards policies; the updated MfE coastal hazards and climate change guidance, which provides information on hazards and sea level rise risk assessments and recommendations to establish a base value for sea level rise of 0.5 metres by the 2090s (2090–2099); and the Coastal Adaptation to Climate Change project (2012), which provides coastal vulnerability and coastal sensitivity indices. Mapping of these indices helps New Zealand to better understand how to target and prioritize adaptation activities such as excluding high-risk flood-prone areas and sea level areas in residential zones, as well as raising community awareness about coastal hazards.</p>
Marine environment and fisheries	<p><i>Vulnerability:</i> Impacts include ocean acidification and warming of oceans, cumulative effect on coastal marine areas and impacts on indigenous birds and mammals. Ocean acidification will cause a decline in calcifying organisms such as mussels and oysters, including cold water species (deep sea corals), and sea level rise will reduce coastal</p>

Vulnerable area	Examples/comments/adaptation measures reported
	<p>habitats, such as salt marshes (according to the report <i>Our Marine Environment 2016</i>). New Zealand's mean sea-surface temperature has increased by about 0.71 °C in the 100 years up to 2009, which could drive regional change in marine ecosystems in the form of fewer temperate species and increase subtropical species and more nutrient-poor species; for example, this link is demonstrated by northern stocks of snapper (<i>Pagrus auratus</i>), where high recruitment leads to faster growth rates.</p> <p><i>Adaptation:</i> PaMs in place to ensure sustainable management of fisheries in New Zealand. The Government operates a quotas management system which controls total commercial catch for all fish stocks in New Zealand's economic zone. Harvest strategy standards provide targets and limits to be set for fisheries and fish stocks, taking into account environmental conditions. Establishment of a network of 44 marine reserves, which collectively protect 10 per cent of New Zealand's territorial sea.</p>
Human health	<p><i>Vulnerability:</i> Direct public health threats from injury and illness from extreme weather events such as heatwaves (although winter-related deaths are expected to decline) are becoming more common. Increased indirect impacts such as changes in disease patterns and disease vectors, warm and wet climate may increase diseases not currently experienced in New Zealand such as dengue fever, and increased migration and related incidence of tuberculosis (from household crowding) and frequent pandemics will lead to intensified pressure on the public health system.</p> <p><i>Adaptation:</i> Climate impacts and health-related considerations are incorporated into adaptation planning and public health surveillance; for example, New Zealand's Environmental Health Indicators relate climate change information such as extremes of temperature and rainfall to the changing occurrence of diseases such as cryptosporidiosis, giardiasis and salmonellosis and identify groups at risk such as the elderly, Maori communities, ethnic minorities and those living in poverty. The New Zealand Climate and Health Council provides health analysis and information for an action resource system to provide central, regional and local authorities with information to help them formulate responses and adaptive strategies for increasing human health resilience to the infectious disease consequences of climate variation and change. The related action of the Ministry of Health prioritizes vulnerable populations in adaptation planning.</p>
Infrastructure and economy	<p><i>Vulnerability:</i> The majority of New Zealand's urban centres and population are located on low-lying coastal land or floodplains of major rivers; climate impacts therefore affect the communities, homes, commercial assets and infrastructure that are exposed to flooding, sea level rise, storm surge and inundation from rising groundwater levels. The agriculture, horticulture, forestry and tourism sectors contribute significantly to New Zealand's economy and are exposed to the impacts of climate change, which means that climate change can have a negative impact on New Zealand's economy as a whole. Impacts such as extreme weather events, wildfires, disruption of transport routes due to storms and increased competition for water resources means that all primary sectors will be affected, which will interfere with the ability to transport primary products from farms to processing facilities and to markets and ports.</p> <p><i>Adaptation:</i> The Thirty-Year New Zealand Infrastructure Plan 2015 provides a common direction for how infrastructure in New Zealand is planned, funded and built over the next 30 years and sets out a vision that, by 2045, New Zealand's infrastructure is resilient, coordinated and contributes to a strong economy and high living standards. The plan further outlines what adaptation and response means, in terms of infrastructure, for six key sectors: transport, telecommunications, energy, 'three waters' (drinking water, wastewater and storm water), productive water and social infrastructure. A toolbox to support planners, engineers, asset managers and hazard analysts in New Zealand has been developed to understand and evaluate the potential impacts of climate change on cities. Information provided in the toolbox is consistent with the Australian and New Zealand standard for risk management (AS/NZS ISO 31000:2009).</p> <p>A framework to understand and inform thinking and strategies on how the tourism industry is responding to climate change and on adaptive planning measures has been put in place by ski resort operators to manage impacts of climate change. The Government Policy Statement for Land Transport 2015, revised in 2018, sets out the Government's</p>

Vulnerable area	Examples/comments/adaptation measures reported
Freshwater resources and glaciers	<p>priorities for expenditure from the National Land Transport Fund over the next 10 years, and guides and provides a key context for the National Transport Agency’s activities. The plan includes objectives on building resilience in the transport network and for a land transport system that mitigates environmental effects, including those arising from climate change.</p> <p><i>Vulnerability:</i> Reduced groundwater supplies and greater variability in river flows over time, with increased frequency of extreme floods and prolonged droughts. The degree of variation will be different across the country due to New Zealand’s complex geography, with intensified stratification in deep lakes, and possibly intensified wind-driven mixing in shallow lakes, and changes in the distribution of native species, valued introduced species and invasive pests, as well as in the timing and severity of phytoplankton blooms. Warmer habitats are likely to favour the colonization and spread of invasive species, increased water temperature resulting in high algae growth and consequently algal blooms and eutrophication of lakes, increased need for water storage in eastern areas to meet growing irrigation demands due to projected warming and drying, salinization of coastal wetlands as sea level rises and seawater reaches further inland, changes in water resource infrastructure, and increased erosion and sedimentation together with frequent and extreme flooding, which will affect infrastructure such as bridges and flood protection work. NIWA studies (1977–2017) show a decrease in ice volume of most glaciers due to thinning of ice, with permanent loss occurring over the 39-year monitoring period, and decreased agricultural water resources leading to pressure on water resources and agricultural productivity.</p> <p><i>Adaptation:</i> Updated National Policy Statement for Freshwater Management providing national policy direction to regional councils on freshwater management; drought risk management and mitigation; establishment of an Irrigation Acceleration Fund.</p>

131. New Zealand reported in its NC7 on cooperation with non-Annex I Parties in preparing for adaptation, such as financial, technological and capacity-building support. International adaptation activities include providing support to some developing countries to strengthen their capacities and establish meteorological monitoring systems. Examples of bilateral cooperation with developing countries on adaptation include support provided to the Pacific region under the Adaptation Pacific Disaster Risk Management programme, which aims to boost disaster readiness and response, principally in the Pacific and Asia regions under the Adaptation Strengthening Disaster Risk Reduction initiative of the Asian Disaster Preparedness Center, which aims to improve disaster risk reduction capacity in the Lao People’s Democratic Republic, Myanmar, the Philippines and Viet Nam. It focuses on improving the use of risk information and enhancing preparedness for the recovery phase of disasters.

132. New Zealand continues to provide coordination support for the production and publication of the Island Climate Update, in collaboration with various scientific organizations in the Pacific islands. The Island Climate Update initiative disseminates real-time climate data throughout the Pacific region to provide updated information on current climate conditions and seasonal outlooks to Pacific island nations and help them to address climate variability. New Zealand further provides technical support and capacity-building to other countries in Africa, the Caribbean and Latin America. The ERT welcomes the continued contribution of New Zealand and in particular NIWA in assisting Pacific island nations in their efforts to improve adaptive capacity and encourages the Party to sustain such support.

133. The ERT notes that the Party indicated that chapter 6 of the NC7 on vulnerability assessment, climate change impacts and adaptation measures also serves as New Zealand’s first adaptation communication under the Paris Agreement. The chapter has been prepared in accordance with the UNFCCC reporting guidelines on NCs. New Zealand stated in the NC7 that its next adaptation communication will take into account any guidance adopted for adaptation communications by the Conference of the Parties or the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement.

2. Assessment of adherence to the reporting guidelines

134. The ERT assessed the information reported in the NC7 of New Zealand 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.

F. Research and systematic observation

1. Technical assessment of the reported information

135. New Zealand provided information on its general policy and funding relating to research and systematic observation and both domestic and international activities, including contributions to the International Geosphere–Biosphere Programme, GCOS and the IPCC. New Zealand also provided 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. The Party also contributes data to other international databases such as the Argo programme and the Integrated Marine Observing System. Additional exchanges of information are under the auspices of the Pacific Islands Global Climate Observing System and the Asia-Pacific Network for Global Change Research.

136. New Zealand has implemented international and domestic policies and programmes on climate change research, systematic observation and climate modelling that aim to advance capabilities to predict and observe the physical, chemical, biological and human components of the Earth's system over space and time. Major developments since the NC6 include reorganization of the government departments supporting research on climate impacts and the system for allocating research funds to Crown Research Institutes to promote research that contributes to the well-being and prosperity of New Zealand. The total central government investment in climate change research for the period 2015–2016 allocated to different Crown Research Institutes was NZD 50.3 million, covering the following areas: underpinning science platforms, emission reduction, adaptation and technology transfer. The core funding contracts of Crown Research Institutes came to an end in 2017 and funding was transferred to the Strategic Science Investment Fund, which provides longer-term funding for underpinning strategically important science platforms, comprising people, facilities, information and knowledge that provide ongoing science and innovation capability for New Zealand. In the period 2017–2018 the Strategic Science Investment Fund was worth over NZD 260 million per year. The Party reported that much of the climate change science is aligned with the principles and objectives of the Strategic Science Investment Fund.

137. Other developments include research on systematic weather and climate observation and information exchange, which was supported by a further NZD 16 million, and the National Science Challenges, several of which include a significant component of climate change research, supported by NZD 55 million for tackling challenges relating to the environment. Research on agriculture is focused on mitigation of GHG emissions. The ERT notes that the importance of research and innovation on climate change impacts in New Zealand is further demonstrated by the increased funding for both the Crown Research Institutes and the National Science Challenges programme, which are mostly funded by the Government's core budget.

138. The ERT noted that the Crown Research Institutes with the most climate-related research portfolios include: NIWA, with portfolios on atmospheric and oceanic physics and chemistry, GHG measurements, climate observation and analysis, climate processes and causes of change, national and regional predictions and projections, impacts and adaptation options; AgResearch, with portfolios on agricultural GHG mitigation and climate change impacts and adaptation in agriculture; and Landcare Research, with portfolios on indigenous forest measurement and management, agricultural GHG mitigation, soil carbon, impacts of climate change on natural, productive and built environments, and assessment of life cycle GHG emission profiles for various sectors. Research on climate impacts aligned with the National Science Challenges includes understanding the role of the Antarctic and the Southern Ocean in determining New Zealand's climate and future environment (“the Deep South”); resilience to natural hazards, particularly those faced by coastal communities

(“Resilience to Nature’s Challenges”); and enhancing primary sector production and productivity while maintaining and improving land and water quality for future generations (“Our Land and Water”).

139. In the reporting period, New Zealand continued to support GRA through multi-partner funds. The research conducted by GRA aims to reduce agricultural GHG emissions. New Zealand’s emphasis is primarily on emissions from pastoral-based livestock farming systems. The ERT acknowledges New Zealand’s global leadership in developing and accelerating global research in mitigating GHG emissions of enteric CH₄ and reducing N₂O emissions from pastoral livestock farming by seeking solutions to research challenges in the areas of manipulating rumen function, reducing N₂O emissions from soils, manipulating rates of soil carbon change, and improving tools and practices for minimizing GHG emission intensity at the farm system level. The GRA programme also provides short-term exchange opportunities for senior scientists, both from GRA member countries and from New Zealand, while facilitating global research collaboration. GRA also supports a joint programme initiative on agriculture, food security and climate change and the multi-country research call (ERA-GAS) between New Zealand and the European Union to fund research into monitoring and mitigating GHG emissions from the farming and forestry sectors.

140. In terms of activities related to systematic observation, New Zealand reported on national plans, programmes and support for ground- and space-based climate observing systems, including satellite and non-satellite climate observation. The Party also reported on activities to address the challenges related to the maintenance of a consistent and comprehensive observation system. Examples include work by regional councils, MfE and NIWA on a number of national initiatives such as Environmental Monitoring and Reporting, National Environmental Monitoring Standards and Land Air Water Aotearoa projects on national monitoring and quality coding protocols and on data aggregation standard systems to ensure that local data collection is done consistently and data can be easily integrated. New Zealand regional councils have set up the Land Air Water Aotearoa website as an integrated access portal to local authorities’ freshwater, air quality and coastal data.

141. New Zealand has developed national policies contributing to global systems and data management, such as long-term monitoring programmes of several glaciers in New Zealand. The Party maintains observation programmes for atmospheric, terrestrial and oceanic measurements for a suite of GCOS ECVs. These measurements are complemented by archives of historical observations of climate-related parameters. There are four core observation programmes for New Zealand’s ECV observations: (1) surface climate observation, upper air observation and atmospheric constituent measurements undertaken by the MetService and NIWA are provided to the GCOS Global Observing Network; (2) surface oceanic ECV observations are carried out by a range of organizations, with five sea level stations included in the Global Sea Level Observing System network; (3) Voluntary Observing Ships and Argo programmes; ocean water column observations are carried out by NIWA as part of research and commercial projects; and (4) terrestrial ECV observations are conducted by a range of organizations, with most observations being carried out by regional councils; these include freshwater (groundwater, lake and river quality, and river quantity) observations and vegetation surveys.

142. The ERT notes that New Zealand reported on national policies contributing to global observation systems and data management efforts, which include a range of national strategies and legislative frameworks. National Environmental Monitoring Standards is a multiagency project led by regional councils, NIWA, energy companies and MfE to develop and implement national monitoring standards to support and ensure consistency of observation and environmental data across New Zealand. Environmental Monitoring and Reporting is a multiagency project led by regional councils and MfE with the goal of developing a standardized national framework to support national freshwater state-of-the-environment reporting. The Tier 1 statistics programme for environmental indicators and variables provides environmental Tier 1 statistics for marine protected areas and natural resource and environment accounts, including climate change, compiled by Statistics New Zealand.

143. Environmental Tier 1 statistics under development include air quality, stratospheric ozone, soil health, freshwater quality and use, coastal and recreational water quality, marine

biodiversity, terrestrial ecosystem health and atmosphere, and ocean climate change. Land Air Water Aotearoa is an initiative led by regional councils that aims to provide a national mechanism and presentation platform for combining regional environmental monitoring data sets. Data collated include freshwater, coastal and air quality information. Lastly, the Environmental Reporting Act 2015 mandates that the Government Statistician and the Secretary for the Environment have responsibility for national environmental reporting in New Zealand. The Act further mandates that environmental reporting is conducted in line with the principles and protocols for producers of Tier 1 statistics. The ERT welcomes the efforts made by New Zealand in developing a standardized national framework to ensure consistency in the collection of data for monitoring and reporting.

144. The NC7 reflects some actions taken to support capacity-building and the establishment and maintenance of observation systems and related data and monitoring systems in developing countries. Observation systems developed include geographic observation systems, terrestrial systems and meteorological and atmospheric observation systems and models for monitoring various sectors, such as the Island Climate Update monitoring system. During the review, the Party clarified that capacity-building occurs at different levels, such as capacity-building in terms of general global climate research including GHG measurement (see para. 145 below) and capacity-building under research and systematic observation, which includes support for the establishment of national meteorological and hydrological services (see para. 146 below).

145. New Zealand's capacity-building efforts include funding for scientists from developing countries working on global climate change research. New Zealand has provided developing countries with technological and capacity-building support to reduce GHG emissions and adapt to climate change in the agriculture sector through GRA, as well as through the collaboration of GRA with the Climate and Clean Air Coalition and FAO, using the FAO Global Livestock Environmental Assessment Model to assess mitigation options for livestock in 13 developing countries. Under GRA, the Livestock Emissions Abatement Research Network provides fellowships for technicians, doctoral students and post-doctoral students from developing countries in the area of livestock GHG research.

146. National meteorological and hydrological services have been strengthened in several Pacific islands. Under a New Zealand Government contract, MetService provided support to a number of Pacific island nations (the Cook Islands, Kiribati, Niue, Tonga, Tuvalu, Samoa and Tokelau) in relation to their weather and climate observing systems. Through collaborative funding between New Zealand and international partners, NIWA has participated in a Pacific islands data rescue programme. New Zealand official development assistance programmes covered training in technical maintenance and observing practices in several Pacific island countries. New Zealand also collaborates with the Asian Disaster Preparedness Center through bilateral programmes. New Zealand has focused on capacity-building at the organizational and individual level, with an emphasis on forecasting and its verification, climate services and ocean modelling, and strengthening early warning systems as part of national prevention plans to prevent disasters due to extreme weather. The ERT noted the importance of New Zealand's efforts to support developing countries in setting up Earth observation systems and building technical capacity on climate change mitigation and adaptation through training programmes.

147. The ERT notes that New Zealand addressed a number of the climate change research gaps identified in the NC6 related to the better understanding of second- and third-order impacts of climate linked with the interaction of climate variables, in-depth understanding of climate change impacts on biodiversity and native ecosystems, and research on impacts and adaptation-based decision-making tools for communities and businesses. During the review, New Zealand provided information on and examples of second-order impacts of climate change which included the impacts of temperature and moisture change on biosecurity pest risks, biocontrol agents, diseases in horticultural plants, crop pollinators and more recent research carried out under the "Deep South" National Science Challenge on how climate change impacts propagate and cascade across human systems and the implication of such impacts. The ERT recognizes the efforts made by New Zealand in the reporting period to address research gaps in climate change impacts.

2. Assessment of adherence to the reporting guidelines

148. The ERT assessed the information reported in the NC7 of New Zealand 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.

G. Education, training and public awareness

1. Technical assessment of the reported information

149. In the NC7 New Zealand provided information on its actions relating to education, training and public awareness at the domestic level, including on the general policy on education, training and public awareness. This includes primary, secondary and higher education, public information campaigns, training programmes, education materials, resource or information centres, the involvement of the public and non-governmental organizations and their participation in international activities such as GRA fellowships and exchange programmes. New Zealand has built up the system in primary, secondary and higher education that integrates environment and climate education.

150. Compared with the NC6, the Party provided more extensive information on work performed by institutes and research centres, energy efficiency awareness programmes, industrial training programmes and public engagement. However, the ERT notes that the NC7 does not include information on the extent of public participation in the preparation of the content of the NCs. During the review, New Zealand clarified that the public and non-governmental organizations are consulted during the preparation of other climate-related policies such as the preparation of the nationally determined contribution under the Paris Agreement. In the NC7, New Zealand explained that the Government actively engages with the public on climate change issues and has continued to do so since the last reporting period and that the public is not involved in the preparation of NC content.

151. The ERT noted that New Zealand has implemented public awareness campaigns that focus on household and vehicle energy efficiency, certification schemes, tools for measuring emissions and environmental rewards using a wide range of awareness-raising tools. The ERT notes that these programmes are well coordinated but the impacts are not necessarily monitored. Some exceptions to this are the ENERGYWISE programme, where effects of energy efficiency are assessed and quantified, and the Energy Spot television campaign, where consumer research is undertaken to understand the campaign's effectiveness. During the review, the Party highlighted the challenges of assessing the effectiveness of all other public awareness programmes due to lack of data for some of the programmes.

152. Although public access to environmental information and public participation in decision-making is not regulated, a key part of the New Zealand Government's response to climate change is providing climate change information to the public, businesses, local government and the land-based sector. Examples include MfE providing information on its website describing the key government policies to reduce emissions and the work being done to help people to prepare for and adapt to climate change. The website also contains links to climate change resources on other government and non-government websites. The Ministry for Primary Industries has developed a digital library called the Climate Cloud, which has resources related to climate change in New Zealand for land managers, rural professionals and land-based businesses and helps land managers to obtain information on the effects of climate change in order to make successful adaptation and mitigation decisions.

2. Assessment of adherence to the reporting guidelines

153. The ERT assessed the information reported in the NC7 of New Zealand and identified issues relating to transparency. The findings are described in table 17.

Table 17

Findings on education, training and public awareness from the review of the seventh national communication of New Zealand

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 65 Issue type: transparency Assessment: encouragement	<p>The NC7 does not include information on the extent of public participation in the preparation of NCs.</p> <p>During the review, New Zealand clarified that the public and non-governmental organizations were consulted during the preparation of climate-related policies and legislative documents such as the nationally determined contribution under the Paris Agreement and the NZ ETS. New Zealand highlighted in the NC7 that the Government actively engages with the public on climate change issues and has continued to do so since the last reporting period and that the public is not involved in the preparation of NC content as the vast majority of the information contained in the NC is information that is already publicly available.</p> <p>The ERT reiterates the encouragement of the previous ERT for New Zealand to include relevant information on the extent of public participation in the preparation of the NC in its next submission.</p>

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.

III. Conclusions and recommendations

154. The ERT conducted a technical review of the information reported in the NC7 of New Zealand 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 New Zealand.

155. The information provided in the NC7 includes all elements of the supplementary information under Article 7 of the Kyoto Protocol. 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 provided by New Zealand in its 2018 annual submission.

156. New Zealand's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target (5.0 per cent below the 1990 level by 2020) were estimated to be 19.6 per cent above the 1990 level in 2016, whereas total GHG emissions including LULUCF were 54.2 per cent above the 1990 level in 2016. Emission increases were driven by economic and population growth as well as the increase in the international demand for agricultural products, which led to the increase in the size of the national dairy cattle herd; fertilizer application and dairy cattle excreta; road transport activities; the increase in energy consumption in manufacturing industries and construction (due to economic growth and population increase); and the increase in HFCs used as replacements for ozone-depleting substances.

157. New Zealand's main policy framework relating to energy and climate change consists of the Energy Efficiency and Conservation Act, the Climate Change Response Act, the National Environmental Standard for Landfill Gas and, in the near future, the Zero Carbon Bill, which will guide New Zealand's transition towards a net-zero emissions economy, and the amendments to the Climate Change Response Act 2002 to incorporate the requirements of the Paris Agreement and make improvements to the NZ ETS. Key legislation supporting New Zealand's climate change goals includes the New Zealand Energy Strategy 2011–2021 and the New Zealand Energy Efficiency and Conservation Strategy 2017–2022. The mitigation actions with the most significant mitigation impact for reaching the 2020 target are expected to be the NZ ETS (2,930 kt CO₂ eq), the Erosion Control Funding Programme (1,435 kt CO₂ eq), the National Environmental Standard for Landfill Methane (711 kt CO₂ eq) and the Afforestation Grant Scheme (491 kt CO₂ eq).

158. The GHG emission projections provided by New Zealand include those under the WOM and WEM scenarios. Under the WOM scenario, emissions are projected to be 26.5 and 26.7 per cent above the 1990 level in 2020 and 2030, respectively. Under the WEM scenario, emissions are projected to be 23.8 and 19.6 per cent above the 1990 level in 2020 and 2030, respectively.

159. On the basis of the reported information, the ERT concludes that New Zealand may face challenges in achieving its 2020 target (5.0 per cent below the 1990 level by 2020) under the WEM scenario. In this regard, New Zealand reported in the latest update on its 2020 net position that it expects to meet its 2020 target by using removals from LULUCF activities and surplus units from the first commitment period of the Kyoto Protocol.⁷

160. For the second commitment period of the Kyoto Protocol (2013–2020), New Zealand has no target inscribed in the Doha Amendment to the Kyoto Protocol.⁸

161. New Zealand continued to provide climate financing to developing countries in line with the New Zealand Aid Programme and GRA. It has increased its contributions by 47 per cent since the NC6, and its public financial support in 2015 and 2016 totalled USD 40.27 and 34.61 million per year, respectively. For those years, New Zealand's support provided for mitigation action was higher than its support provided for adaptation; however, there is an observed tendency to increase the share of support for adaptation activities. The biggest share of financial support made through bilateral and regional channels went to projects in the energy sector, followed by the water and sanitation, and disaster prevention and preparedness sectors. New Zealand provided information on activities related to technology transfer, access and deployment benefiting developing countries, including the integrated approach applied to capacity-building and technology transfer as part of its overall climate support portfolio.

162. New Zealand's vulnerability assessment focuses on agriculture and forestry, biodiversity and natural ecosystems, coastal zones, freshwater and glaciers, human health, infrastructure and economy, the marine environment and fisheries, and cultural heritage for the whole country. New Zealand implements relevant adaptation measures at the national, regional and local level, mainly through key legislation, policy instruments and statements, and technical guidance documents. Updated climate change projections for New Zealand were produced based on the AR5; these projections show that New Zealand is already experiencing some of the climate impacts in some of these sectors. The impacts on these vulnerable areas underscores the changes and implications of increased temperature, sea level rise and changes in rainfall with associated risks of flooding or drought and wind speed. In the reporting period, significant investments were made in research programmes studying the impacts of climate change in New Zealand.

163. New Zealand undertakes extensive research and systematic observation in programmes for atmospheric, terrestrial and oceanic measurements for a suite of GCOS ECVs, including climate and the marine environment. The government departments supporting research have been reorganized, as has the system for allocating research funds to Crown Research Institutes. The national importance of research is demonstrated by the Government's increased allocation of funding for research on systematic weather and climate observation. Progress continues on the National Science Challenges, several of which include a significant component of climate change research. The Conservation and Environment Science Road Map identified the scientific knowledge required in the next 20 years to support future decision-making. The road map also sets the research needs and priorities across all scientific fields and aims to strengthen collaboration among the different sectors by ensuring that all stakeholders have a common understanding of research needs on environmental issues for New Zealand. Technical guidance on the use and uptake of climate change information in decision-making has been improved and updated. New Zealand participates extensively in international cooperation on research, development and education with many countries around the world. Climate research and systematic observation is conducted

⁷ Available at www.mfe.govt.nz/climate-change/reporting-greenhouse-gas-emissions/latest-2020-net-position.

⁸ Available at https://unfccc.int/files/kyoto_protocol/application/pdf/kp_doha_amendment_english.pdf.

through a combination of public bodies, academic institutions, research institutes and GRA, which provide new, ground-breaking knowledge of national and international significance.

164. With respect to education, training and public awareness, New Zealand has implemented an extensive array of measures across the education system embracing all communities. The broader part of the curriculum in primary and secondary education with key objectives of respect for climate change and sustainability was introduced and is taught in Maori and in English. Examples include the Mātauranga Whakauka Taio – Environment Education for Sustainability Strategy and Action Plan, which was launched on 27 July 2017 and focuses on Maori knowledge and values in environmental education. The New Zealand Government provides resources and funding for climate change related education and training in schools, research institutes and industry; examples include “the Deep South” initiative under the National Science Challenges programme working with industries, media, communities and various sectors through public outreach initiatives to help New Zealanders to make decisions that are informed by climate science. The MfE website provides a key source of climate change information and covers information on climate change science, impacts, adaptation and government policies.

165. In the course of the review, the ERT formulated the following recommendations for New Zealand to improve its adherence to the UNFCCC reporting guidelines on NCs and its reporting of supplementary information under the Kyoto Protocol:⁹

- (a) To improve the completeness of its reporting by:
 - (i) Providing information on how the Party believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objectives of the Convention (see issue 1 in table 7);
 - (ii) Providing information on emission projections related to fuel sold to ships and aircraft engaged in international transport, to the extent possible, and reporting them separately and not included in the totals (see issue 3 in table 11);
 - (iii) Providing information on factors and activities used for projections of F-gases in the IPPU sector and GHG emissions from navigation, aviation and rail transport (see issue 6 in table 11);
 - (iv) Providing an estimate of the total effect of PaMs in terms of GHG emissions avoided or sequestered, by gas (on a CO₂ eq basis) in 1995 and 2000 (see issue 1 in table 13);
- (b) To improve the transparency of its reporting by:
 - (i) Providing more detailed information on steps it has taken to promote and/or implement any decisions by ICAO and IMO in order to limit or reduce emissions of GHGs not controlled by the Montreal Protocol (see issue 3 in table 7);
 - (ii) Providing information on success and failure stories when reporting on activities related to technology transfer, where feasible (see issue 1 in table 15).

IV. Questions of implementation

166. 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 question of implementation was raised by the ERT during the review.

⁹ 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 New Zealand. 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>.

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BR3 of New Zealand. 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>.

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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>.

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“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>.

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“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 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>.

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B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Emily Dunning (Ministry of Environment), including additional material.