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Technical analysis of the fourth biennial update report of Chile submitted on 18 January 2021

Summary report by the team of technical experts

Summary

According to decision 2/CP.17, paragraph 41(a), Parties not included in Annex I to the Convention, consistently with their capabilities and the level of support provided for reporting, were to submit their first biennial update report by December 2014. Further, paragraph 41(f) of that decision states that Parties not included in Annex I to the Convention shall submit a biennial update report every two years, either as a summary of parts of their national communication in the year in which the national communication is submitted or as a stand-alone update report. As mandated, the least developed country Parties and small island developing States may submit biennial update reports at their discretion. This summary report presents the results of the technical analysis of the fourth biennial update report of Chile, conducted by a team of technical experts in accordance with the modalities and procedures contained in the annex to decision 20/CP.19.



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Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AD	activity data
AFOLU	agriculture, forestry and other land use
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BUR	biennial update report
CDM	clean development mechanism
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
COP	Conference of the Parties
EF	emission factor
ETF	enhanced transparency framework under the Paris Agreement
F-gas	fluorinated gas
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
ICA	international consultation and analysis
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance	<i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i>
IPCC good practice guidance for LULUCF	<i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
N ₂ O	nitrous oxide
NA	not applicable
NAMA	nationally appropriate mitigation action
NC	national communication
NDC	nationally determined contribution
NE	not estimated
NIR	national inventory report
non-Annex I Party	Party not included in Annex I to the Convention
NO _x	nitrogen oxides
ODS	ozone-depleting substance(s)
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
Revised 1996 IPCC Guidelines	<i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i>
SF ₆	sulfur hexafluoride
S/I	no information
SNICHILE	National Greenhouse Gas Inventory System of Chile
SO ₂	sulfur dioxide
TTE	team of technical experts
UNFCCC Annex I inventory reporting guidelines	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”

UNFCCC guidelines for the preparation of NCs from non-Annex I Parties

“Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention”

UNFCCC reporting guidelines on BURs

“UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention”

I. Introduction and process overview

A. Introduction

1. The process of ICA consists of two steps: a technical analysis of the submitted BUR and a facilitative sharing of views under the Subsidiary Body for Implementation, resulting in a summary report and a record, respectively.
2. According to decision 2/CP.17, paragraph 41(a), non-Annex I Parties, consistently with their capabilities and the level of support provided for reporting, were to submit their first BUR by December 2014. In addition, paragraph 41(f) of that decision states that non-Annex I Parties shall submit a BUR every two years, either as a summary of parts of their NC in the year in which the NC is submitted or as a stand-alone update report.
3. Further, according to paragraph 58(a) of the same decision, the first round of ICA is to commence for non-Annex I Parties within six months of the submission of the Parties' first BUR. The frequency of developing country Parties' participation in subsequent rounds of ICA, depending on their respective capabilities and national circumstances, and the special flexibility for small island developing States and the least developed country Parties, will be determined by the frequency of the submission of BURs.
4. Chile submitted its third BUR on 3 December 2018, which was analysed by a TTE in the thirteenth round of technical analysis of BURs from non-Annex I Parties, conducted from 27 to 31 May 2019. After the publication of its summary report, Chile participated in the eighth workshop for the facilitative sharing of views, convened in Madrid on 9 December 2019.
5. This summary report presents the results of the technical analysis of the fourth BUR of Chile, undertaken by a TTE in accordance with the provisions on the composition, modalities and procedures of the TTE under ICA contained in the annex to decision 20/CP.19.

B. Process overview

6. In accordance with the mandate referred to in paragraph 2 above, Chile submitted its fourth BUR on 18 January 2021 as a stand-alone update report. The submission was made within two years and two months from the submission of the third BUR. During the technical analysis, the Party explained the reasons for submitting the BUR slightly more than two years after the submission of the last BUR.
7. Chile clarified that it faced challenges in submitting its fourth BUR owing to the impact of the coronavirus disease 2019, which placed additional pressure onto its already constrained human resource capacity. The Party emphasized that, despite these challenges, it raised the ambition of its NDC, succeeded in submitting its updated 2020 NDC, submitted the draft Climate Change Framework Law to the National Congress, and exercised the COP 25 Presidency for an additional year to lead efforts in international climate action.
8. A desk analysis of Chile's BUR was conducted remotely from 28 June to 2 July 2021 and was undertaken by the following TTE, drawn from the UNFCCC roster of experts on the basis of the criteria defined in decision 20/CP.19, annex, paragraphs 2–6: Zuelclady Maria Fernanda Araujo Gutierrez (Mexico), Bertha Iris Argueta Tejada (Honduras), Luis Caceres Silva (former member of the Consultative Group of Experts from Ecuador), Carlos Fuller (former member of the Consultative Group of Experts from Belize), Liviu Gheorghe (Romania), Liudmila Hristova Naydenova (Netherlands), Marcela Itzel Olguin-Alvarez (Mexico), Elisabeth Pagnac-Farbiaz (France), Jose Manuel Ramirez Garcia (Spain), Juan José Rincón Cristóbal (Spain), Raul Salas Reyes (Mexico), Alexander Valencia (Colombia) and Iván Darío Valencia (Colombia). Ms. Pagnac-Farbiaz and Mr. Salas Reyes were the co-leads. The technical analysis was coordinated by Javier Hanna Figueroa (secretariat).
9. During the technical analysis, in addition to the written exchange, in the virtual team room, to provide technical clarifications on the information reported in the BUR, the TTE

and Chile engaged in consultation¹ on the identification of capacity-building needs for the preparation of BURs and participation in the ICA process. Following the technical analysis of Chile's fourth BUR, the TTE prepared and shared a draft summary report with Chile on 12 October 2021 for its review and comment. Chile, in turn, provided its feedback on the draft summary report on 23 November 2021.

10. The TTE responded to and incorporated Chile's comments referred to in paragraph 9 above and finalized the summary report in consultation with the Party on 17 January 2022.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

11. The scope of the technical analysis is outlined in decision 20/CP.19, annex, paragraph 15, according to which the technical analysis aims to, without engaging in a discussion on the appropriateness of the actions, increase the transparency of mitigation actions and their effects and shall entail the following:

(a) The identification of the extent to which the elements of information listed in paragraph 3(a) of the ICA modalities and guidelines (decision 2/CP.17, annex IV) have been included in the BUR of the Party concerned (see chap. II.B below);

(b) A technical analysis of the information reported in the BUR, specified in the UNFCCC reporting guidelines on BURs (decision 2/CP.17, annex III), and any additional technical information provided by the Party concerned (see chap. II.C below);

(c) The identification, in consultation with the Party concerned, of capacity-building needs related to the facilitation of reporting in accordance with the UNFCCC reporting guidelines on BURs and to participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention (see chap. II.D below).

12. The remainder of this chapter presents the results of each of the three parts of the technical analysis of Chile's BUR outlined in paragraph 11 above.

B. Extent of the information reported

13. The elements of information referred to in paragraph 11(a) above include the national GHG inventory report; information on mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, and information on progress in their implementation; information on domestic MRV; and information on support needed and received.

14. According to decision 20/CP.19, annex, paragraph 15(a), in undertaking the technical analysis of the submitted BUR, the TTE is to identify the extent to which the elements of information indicated in paragraph 13 above have been included in the BUR of the Party concerned. The TTE considers that the reported information is mostly consistent with the UNFCCC reporting guidelines on BURs. Specific details on the extent of the information reported for each of the required elements are provided in the tables included in annex I.

15. The current TTE noted improvements in the reporting in Chile's fourth BUR compared with that in its previous BUR analysed. Information on the GHG inventory, mitigation actions and their effects, needs and support reported in the Party's fourth BUR demonstrates that it has taken into consideration the areas for enhancing the transparency of the extent of information reported, which is noted by the previous TTE in the summary report on the technical analysis of the Party's previous BUR.

¹ The consultation was conducted via videoconferencing.

C. Technical analysis of the information reported

16. The technical analysis referred to in paragraph 11(b) above aims to increase the transparency of information reported by the Parties on mitigation actions and their effects, without engaging in a discussion on the appropriateness of those actions. Accordingly, the focus of the technical analysis was on the transparency of the information reported in the BUR.

17. For information reported on national GHG inventories, the technical analysis also focused on the consistency of the methods used for preparing those inventories with the appropriate methods developed by the IPCC and referred to in the UNFCCC reporting guidelines on BURs. Chile submitted an NIR as a stand-alone document and, further to consultations with the TTE, requested a more detailed analysis and documentation of the findings contained in the NIR to be undertaken using the agreed GHG inventory tool.

18. The results of the technical analysis are presented in the remainder of this chapter.

1. Information on national circumstances and institutional arrangements relevant to the preparation of national communications on a continuous basis

19. As per the scope defined in paragraph 2 of the UNFCCC reporting guidelines on BURs, the BUR should provide an update to the information contained in the most recently submitted NC, including information on national circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis. In their NCs, non-Annex I Parties report on their national circumstances following the reporting guidance contained in decision 17/CP.8, annex, paragraphs 3–5, and they could report similar information in their BUR, which is an update of their most recently submitted NC.

20. In its fourth BUR, Chile provided an update on its national circumstances, including a description of national and regional development priorities, objectives and circumstances, including features of national geography, society, environment and economy that might affect the Party's ability to deal with mitigating and adapting to climate change. The Party also reported information regarding national circumstances and constraints on the specific needs and concerns arising from the adverse effects of climate change and the impact of the implementation of response measures as referred to in Article 4, paragraph 8, and, as appropriate, Article 4, paragraphs 9–10, of the Convention.

21. Chile's political administrative system consists of 16 administrative regions, 54 provinces and 346 communes. According to the 2017 census, the country has a total population of 17,574,003, with a high concentration of inhabitants in its Metropolitana region (40.5 per cent). Its economic model promotes trade and investment. In 2019, gross domestic product was USD 282,254 million and gross domestic product per capita USD 24,225, and mining activities accounted for 52.2 per cent of total national exports and intermediate goods accounted for 49.6 per cent of imports.

22. In addition, Chile provided a summary of relevant information regarding its national circumstances in tabular format.

23. Chile reported in its fourth BUR an update on its existing institutional arrangements relevant to the preparation of its NCs and BURs. The description covers key aspects of the institutional arrangements, including the environmental and national climate institutional frameworks. The description of the latter includes the link between the Climate Change Office of the Ministry of the Environment, the coordinating bodies on climate change (Ministerial Council for Sustainability, Interministerial Committee on Climate Change, Regional Climate Change Committees and Environmental Advisory Board) and the sectoral institutional framework. The Ministry of the Environment, through its Climate Change Office, is responsible for coordinating the preparation of national reports for submission to the UNFCCC.

24. Chile also provided an update on the legal status and roles and responsibilities of the Ministry of the Environment, the roles and level of involvement of other institutions and experts, mechanisms for information and data exchange, QA/QC procedures, and provisions for public consultation and other forms of stakeholder engagement. The TTE noted

improvements to the information reported in the BUR compared with that provided in the third BUR, including with regard to inputs from the private sector and the National Long-term Climate Strategy.

25. Information on how the continuity and permanence of the existing institutional arrangements will ensure the preparation and reporting of future BURs on a continuous basis was not reported in Chile's BUR and the reason for this was not elaborated on by the Party during the technical analysis.

26. The TTE noted that the transparency of the information reported on institutional arrangements could be enhanced by addressing the area noted in paragraph 25 above, which could facilitate a better understanding of the information reported on institutional arrangements.

27. Chile reported in its BUR an update on its domestic MRV arrangements and current and planned initiatives and steps for developing an integrated platform for climate change information. The structure of the integrated platform will be consistent with that of systems currently in operation, such as SNICHILE and the "HuellaChile" carbon footprint management programme. Information was also provided on other MRV initiatives, including CO₂ tax; mitigation actions in the energy sector; renewable energy projects; sustainable development of local energy strategies and strengthening of municipal energy management through the Commune Energy programme; and savings certificates for energy projects and MRV climate systems within the framework of the Pacific Alliance.

28. Chile reported in its BUR (pp.49, 131–132 and 190–191) information on the process for designing and implementing the National Forecasting System, with the support of the Capacity-building Initiative for Transparency project, which will form the basis for continuous analysis of historical and projected emissions for monitoring and planning purposes and for compliance with requirements under the ETF. The initiatives relating to this project will facilitate the development of general guidelines and tools to ensure consistency and comparability of GHG emission projections among different sectors and ensure transparency of the results with the involvement of various stakeholders. The TTE commends the Party for the clear and comprehensive reporting on its proactive approach to preparing for ETF implementation.

2. National greenhouse gas emissions by sources and removals by sinks

29. As indicated in table I.1, Chile reported information on its GHG inventory in its BUR fully in accordance with paragraphs 3–10 of the UNFCCC reporting guidelines on BURs and paragraphs 8–24 of the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties, contained in the annex to decision 17/CP.8.

30. Chile submitted its fourth BUR in 2021 and the GHG inventory reported is for 1990–2018. The GHG inventory is consistent with the requirements for the reporting time frame.

31. Chile submitted an NIR in conjunction with its fourth BUR. The relevant sections of the NIR were referenced in the BUR and the document was made publicly available on the UNFCCC website.²

32. GHG emissions and removals reported in the BUR covering the 1990–2018 inventories were estimated using mainly tier 1 methodologies from the 2006 IPCC Guidelines, although tier 2 and 3 methodologies were used for some categories and subcategories in the energy, IPPU, agriculture, LULUCF and waste sectors. The TTE commends Chile for using the 2006 IPCC Guidelines for reporting emissions and removals for all sectors.

33. With regard to the methodologies used, information was reported transparently in the NIR, including the equations and tiers applied for each category and subcategory. Tier 1 methodologies were used for the majority of the calculations, but tier 2 and 3 methodologies were used where country-specific AD and EFs were available: for example, for non-CO₂ GHG emissions from road transportation, CO₂ emissions from cement production, N₂O emissions from nitric acid production, CO₂ emissions from iron and steel production, CO₂

² <https://unfccc.int/BURs>.

emissions from lead production, CH₄ emissions from cattle under enteric fermentation, CH₄ and N₂O emissions from cattle and swine under manure management, CO₂ emissions and removals from living biomass for forest land, and CH₄ emissions from landfills. Information on the methodologies and tiers applied in each category and subcategory was also detailed in annex 1 to the BUR.

34. In its BUR, Chile provided a list summarizing the main sources of information and AD and referred to the NIR for more detailed information. Information on AD and the sources of AD and EFs used was clearly reported in the NIR. The TTE commends the Party for providing transparent information on methods, AD and EFs in the NIR, which facilitated the technical analysis.

35. The NIR, which is well structured, transparent and complete across all sectors and categories, also includes, for each category, information on the QA/QC procedures carried out, an explanation as to whether recalculations were performed and why, information on the effect of these recalculations and, where appropriate, an improvement plan at the subcategory level (for the energy and IPPU sectors) or category level (for the agriculture, LULUCF and waste sectors). During the technical analysis, Chile provided the TTE with a set of calculation worksheets for the 1990–2018 GHG inventories, which enhanced the transparency and clarity of its reporting and facilitated the technical analysis.

36. Information on the Party's total GHG emissions by gas for 2018 is outlined in table 1 in Gg CO₂ eq. It shows an increase in emissions of 128.2 per cent excluding LULUCF since 1990 (from 49,209.50 Gg CO₂ eq in 1990 to 112,312.60 Gg CO₂ eq in 2018). Chile provided information on trends by sector and gas in its BUR (pp.79–86) and included, as part of its NIR, explanations for these trends for each of the sectors by gas and categories reported (chaps. 3–7, pp.76–518).

Table 1

Greenhouse gas emissions by gas of Chile for 2018

<i>Gas</i>	<i>GHG emissions (Gg CO₂ eq) including LULUCF</i>	<i>% change 1990–2018</i>	<i>GHG emissions (Gg CO₂ eq) excluding LULUCF</i>	<i>% change 1990–2018</i>
CO ₂	23 007.12	181.8	87 191.74	170.3
CH ₄	14 874.63	27.5	14 758.93	28.0
N ₂ O	6 496.94	18.1	6 419.93	18.6
HFCs ^a	3 829.82	8 356 895.2	3 829.82	8 356 895.2
PFCs	0.77	NA	0.77	NA
SF ₆	111.43	550.4	111.43	550.4
Other	NA	NA	NA	NA
Total	48 320.72	541.6	112 312.62	128.2

^a HFC emissions amounted to only 0.05 Gg CO₂ eq in 1990.

37. Information on other emissions was clearly reported for the time series 1990, 1994, 2000, 2010, 2013, 2016 and 2018 (BUR, annex 3, pp.252–284). For 2018 the Party reported 302.16 Gg NO_x emissions, 992.16 Gg carbon monoxide emissions and 406.74 Gg non-methane volatile organic compound emissions. Chile also reported SO₂ emissions in the amount of 363.97 Gg and black carbon emissions in the amount of 15.30 Gg for 2018.

38. Chile applied notation keys in tables in both the NIR and the BUR where numerical data were not provided, except in annex 4 to the BUR. The use of notation keys was consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties. The Party explained in annex 2 to the BUR that emissions for certain categories or subcategories were reported as “NE” and “IE” owing to lack of AD and lack of disaggregated data, respectively. Table A.2 in annex 2 to the BUR provided information on the subcategory where emissions for categories or subcategories reported as “IE” were reported. Chile stated that it will endeavour to estimate emissions for categories and subcategories reported as “NE” as a priority in future GHG inventories, on the basis of a cost–benefit analysis, in order to improve the completeness of its reporting. The TTE commends Chile for clearly reporting on the use

of notation keys, especially the use of “NE” and “IE”, which enabled the TTE to better understand the information reported.

39. In accordance with the information provided by the Party in annex 2 to the NIR, the TTE noted that information on emissions and removals for the following subcategories and categories was not reported in Chile’s fourth BUR, recognizing that the 2006 IPCC Guidelines do not contain a methodology specific to many of these categories and subcategories: 1.A.3.b.vi urea-based catalysts (CO₂); 1.A.5.a stationary (other) (CO₂, CH₄, N₂O); 1.B.1.a.i.3 abandoned underground mines (CH₄); 1.B.1.b uncontrolled combustion and burning coal dumps (CO₂); 1.B.2.a.iii.1 oil exploration (CO₂, CH₄); 1.B.2.a.iii.3 oil transport (CO₂); 1.B.2.a.iii.4 oil refining (CO₂); 1.B.2.a.iii.5 distribution of oil products (CO₂, CH₄); 1.B.2.a.iii.6 other (oil) (CO₂, CH₄); 1.B.2.b.iii.1 natural gas exploration (CO₂, CH₄); 1.B.2.b.iii.4 natural gas transmission and storage (CO₂); 1.B.2.b.iii.6 other (natural gas); 2.A.4.a ceramics (CO₂); 2.A.4.b other uses of soda ash (CO₂); 2.A.4.d other (other process uses of carbonates) (CO₂); 2.G.3.b propellant in aerosol products (N₂O); 3.C.4 other (rice cultivation); 3.D.1.b.ii sewage sludge applied to soils (direct N₂O emissions from managed soils); 3.D.1.b.iii other organic fertilizers applied to soils (direct N₂O emissions from managed soils); 3.D.2.a.ii.2 sewage sludge applied to soils (indirect N₂O emissions from managed soils); 3.D.2.a.ii.3 other organic fertilizers applied to soils (indirect N₂O emissions from managed soils); 4.A.1.b.iii.2 other (disturbances – biomass loss – forest land remaining forest land); and 4.D.1 wetlands remaining wetlands. The Party clarified in its BUR and NIR that this is due to a lack of AD and that this issue is included in its continuous improvement plan.

40. Chile reported in its BUR (tables 4–6, chap. 2, and annexes 3–4) comparable information addressing the tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF and the sectoral reporting tables annexed to the Revised 1996 IPCC Guidelines.

41. The shares of emissions that different sectors contributed to the Party’s total GHG emissions excluding LULUCF, as reported by the Party, in 2018 are reflected in table 2.

Table 2
Shares of greenhouse gas emissions by sector of Chile for 2018

<i>Sector</i>	<i>GHG emissions (Gg CO₂ eq)</i>	<i>% share^a</i>	<i>% change 1990–2018</i>
Energy	86 954.26	77.4	158.6
IPPU	6 611.33	5.9	197.2
Agriculture	11 789.42	10.5	–0.4
LULUCF	–63 991.90	NA	6.3
Waste	6 957.61	6.2	358.0

^a Share of total emissions without LULUCF.

42. Chile reported information on its use of GWP values consistent with those provided by the IPCC in its AR4 based on the effects over a 100-year time-horizon of GHGs. The Party provided the GWP values used in the BUR (table 1, chap. 2). Chile did not report emissions using the GWP values provided by the IPCC in its AR2, as required in decision 17/CP.8, annex, paragraph 20; however, it reported in NIR table 8 the names of two files of its electronic tabular registry system used for internal purposes containing emission totals calculated using GWP values from both the AR2 and the AR5, which were not available in the NIR. The Party also provided data on all emissions in units of mass, which allow total emissions expressed in CO₂ eq to be estimated using the GWP values provided in the AR2, if required.

43. For the energy sector, which is the main GHG-emitting sector in Chile’s GHG inventory, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, EFs and notation keys. Chile reported emissions from stationary (from energy industries, manufacturing industries and construction and other sectors) and mobile (from transport) combustion, as well as fugitive emissions from coal mining and oil and natural gas systems. The main driver of the increase in emissions from the energy sector from 1990 to 2018 (158.6 per cent) was a sustained increase in energy consumption in the country,

including coal and natural gas for electricity generation and liquid fuels (mostly diesel oil and gasoline) for road transportation. The main source of AD for the energy sector emission estimates is the national energy balance, supplemented by additional information from, for example, the National Institute of Statistics. For almost all categories in the energy sector, Chile applied the tier 1 methodology with default EFs from the 2006 IPCC Guidelines. A tier 2 methodology was applied only to CO₂ emissions from subcategory 1.A.1.c.i manufacture of solid fuels and non-CO₂ emissions from subcategory 1.A.3.b road transportation, for which the Party used country-specific EFs for each vehicle type.

44. During the technical analysis, the TTE identified some issues with the accuracy of the AD used throughout the time series. For example, Chile applied the range 2004–2013, instead of 2004–2018, to determine the share of fuel consumption of processing plants in the energy sector prior to 2004. In the past, biofuels were reported in the national energy balance under biomass without explicit differentiation of types; however, since 2017, Chile has enhanced the reporting of biofuels, disaggregating these per type. During the technical analysis, the Party clarified that biofuels were included in the calculations for all relevant years of the time series. Trips to Antarctica and overseas territories were considered under international aviation or navigation, instead of domestic aviation and navigation. During the technical analysis, the Party clarified that it is aware of these issues and has identified possible improvements and indicated that it will continue working to resolve these aspects for next BUR and NIR cycle.

45. For the IPPU sector, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, EFs and notation keys. Chile reported emissions for many categories in this sector, including mineral industry (production of cement, lime and glass), chemical industry (production of nitric acid, methanol and ethylene), metal industry (production of iron and steel, and ferroalloys), non-energy products from fuels and solvent use (use of lubricants and waxes), product uses as substitutes for ODS (refrigeration and air conditioning, foam blowing agents, fire protection, aerosols and solvents) and other product manufacture and use (electrical equipment). The main emission sources in the IPPU sector have changed over the years. Until 2006, the main sources were the metal and chemical industries, but since 2008 use of F-gases and the mineral industry have been the main contributors. Owing to international market competition for iron and steel, and a decrease in methanol production from natural gas, emissions from the metal and chemical industries have decreased significantly since 2008. In 2018, the major source of emissions in the IPPU sector was the use of F-gases under category 2.F product uses as substitutes for ODS (57.9 per cent), followed by category 2.A mineral industry (22.9 per cent). F-gas emissions in category 2.F product uses as substitutes for ODS mainly stem from refrigeration and air conditioning.

46. Tier 1, 2 and 3 methodologies from the 2006 IPCC Guidelines and both country-specific and default EFs were used for estimating GHG emissions from the IPPU sector. Tier 2 methodology was used for estimating CO₂ emissions for categories 2.C.1 iron and steel production and 2.C.5 lead production and, for the first time, 2.F.1 refrigeration and air conditioning. Tier 3 methodology was used for category 2.B.2 nitric acid production. For the first time, PFC emissions were reported under category 2.F product uses as substitutes for ODS, and N₂O emissions from medical applications under category 2.G.3 N₂O from product uses, which were both previously reported as “NE”. Chile also improved its GHG inventory by including a complete mass balance of the carbon contained in raw materials and output products (iron and steel pellets), in which the remaining carbon is converted to CO₂ on the basis of the corresponding stoichiometry. The TTE noted that information on QA/QC procedures was not always transparent in the BUR. For example, it was not clear if all IPPU categories were subject to QA/QC procedures. During the technical analysis Chile clarified that all IPPU categories were subject to QA/QC procedures. The TTE noted that the clarity of the information on QA/QC procedures would be enhanced by describing the procedures for all GHG inventory categories. At the same time, the TTE noted an improvement in the transparency of the Party’s reporting on the procedures and arrangements undertaken to collect and archive data and on data exchange procedures in its fourth BUR compared with those in its previous BUR.

47. The TTE identified that emissions for subcategories 2.A.4.a ceramics and 2.A.4.d other (sugar, pulp and paper, construction) were reported using the notation key “NE” owing to a lack of AD (BUR, annex 2, p.248). The TTE also identified an issue relating to accuracy owing to the estimates and assumptions made to fill some AD gaps for categories 2.D.2 paraffin wax use and 2.B.2 nitric acid production. During the technical analysis, the Party clarified that it is aware of these issues and explained that these issues are related to the limited availability of AD.

48. Chile reported that there is no domestic production of F-gases and that any F-gases are therefore imported. With respect to the inventory reported in the previous BUR, the TTE noted that Chile implemented some improvements regarding the breakdown of category 2.F.1 refrigeration and air conditioning by type of application, which were possible owing to the coordinated work between SNICHILE and the National Ozone Unit within the Climate Change Office of the Ministry of the Environment. Emissions relating to the use of PFCs were reported in the GHG inventory on the basis of import and export customs data, albeit such emissions are fairly low and occur sporadically. Chile applied tier 2a methodology for category 2.F.1 refrigeration and air conditioning, which uses default EFs, in accordance with the 2006 IPCC Guidelines, but disaggregated the activities by type of application. Tier 1 methodology was applied for all other subcategories under category 2.F product uses as substitutes for ODS, using both country-specific and default EFs, in accordance with the 2006 IPCC Guidelines.

49. Chile reported emission or removal estimates separately for the agriculture and LULUCF sectors, instead of emission or removal estimates for the AFOLU sector, including information in separate chapters of the NIR (chap. 5 for agriculture and chap. 6 for LULUCF) and covering all AFOLU categories in the 2006 IPCC Guidelines. The TTE noted that this facilitated the analysis of total net GHG emissions including and excluding LULUCF and enhanced understanding of the information reported. The Party used the common reporting format categorization for naming categories in the agriculture and LULUCF sectors in accordance with the UNFCCC Annex I inventory reporting guidelines, which are used in this report, instead of the codes of categories for the AFOLU sector provided in the 2006 IPCC Guidelines.

50. For the agriculture sector, enteric fermentation (CH₄) and agricultural soils (N₂O) were identified as key categories and the most relevant emissions sources in the sector for 2018 (accounting for 42.16 and 39.84 per cent, respectively, of total sectoral emissions), as well as for 1990 (50.76 and 37.94 per cent, respectively, of total sectoral emissions). Chile applied a combination of tier 1 and 2 methodologies from the 2006 IPCC Guidelines and used both country-specific and default EFs. Tier 2 methodology was applied for estimates of CH₄ emissions from cattle under category 3.A enteric fermentation and CH₄ and N₂O emissions from cattle and swine under category 3.B manure management.

51. During the technical analysis, the TTE noted that direct and indirect N₂O emissions from sludge and other organic fertilizers applied to agricultural soils under subcategories 3.D.1.b.ii sewage sludge applied to soils, 3.D.1.b.iii other organic fertilizers applied to soils, 3.D.2.a.ii.2 sewage sludge applied to soils and 3.D.2.a.ii.3 other organic fertilizers applied to soils were reported using the notation key “NE”. In the NIR, the Party did not provide any information on future plans to estimate such emissions. During the technical analysis, the Party clarified that it will correct the issues noted above in the next GHG inventory cycle.

52. The TTE noted that Chile included clear information on GHG emissions, methodological tier levels, AD and their sources, EFs, key categories, notation keys used and other information specific to the agriculture sector. Information on manure management systems used in the country for different animal subcategories and a description of the animal subcategories were not provided in the NIR; however, information on manure management systems was provided to the TTE during the technical analysis. It was not clear to the TTE why the Party did not report such information in the NIR. Additionally, the Party indicated that expert judgment was used to disaggregate animal subcategories, including swine and cattle.

53. For the LULUCF sector, Chile reported GHG emissions and removals for 1990–2018. The LULUCF sector has consistently been a net sink during this period, owing mainly to

increases in biomass in native forests and the area of forest plantations. In 2018, net removals from the LULUCF sector offset 57.0 per cent of emissions from all other sectors. Removals from the LULUCF sector increased by 55.9 per cent from 1990 to 2018 (from –105,456.76 to –164,365.36 Gg CO₂ eq). Overall, net removals from the LULUCF sector have fluctuated between a minimum of 11,710.30 Gg CO₂ eq in 2017 (owing to extremely high emissions from forest fires) and a maximum of 76,966.43 Gg CO₂ eq in 2010. Net removals from forest land were 61,334.30 Gg CO₂ eq in 2018 and increased by 0.2 per cent from 1990 to 2018, owing mainly to the increase by 76.5 per cent in the area of forest plantations (from 1,734,816 ha in 1990 to 3,062,596 ha in 2018) and the increase in biomass in native secondary forests (27.1 per cent between 1990 and 2018), national parks, reserves and forests under management, but also to the decrease in land conversions to forest land since 2016 and increase of log harvesting in 2018.

54. Chile applied tier 1 and 2 methodologies and used both default and country-specific EFs for estimating CO₂, CH₄, and N₂O emissions in the LULUCF sector (NIR table 305). Chile provided in the NIR information on the methods used for determining a consistent land representation at the national level. These methods are based mainly on cadastral information provided by the National Forestry Corporation, which is required to be updated at least every 10 years. The Party also provided detailed information on forest distribution across the country and the methods used for land representation, as well as information on climate zones (pp.381–387). The TTE commends Chile for its efforts to provide more detailed information on forest distribution and land representation, including information regarding grassland climate zones. The reporting covers all land-use categories and land-use changes provided in the 2006 IPCC Guidelines. In addition, the Party reported in the NIR that satellite imagery and ground truthing information were used to classify land use and different vegetation formations. This methodology allowed the production of land-use and land-cover maps that reflect the land use and land cover determined by human action or natural events at the time of images acquisition. The Party provided disaggregated information on grassland and scrubland in the NIR, which was an improvement compared with the previous NIR.

55. Chile used approach 3 from the 2006 IPCC Guidelines with spatially explicit land-use conversion data for land representation. The Party enhanced its previous approach and used a multi-index integrated change analysis model to identify changes using Landsat 8 satellite imagery. Chile provided information on land-use category transition matrices for 2017–2018 (NIR table 309, p.389). It was not clear to the TTE the reason why the NIR did not include information on land-use category transition matrices since 1990. During the technical analysis, the Party clarified that land-use category transition matrices are available for all years since 1990 as part of the national tabular registry system in which Chile archives data for its GHG inventory. In addition, Chile indicated that it is in the process of updating information on land uses from 2018 to 2020 using the Integrated Monitoring System of Native Forest Ecosystems method, which allows the identification of land-use changes by region.

56. In 2018, other land, forest land and grassland covered 35.1, 25.7 and 28.0 per cent of the national territory, respectively. The remaining 11.2 per cent was identified as cropland, wetlands and settlements. Despite the area of other land being the largest among the areas of the other land uses in the national territory, emissions from other land accounted for only 0.4 per cent of total emissions and removals from the LULUCF sector in 2018. Chile provided in its NIR and BUR a definition of each land-use category, including the definition of other land. It also provided disaggregated data for land converted to other land (NIR table 364), which was an improvement compared with the previous NIR. The TTE identified abrupt changes in emission trends for land converted to other land in NIR figures 170–171 (pp.449–450); however, a detailed explanation was not provided for such changes in trends for 2001–2002, 2007–2008 and 2016–2017.

57. For the waste sector, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, EFs, key categories and notation keys. In 2018, the major emissions source in the sector was solid waste disposal (67.4 per cent), followed by wastewater treatment and discharge (30.1 per cent). Chile reported emissions for all categories in the waste sector (solid waste disposal, biological treatment of solid waste, incineration and open burning of waste, and wastewater treatment and discharge). The main

driver of the increase in emissions from 1990 to 2018 (358.0 per cent) is the increase in population and thus in waste generation, which was partially offset by the implementation of CH₄ recovery from waste disposal sites and of low-emitting wastewater treatment installations from 2007 to 2013. Chile applied a combination of tier 1 and 2 approaches from the 2006 IPCC Guidelines and used both default and country-specific EFs. Tier 2 methodology was applied for key categories (solid waste disposal, and wastewater treatment and discharge), and tier 1 for the remaining categories in the sector.

58. The TTE identified some issues relating to the AD and EFs used in the waste sector. The TTE noted that the Party used the Spanish language version of the 2006 IPCC Guidelines as its main reference, but this version does not contain the various corrigenda to the 2006 IPCC Guidelines that are only included in the English version published online. Chile therefore did not use the correct N₂O EF for composting. During the technical analysis the Party indicated that this will be corrected in the next GHG inventory cycle. The TTE noted that Chile considered textiles and wood in disposal sites under “bulk waste” and therefore did not break down and report data using the specific degradable organic carbon and CH₄ generation rate values for each type of waste, but instead used the values for “bulk waste”. In addition, the TTE identified a lack of data for clinical waste and inconsistency in the data for sludge from industrial wastewater across the time series. The approaches to filling data gaps related to these activities were not always aligned with the good practice recommendations in the 2006 IPCC Guidelines. During the technical analysis, Chile stated that in its next BUR and NIR it will implement the required improvements to its GHG inventory on the basis of the findings of the TTE.

59. The NIR and the BUR provide an update to all GHG inventories reported in the Party’s previous NCs and BURs. The information reported provides an update of the third BUR, which addressed anthropogenic emissions and removals for 1990–2016. The update was carried out for 1990–2016 using the methodologies contained in the 2006 IPCC Guidelines, thus generating a consistent 29-year time series in the fourth BUR. The Party reported that it recalculated emissions from all sectors for 1990–2016, mainly owing to the inclusion of new categories, improvements in the methodology and changes in EFs. Recalculations resulted in a decrease of estimated emissions for 2016 by 23 per cent.

60. Chile described in its BUR the national institutional framework for the preparation of its GHG inventory. The Party reported that the Ministry of the Environment, through its Climate Change Office, is the governmental body responsible for Chile’s GHG inventory through SNICHILE. The institutional, legal and procedural arrangements established for the GHG inventory preparation are covered by SNICHILE and aim to ensure that the preparation of national GHG inventories is sustainable and maintain the consistency and quality of the GHG data and results reported. The core work of SNICHILE is divided into five lines of action: operation of the system, updating the GHG inventory; performing QA/QC procedures; creating and maintaining capacities; and archiving and disseminating information. The GHG inventory is the result of collective and continuous efforts by the Ministries of Agriculture, Energy and the Environment, which work co-ordinately within the framework of SNICHILE and strengthen the preparation of the inventory by engaging national sectoral expertise from within their own ministries. SNICHILE comprises a national technical team (technical coordination team, AFOLU coordination team and sectoral technical teams), a reporting coordination team, the Council of Ministers for Sustainability, and internal and external experts.

61. Chile clearly reported that a key category analysis was performed for both the level of and trend in emissions using approaches 1 and 2 from the 2006 IPCC Guidelines. Annex 1 to the NIR provides detailed information on the methodology and assumptions used in the calculations.

62. The BUR provides information on QA/QC procedures for all sectors. The information reported indicates that, since 2015, SNICHILE has implemented the QA/QC system for inventory preparation in accordance with the 2006 IPCC Guidelines. In annex 11.01 to the NIR, Chile included information on all QC activities carried out by experts involved in inventory development. Table 66 in annex 11.02 includes information on the QA processes carried out on the GHG inventory. The Party reported on a new QA process undertaken since the previous ICA process, which was carried out as part of the work of the Latin American

Network on GHG Inventories. The TTE commends Chile for providing information in accordance with the 2006 IPCC Guidelines.

63. Chile clearly reported in the NIR information on CO₂ fuel combustion using both the sectoral and the reference approach. The information reported indicates that the CO₂ combustion emissions estimated under the sectoral and reference approaches in 2018 are 84,104.8 and 84,846.7 Gg CO₂ eq, respectively. Chile included in its NIR a comparative analysis of the results of the two approaches. The largest difference occurred in 2010 (–8.3 per cent) and was caused by the correction of certain natural gas and diesel oil consumption figures under the subcategories 1.A.2.i mining (excluding fuels) and quarrying and 1.A.3.e.ii off-road, since the values of fuel consumption for 2010 fell significantly outside of the range for the indicated uses, owing to methodological errors in the energy balance data for 2010. Differences of –6.7 and –5.3 per cent were also identified in 2013 and 2014, respectively, which were due to the correction of the allocation of petroleum coke under category 1.A.2.m non-specified industry and interpolation corrections for those years with respect to the consumption of coal and diesel oil under category 1.A.2.i mining (excluding fuels) and quarrying. The TTE commends Chile for providing more detailed information relating to the differences between both approaches across the time series.

64. Information was clearly reported on international aviation and marine bunker fuels. Chile reported GHG emissions from fossil fuel consumption in international aviation and navigation as memo items, and such emissions were excluded from the national totals. In 2018, GHG emissions from international aviation amounted to 1,798.6 Gg CO₂ eq, representing an increase of 433.0 per cent since 1990, mainly caused by the increased number of international flights, as more of the population becomes able to afford to fly abroad. In 2018, GHG emissions from international navigation amounted to 888.9 Gg CO₂ eq, following a significant decrease since 2008, when the highest level of emissions from this activity was achieved. The general decreasing trend in emissions from international aviation and navigation observed since 2009 is due to international market competition regarding bunker fuel selling prices, which has led to a decrease in fuel sales in Chile, but an increase in sales in neighbouring countries.

65. Chile reported information on the uncertainty assessment (level and trend) of its national GHG inventory. The uncertainty analysis was based on approach 1 (error propagation method) of the 2006 IPCC Guidelines and covers all categories and all direct GHGs. The results obtained, as reported in the BUR and the NIR, show an asymmetric uncertainty range of –86.5 to +86.8 per cent. Information on how uncertainty was estimated was reported in annex 2 to the NIR, including on the values and sources of uncertainty for each emission source and sink estimate; however, it was not clear why and how Chile dealt with asymmetric uncertainties, considering the use of the propagation error method (approach 1 of the 2006 IPCC Guidelines), which considers in principle a symmetric distribution of the uncertainty range.

66. The TTE noted that the transparency of the information reported on GHG inventories could be further enhanced by addressing the areas noted in paragraphs 42, 44, 46, 47, 51, 52, 55, 56 and 65 above, which could facilitate a better understanding of the information reported on GHG inventories.

67. In paragraph 63 of the summary report on the technical analysis of Chile's third BUR, the previous TTE noted areas where the transparency of the reporting on GHG inventories could be enhanced. The current TTE noted the improvements referred to in paragraphs 46, 48, 49, 54, 56, 59, 62 and 63 above and commends the Party for enhancing the transparency of its reporting.

3. Mitigation actions and their effects, including associated methodologies and assumptions

68. As indicated in table I.2, Chile reported in its BUR, mostly in accordance with paragraphs 11–13 of the UNFCCC reporting guidelines on BURs, information on mitigation actions and their effects, to the extent possible.

69. The information reported provides a comprehensive overview of the Party's mitigation actions and their effects. Most of the mitigation actions are in the energy sector.

In its BUR, Chile reported information on its intention to become carbon neutral by 2050, which is included in its draft Climate Change Framework Law. Additionally, the Party has a long-term vision commitment focused on two main pillars: reducing GHG emissions and increasing natural carbon stocks. Chile has also made a voluntary commitment to reduce its emissions by 20 per cent by 2020 below the ‘business as usual’ scenario developed with 2007 as the base year. The TTE noted that Chile updated the 1990–2018 ‘business as usual’ scenario in its BUR; therefore, the estimated emission reductions reported in the BUR are not comparable with those reported in previous BURs. When compared with the ‘business as usual’ scenario with 2007 as base year, the emission balance is lower for all years except for 2015 and 2017 and so the emission balance and objective of a 20 per cent reduction by 2020 have been met. Chile reported that climate change has been mainstreamed and integrated in its development plans, including mitigation, and its NDC would be aligned with the National Long-term Climate Strategy, which establishes that the country plans to become carbon neutral by 2050.

70. Chile reported in its BUR that in September 2015 it presented its first NDC, with a mitigation commitment represented by a carbon intensity indicator. The updated NDC reported in 2020 presents a comprehensive structure with mitigation and adaptation components and integrated commitments (cross-cutting issues), and a social pillar of just transition and sustainable development. Chile’s mitigation target includes an unconditional commitment of a GHG emission budget of no more than 1,100 Mt CO₂ eq between 2020 and 2030, with GHG emissions peaking in 2025 and a goal of reaching a GHG emission level of 95 Mt CO₂ eq in 2030. The updated NDC also considers public policies regarding climate and clean air, with the objective of mitigating short-lived climate pollutants, specifically black carbon. The commitment aims to reduce GHG emissions by at least 25 per cent by 2030 compared with the 2016 level.

71. Chile reported detailed information on its sectoral mitigation actions in tabular format in its BUR (chap. 3 and annex 5) in accordance with decision 2/CP.17, annex III, paragraph 11. These mitigation actions were divided into seven groups or sectors: energy; transport; mining; buildings, urbanization and public infrastructure; use of F-gases; AFOLU, covering actions in the LULUCF and agriculture sectors (see para. 90 below); and waste. Comprehensive qualitative information on mitigation actions and their effects was provided in both narrative and tabular format in BUR chapter 3, where information on climate change mitigation policies and measures at the local and regional level, and in the private sector, was also provided; however, these are not listed in annex 5, where Chile reported complementary information with detailed information on the progress of the mitigation actions, their objectives and goals, implemented actions, GHGs covered, expected or achieved reductions, and methodologies and assumptions.

72. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Chile clearly reported the names of mitigation actions and sectoral coverage in BUR chapter 3 and annex 5. Information on progress indicators was also reported in annex 5, but this information was not clear (see para. 74 below). A clear description of mitigation actions, including information on quantitative goals, was provided in the BUR. The TTE noted that information on subgroups or subsectors was provided for mitigation actions in the transport and mining sectors, which enhanced the clarity of the information provided. The TTE commends the Party for this effort.

73. Information on gases covered was not reported in Chile’s BUR for most mitigation actions. In some instances where information was provided, the gases covered were not reported accurately (for example, SF₆ was reported as a GHG covered by mitigation actions in the transport sector and in other instance CH₅ and CH₆ were reported as gases covered for some mitigation actions in the energy sector, which is probably a typographical error). During the technical analysis, the Party clarified that some oversights occurred in the reporting of the coverage of gases and that this was a QC issue of the report rather than a capacity issue. However, the TTE also noted that the Party reported in its fourth BUR information on the gases covered for some mitigation actions, for which the third BUR did not contain information on the gases covered, such as the National Energy Policy 2050 and the Geothermal Energy Concession Management System. The TTE further noted that information on black carbon was reported for two mitigation actions, namely the 2018–2022

Energy Pathway and the Residential Heating Matrix Transition Plan. The TTE recognizes the Party's efforts to provide information on GHGs and non-CO₂ GHGs that were not reported in the previous BUR.

74. The TTE also noted that information on progress indicators and goals, both quantitative and qualitative, was provided in the same column of the tabular format used for reporting on mitigation actions and, in some cases, the indicators reported were not clear (e.g. Chile reported "not envisaged" as the goal for the mitigation action "Improvement and implementation of bike paths and multipurpose paths" in table A.5.2 in annex 5 to the BUR). During the technical analysis, Chile clarified that its data collection process does not allow for differentiation between indicators and goals.

75. Information on methodologies and assumptions was only provided for some sectoral mitigation actions (BUR, annex 5). During the technical analysis, Chile clarified that it faced challenges in identifying methodologies and assumptions for sectoral mitigation actions owing to human resource constraints in subnational institutions, and so decided only to monitor policies with the most significant GHG reduction effects.

76. In general, Chile clearly reported information on the objectives of the actions and steps taken or envisaged to achieve them for most sectoral mitigation actions. However, information on the results achieved, such as estimated outcomes and emission reductions, was not reported for most mitigation actions. During the technical analysis, Chile highlighted that, in 2020, it faced human capacity constraints, as the national experts responsible for estimating outcomes and emission reductions were working on the elaboration of Chile's 2020 updated NDC and Carbon Neutrality Plan, which hindered the Party's progress in reporting information on the results achieved by mitigation actions.

77. Information on mitigation actions in the energy sector was presented in BUR section 4.1.1 (chap. 3) and in table A.5.1 in annex 5 to the BUR. The Ministry of Energy is the institution responsible for the normative and regulatory aspects of energy policies and measures in Chile, and the private sector plays a key role as an investor in the sector. Chile reported that, in December 2019, the installed capacity for energy generation using fossil fuels was 51 per cent (of which 20 per cent coal, 20 per cent natural gas and 11 per cent oil) and using renewable energy sources was 49 per cent (of which 27 per cent hydroelectric, 11 per cent wind power, 8.5 per cent solar and 2.5 per cent biomass). The Party described in the BUR that its net billing law (law 21118), which aims to support the decarbonization of Chile's energy matrix by enabling self-generation of electricity through renewable energy sources up to a capacity of 300 kW, recorded a total energy generation of 42 MW distributed across 1,977 self-generation installations in 2019. Chile's National Energy Policy defines the vision for the energy sector by 2050 and is supported by policies such as the 2018–2022 Energy Pathway, Carbon Neutrality Plan, Just and Sustainable Transition Strategy for the Energy Sector, Renewable Energy Strategy for Heating and Cooling, and National Green Hydrogen Strategy. It remained unclear to the TTE how the National Green Hydrogen Strategy will differentiate between hydrogen produced from fossil fuels and that from renewable energy sources. During the technical analysis, Chile provided additional information on this Strategy, emphasizing its aim of producing hydrogen from renewable energy sources only.

78. The Party also reported detailed information on 27 mitigation actions in a tabular format in table A.5.1 in annex 5 to the BUR, covering a wide variety of areas, including transformational pathways for energy systems, energy efficiency and renewable energy. For most mitigation actions in the energy sector, the Party reported information on the objectives of the actions and steps taken or envisaged to achieve them, progress of implementation and underlying steps taken or envisaged to achieve them, and results achieved or envisaged to be achieved, such as estimated emission reductions. Regarding the latter, the mitigation action National Energy Policy 2050 had the highest estimated emission reduction in the energy sector of any mitigation action: 17,330.00 kt CO₂ eq by 2030 compared with the emissions in the 'business as usual' scenario with 2007 as the base year.

79. Information on progress in implementing the mitigation action law 20698 on extending the energy matrix to non-conventional renewable sources was not clearly reported in the BUR. During the technical analysis, the Party clarified that no additional information

on progress was required in the BUR, as the goal established for 2025 under this law has already been met, and that Chile was currently considering a potential update to set a new, more ambitious target.

80. Information on mitigation actions in the transport sector was reported in BUR section 4.1.2 (chap. 3) and table A.5.2 in annex 5 to the BUR. The Ministry of Transportation and Communications, through the Undersecretary of Transport, is responsible for developing policies and measures that contribute to the development of efficient, safe and sustainable transportation systems in Chile. The Party highlighted the close relationship between the Ministry of Transportation and Communications, the Ministry of Energy and the Ministry of the Environment. Their collaborative work is highlighted, for example, in strategic guideline 34 of the National Energy Policy 2050, which defines Chile's commitment to improving the energy efficiency of vehicles by 2050, and the National Strategy for Electromobility (adopted in 2017), which outlines the actions required to achieve the targets of a 40 per cent share of private vehicles running on electricity by 2050 and a 100 per cent share of urban public transport vehicles running on electricity by 2040.

81. Information on 20 mitigation actions for the transport sector was reported in table A.5.2 in annex 5 to the BUR, covering air, land and maritime transportation measures, such as enhancing public transportation to reduce air pollution and related GHG emissions, establishing a workplan to address GHG emissions in maritime transportation and implementing a green tax for new private vehicles. Most of the mitigation actions listed in table A.5.2 have already been implemented or are being implemented. The Party clearly reported information on the objectives of the mitigation actions in the transport sector and steps taken or envisaged to achieve them, progress in their implementation and underlying steps taken or envisaged to achieve them.

82. The Party also reported the results of implementing one mitigation action in terms of emission reductions. The estimated GHG emission reductions resulting from the mitigation action Emissions Report on the Public Bus Transport System of Greater Santiago amount to 46,392.00 kt CO₂ eq; however, it was not clear if these estimated emission reductions have already occurred or, if not, whether they are expected to occur and by when. The TTE noted that these estimated reductions are significantly higher than the estimated reductions resulting from the National Energy Policy 2050 (17,330.00 kt CO₂ eq). It was not clear to the TTE why these reported estimated reductions were significantly higher than other sectoral mitigation actions, as the Party did not confirm or provide additional information on the reported estimated reductions. The TTE also noted that information on subsectors was reported for the mitigation actions in the transport sector. The TTE commends the Party for the additional effort of reporting information on subsectors in the transport sector in the BUR, as it enhanced the transparency of the information reported.

83. Mitigation actions in the mining sector are mainly focused on reducing the amount of electricity consumed and fuels combusted in extraction and production processes and promoting renewable energy sources. Most were reported as being under implementation. Chile reported information on eight mitigation actions in table A.5.4 in annex 5 to the BUR. Chile is the world's largest producer of copper and its electricity consumption for this purpose is expected to increase by 38 per cent from 23.9 TWh in 2019 to 33.10 TWh by 2030. The importance of implementing renewable energy technologies and energy efficiency strategies in the mining sector was therefore emphasized by Chile in the BUR. Solar energy and wind energy are expected to provide around 50 per cent of the energy used by the copper mining sector by 2023.

84. Chile also highlighted that concentrated solar power technology is a potential option for complementing other renewable energy sources to assist in providing continuous energy to the mining industry throughout the day. The GHG Mitigation Plan for the Energy Sector, implemented in 2017, contains a series of policies and measures designed to improve energy efficiency in the mining sector, including a minimum energy efficiency standard for small (7.50 kW) and medium (75 kW) engines, the Energy Efficiency Action Plan 2020, and enabling financing options for energy efficiency programmes. Chile indicated in the BUR that the use of solar-generated hydrogen as an alternative fuel is being considered as a substitute for fossil fuels as a new policy for the mining sector. The Party clearly reported

information on the objectives of the mitigation actions in the mining sector and steps taken or envisaged to achieve them.

85. The mitigation actions for the buildings, urbanization and public infrastructure sector are presented for public works and for housing and urban planning, and are focused mostly on energy efficiency, sustainable building practices and the promotion and use of renewable energy, as highlighted in the National Urban Development Policy. Chile provided detailed information on 17 mitigation actions under this sector in tables A.5.5–A.5.6 in annex 5 to the BUR, and most were reported as implemented or planned. The Ministry of Public Works and the Ministry of Housing and Urban Planning, in coordination with the Ministry of the Environment, are responsible for the design and implementation of policies and measures for this sector.

86. The National Strategy for Sustainable Building was developed in 2013 to guide sustainable construction practices in Chile. The 2017–2022 Climate Change Infrastructure Services Adaptation and Mitigation Plan promotes the use of renewable energy sources, integration of energy efficiency measures and reduction of GHG emissions in the public infrastructure design and construction process. Chile also published the Sustainable Building Standards for Houses in 2016 as part of the National Strategy for Sustainable Building. Other initiatives that result in GHG emission reduction are described in BUR table 16 (chap. 3). The Party clearly reported information on the objectives of the mitigation actions for the buildings, urbanization and public infrastructure sector and steps taken or envisaged to achieve them, and progress of implementation and underlying steps taken or envisaged to achieve it. Information on an additional four mitigation actions being implemented by other actors (such as the Board of Directors of the Production Development Corporation) under this sector was reported in a tabular format in BUR table 16 (chap. 3), but not in its annex 5.

87. Chile provided information on mitigation actions related to the use of F-gases in its fourth BUR that was not reported in the previous BUR. The Ministry of the Environment is responsible for the implementation of the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer through six main initiatives: identifying uses of HFCs in the country by sector and subsector through a national survey on alternative gases to ODS for the national and HFC inventories; modifying, with the support of the Ministry of Finance, the customs tariff and specific descriptors of HFCs; implementing regulations to support the implementation of the Kigali Amendment; implementing a range of measures to raise awareness of and build capacity to implement the requirements of the Kigali Amendment, including for the HFC customs control regulations among experts from the Ministries of the Environment, Energy and Health and from Customs, and for developing the required skills for the installation and maintenance of cooling systems; improving energy efficiency through the implementation of the National Cooling Plan, which was developed in 2020 by the Ministry of Energy; and implementing relevant projects supporting the reduction of the use of HFCs in refrigeration technologies used in various industrial and commercial applications.

88. Chile provided detailed information on eight mitigation actions related to the use of F-gases in table A.5.7 in annex 5 to the BUR. The mitigation actions focus mainly on reducing the use of HFCs, raising awareness of and building capacity on the use of HFCs, and delivering financing options to substitute the use of HFCs, and were reported as implemented, under implementation or planned. The Party clearly reported information on gases covered, the objectives of the mitigation actions related to the use of F-gases, steps taken or envisaged to achieve them, and progress of implementation. The TTE commends Chile for its efforts to include information on mitigation actions related to the use of F-gases in its fourth BUR.

89. Reduction commitments under the AFOLU sector (mainly related to forest land) are guided by Chile's updated 2020 NDC, which includes objectives such as promoting the sustainable management and recovery of native forest lands and the afforestation of 70,000 ha of uncovered soils, with estimated annual GHG emission reductions of between 3.0 and 3.4 Mt CO₂ eq by 2030. Chile's National Strategy on Climate Change and Vegetational Resources includes 26 mitigation measures and is one of the instruments implemented to achieve the AFOLU commitments included in the updated 2020 NDC. As part of the implementation of this Strategy, Chile has conducted a variety of projects, including the

Sustainable Land Management Project and the National Programme under the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries. Other mitigation measures under the AFOLU sector include the 2015–2035 National Forest Policy and the National Landscape Scale Restoration Plan 2021–2030. In BUR tables 10–11 (chap. 3) detailed information on four mitigation actions in the AFOLU sector was presented, focusing mainly on National Strategy on Climate Change and Vegetational Resources measures and policies and measures relating to agriculture and food. These mitigation actions were reported as either implemented or under implementation.

90. The TTE noted that the information contained in BUR tables 10–11 (chap. 3) is consistent with the disaggregation of the AFOLU sector into LULUCF and agriculture categories. The TTE also noted that Chile aligned these categories with the categories used in the national GHG inventory, which facilitated a better understanding of the information and avoided potential methodological inconsistencies when estimating avoided GHG emissions or increased removals. The Party reported information on the name, nature and progress of implementation of the mitigation actions reported in BUR tables 10–11 (chap. 3), but did not include information on mitigation actions for the AFOLU sector in annex 5 to the BUR. During the technical analysis, the Party stated that information on mitigation actions and their effects for the AFOLU sector should have been included in annex 5.

91. The mitigation actions in the waste sector are focused mainly on the management of solid waste. The Ministry of Health is responsible for designing and implementing policies and measures for handling waste and the Ministry of the Environment is responsible for designing and implementing policies focused on the environmental impacts of waste handling. Chile emphasized in the BUR that each municipality is responsible for defining its own waste treatment practices. The Regulation on Basic Sanitary and Safety Conditions in Sanitary Landfills (supreme decree 189/2005) determines the design, construction and operation of landfills and introduces standards for the capture and flaring of biogas produced in landfills. In 2018, Chile implemented the National Solid Waste Programme as a public investment programme that aims to increase the rate of final disposal of residential solid waste in suitable facilities, to close facilities that do not meet environmental and sanitary requirements and to reduce the generation of residential solid waste. In 2019, Chile began to develop and implement its Circular Economy Road Map, which aims to create a transformational pathway for how waste is produced and treated in the country and promote more efficient use of resources. The diagnosis phase of the Road Map was completed in 2020 and the next phase will define the vision of the Road Map in line with Chile's updated 2020 NDC.

92. Other mitigation projects in the waste sector are supported by the Canada–Chile Agreement on Environmental Cooperation, which aims to reduce the amount of CH₄ produced by waste disposal, develop MRV arrangements for waste handling and treatment, promote public and private financing for waste handling projects, and provide technical assistance to relevant stakeholders. Chile reported information on six mitigation actions in table A.5.3 in annex 5 to the BUR, indicating that most of them were either implemented or planned. These actions are framed in the policies and measures indicated above and focused mainly on recycling solid waste, implementing the Circular Economy Road Map, treating organic waste, and reducing CH₄ produced in landfills under the Canada–Chile Agreement. The Party clearly reported information on the name and nature of each mitigation action in the waste sector, including a description and the objectives of the actions and steps taken or envisaged to achieve them, and progress of their implementation and underlying steps taken or envisaged to achieve them.

93. Chile also provided information on local and regional mitigation actions in BUR section 4.2 (chap. 3). The subnational mitigation actions reported are focused on reflecting local needs, taking into account the geography and economy of each region. In general terms, for reporting purposes, regions are divided in two groups: net GHG-emitting regions (Arica and Parinacota, Tarapacá, Antofagasta, Atacama, Coquimbo, Valparaíso, O'Higgins, Maule, Ñuble, Biobío and Metropolitana) and net sink regions (La Araucanía, Los Ríos, Los Lagos, Aysén and Magallanes). The mitigation actions at the local level are mainly focused on waste management, renewable energy projects and waste projects. The Party clearly mentioned the

objectives of the actions in BUR table 18 (chap. 3). However, it was not clear which actions are implemented, under implementation or planned.

94. Regarding local and regional mitigation actions, Chile is currently developing an operative structure at the subnational level through the regional committees on climate change, which oversee the coordination and implementation of climate change actions. These committees are not yet established in all regions, but it is expected that all regions will establish one, as envisaged under the draft Climate Change Framework Law. Chile has also established a Municipal Environmental Certification System, a Ministry of the Environment programme for the training and certification of municipalities in relation to the environmental management of their territories. Currently, 66.9 per cent of municipalities participate in this programme.

95. Information regarding methodologies, assumptions and steps taken or envisaged to achieve the local and regional mitigation actions was not reported in Chile's BUR. However, during the technical analysis, Chile mentioned that it faced challenges in designing, identifying and monitoring the mitigation actions at the local and regional level owing to issues caused by the rotation of personnel in local governments and a skills gap. The Party emphasized that this area would therefore benefit from capacity-building.

96. Chile also provided information on mitigation actions for the private sector, which are mainly focused on emission reduction. The Agency for Sustainability and Climate Change, created under agreement 2947/2016 of the Board of Directors of the Production Development Corporation (successor of the National Council for Clean Production), is a committee with the mission of promoting the inclusion of the climate change dimension and sustainable development in private sector activities. Through voluntary agreements, this enhances coordination with public institutions and promotes initiatives and the implementation of programmes and projects that contribute to the development of a sustainable, resilient and low-carbon economy. One of the main instruments of the Board of Directors of the Production Development Corporation is the clean production agreements, which were registered in 2012 as Chile's first NAMA. Since 2016, reductions achieved under these agreements have been reported publicly, on the basis of guidelines for a generic MRV framework for NAMAs developed by the Ministry of the Environment. Between 2012 and 2017, 79 clean production agreements were signed with private stakeholders, with an estimated emission reduction of 457,438 t CO₂ eq.

97. Another mitigation initiative is the "HuellaChile" carbon footprint management programme, which encourages the quantification, reporting and management of GHG emissions at the organizational level in the private sector. This programme was established in 2015 and has three work lines: free access to a tool for calculating GHG emissions at the organizational level; technical support, including training, technical meetings and clarifications by telephone or email; and certification (seals of recognition) for participating organizations according to the level of progress achieved in GHG management. As at May 2020, 1,059 organizations from various economic sectors in Chile's public and private sectors had taken part in this initiative.

98. The Party clearly reported information on methodologies and the objectives of the mitigation actions for the private sector, and steps taken or envisaged to achieve them, and progress in their implementation. The Party also reported the results of implementing the mitigation actions, such as the number of companies participating in the "HuellaChile" carbon footprint management programme and the fact that 521 recognition certificates were issued in the following categories: 489 for quantification of GHG emissions, 22 for reduction of GHG emissions, 7 for excellence in GHG management, training and estimation of specific EFs and 3 for neutralization of GHG emissions. During the technical analysis, Chile stated that it is making efforts to increase the involvement of the private sector in the programme and to develop a road map which defines specific aspects such as elements of the carbon markets, offsets of GHG emissions and sectors involved. The TTE commends the Party for its efforts to provide more detailed information on private sector mitigation initiatives.

99. The BUR also provided information on other initiatives and additional mitigation actions developed by the private sector covering energy, waste, industry, construction, transport, agriculture, forestry, and conservation and biodiversity. Of these, 54 per cent were

reported as being in progress, 40 per cent as completed and 6 per cent as awaiting implementation. The percentages reported regarding the participation of the private sector mitigation actions in the reported actions in each of the sectors mentioned above totalled more than 150 per cent and the reason for this was not clear to the TTE.

100. The Party clearly reported information on progress of implementation of mitigation actions, financial resources and implementing actions undertaken for the other initiatives developed by the private sector. However, information on estimated outcomes, emission reductions and co-benefits was not reported in Chile's BUR. During the technical analysis, the Party clarified that the private sector presents information on a voluntary basis (i.e. there is no mandate for private companies to estimate and report emission reductions) and that significant efforts have been done to gather information from these initiatives. Furthermore, Chile explained that due to the lack of capacity and resources available, emission reductions estimates were only performed for main mitigation actions. The TTE recognizes the efforts made by Chile to improve the completeness of its reporting and considers that the Party may continue its efforts to estimate emission reductions for mitigation initiatives from the private sector once capacities and resource constraints are addressed.

101. Chile provided information on its NAMAs in the BUR (pp.178–183) consistently with the mitigation actions listed in document FCCC/AWGLCA/2011/INF.1. The Party provided comprehensive information on six NAMAs currently included in the NAMA registry in BUR table 23 (chap. 3), clearly reporting the name and description of the NAMAs, coverage (i.e. sectors and gases), objectives of the actions, progress of implementation and underlying steps taken or envisaged to achieve them, and estimated emission reductions.

102. Chile provided information on its involvement in international market mechanisms as a Party to the Kyoto Protocol. It reported that, since 2003, 184 CDM projects have been approved by its designated national authority, 102 have been registered under the UNFCCC CDM process and 9 are undergoing validation. Chile highlighted that 109 of the registered and validated CDM projects relate to renewable energy sources and have contributed 4,068 MW of installed capacity to its energy system. The Party also reported the distribution of CDM project types: wind power (40.6 per cent), hydroelectric power (35.3 per cent), solar power (16.0 per cent), biomass (5.8 per cent), geothermal power (1.8 per cent), landfill gas (0.5 per cent), and CH₄ emission avoidance (0.1 per cent). It reported information on market mechanisms such as the Partnership for Market Readiness, carbon tax and social cost of carbon. Under the Partnership for Market Readiness, Chile was the first country to execute all Partnership for Market Readiness components and, as a result, received support for a second phase, in which it will strengthen its carbon tax scheme by broadening its scope; implement an integrated MRV platform; and evaluate its carbon pricing instrument schemes. It will also design the national registry of mitigation actions for the "HuellaChile" carbon footprint management programme to integrate offsets of GHG emissions into the system.

103. The carbon tax generated revenue of USD 185.6 million in its third year of operation (2019), which represents a decrease of 1.4 and 1.6 per cent compared with the revenue in 2018 and 2017, respectively, and achieved a reduction in CO₂ emissions of 1.4 per cent and particulate matter of 28 per cent compared with the first year of implementation. The social cost of carbon was first estimated in 2011 by the National Public Investment System, using a proxy value based on the market price of instruments traded under the CDM, corresponding to USD 4.05/t CO₂ in 2011 and USD 8.45/t CO₂ in 2016. This approximation method was replaced in 2017 with a calculation of the shadow carbon price based on the abatement cost curve, which resulted in a range for the social cost of carbon of USD 20–43/t CO₂, with an average value of USD 32/t CO₂. During the technical analysis, the Party stated that it is working on promoting inclusion of climate risk analyses in the financial and banking sector, which is important for complementing the efforts to promote mitigation and adaptation activities in the private sector. Chile clarified that the mitigation actions developed by the private sector are not mandatory but were included in the BUR as evidence of its commitment. The Party is also working to include financial climate risks in the activities developed by the private sector.

104. Chile reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. Chile also provided information on its voluntary market, following the general guidelines for domestic MRV of domestically supported

NAMAs contained in the annex to decision 21/CP.19. The Party indicated that, with the support of the Capacity-building Initiative for Transparency, it is in the process of designing and implementing the National Forecasting System, which will lay the groundwork for a continuous analysis of past and projected emissions for monitoring and planning purposes. The National Forecasting System will develop guidelines to ensure consistency and comparability of GHG emission projections for different sectors, and will be the monitoring instrument for mitigation measures.

105. Also, Chile reported that it is in the process of developing and designing a domestic MRV system for mitigation actions, including specifically developing sectoral MRV systems. For example, the carbon tax MRV system will consider the feasibility of generating the necessary information to operate both local (particulate matter, NO_x, SO₂) and global (CO₂) pollutant taxes; sectoral differences among the actors subject to the tax with regard to technologies; and regulatory consistency of the rules that apply across all sectors. In reference to the MRV system for mitigation actions in the energy sector, the Ministry of Energy is developing a single platform for monitoring actions in the energy sector committed to in the NDC and actions that will arise during the implementation of energy plans. This sectoral MRV system will be articulated with the national MRV system of mitigation actions to be developed by the Ministry of the Environment and linked to the transparency and robustness required in international agreements. Chile is also developing an MRV system for self-supply systems that use non-conventional renewable energies, an MRV system for large-scale generation projects, an MRV system for the Commune Energy programme and a mechanism for savings certificates for energy projects.

106. Chile outlined in the BUR that it plans to develop an integrated platform for climate change information, which will allow all institutions involved in mitigation actions to generate the necessary relevant information and report it to the Ministry of the Environment. This platform will be composed of different modules, among which stands out SNICHILE and the “HuellaChile” carbon management programme. During the technical analysis, Chile highlighted that it recognizes the importance of having an MRV system that covers mitigation actions at the regional and local level, but emphasized the challenges involved at this stage. It also emphasized that it is working to improve capacity and reporting at the regional and local level through the work of the regional committees on climate change, and once the work of these committees is fully operational, the Party will need support to further strengthen and maintain local capacities in the different regions.

107. The TTE noted that the transparency of the information reported on mitigation actions could be enhanced by addressing the areas noted in paragraphs 73, 74, 75, 76, 77, 79, 82, 86, 90, 93, 95, 99 and 100 above, which could facilitate a better understanding of the information reported on mitigation actions.

108. In paragraph 82 of the summary report on the technical analysis of Chile’s third BUR, the previous TTE noted areas where the transparency of the reporting on mitigation actions could be further enhanced. The current TTE noted the improvements referred to in paragraphs 72, 73, 76, 82, 88, 98 and 101 above and commends the Party for enhancing the transparency of its reporting.

109. Chile reported in its BUR (chap. 3, section 7.3) information on the areas for improvement in future BURs, including plans for the preparation of its first biennial transparency report under the ETF, in accordance with Article 13 of the Paris Agreement, and its current initiatives for enhancing its existing MRV system for compliance with requirements under the ETF and transitioning to a new MRV system. Chile clarified during the technical analysis that it is working on enhancing the capacity of regional and local governments to monitor, identify and design mitigation actions which will be included in the national reporting under the ETF in the future. The TTE commends the Party for the reporting on its proactive approach to preparing for ETF implementation.

4. Constraints and gaps, and related technology, financial, technical and capacity-building needs, including a description of support needed and received

110. As indicated in table I.3, Chile reported in its BUR, fully in accordance with paragraphs 14–16 of the UNFCCC reporting guidelines on BURs, information on finance, technology and capacity-building needs and support received.

111. Chile reported information on constraints and gaps, and related financial, technical and capacity-building needs in accordance with decision 2/CP.17, annex III, paragraph 14. These were identified on the basis of surveys completed by the public institutions that constitute the Interministerial Committee on Climate Change, and were reported in BUR tables 1–8, chapter 4.

112. In its BUR, Chile identified 49 constraints, 38 financial and technical needs and 83 capacity-building needs relating to the following areas: preparing and reporting BURs, NCs and NDCs on a continuous basis; achieving sustainability in the GHG inventories biennial preparation process; implementing mitigation measures to reduce net GHG emissions associated with decarbonization in key sectors; implementing adaptation measures to build resilience and reduce vulnerability to climate change; strengthening national capacities for participation in multilateral climate change negotiations; enhancing cross-sectoral capacities and participating in ICA. Additionally, in annex 6 to the BUR, Chile reported information on 30 cross-sectoral needs for managing the climate risks proposed by 10 sectoral organizations in the areas of energy, agriculture, forestry, fisheries, packaging, cement, waste and cross-cutting support to companies. In annex 7 to the BUR, Chile reported 27 cross-cutting needs identified by private sector industries: 12 involving capacity-building and technical assistance, 5 involving transfer and technology development, 5 involving climate finance and 5 involving institutional strengthening.

113. Chile specifically reported in its BUR (chap. 4, section 2.1) information on its financial, technical and capacity-building needs for improvement and periodic reporting of future BURs, NCs and NDCs.

114. Chile also reported in the BUR some information on constraints and gaps, and related needs in the context of adaptation (chap. 4, table 4).

115. Information was not reported in BUR tables 1–6 (chap. 4) or elsewhere on how the constraints and gaps, and financial, technical and capacity-building needs that could be identified in related studies conducted between 2018 and 2020 were considered, including information on the methodology used to prioritize the financial, technical and capacity-building needs from the needs identified in the surveys completed by the public institutions that constitute the Interministerial Committee on Climate Change, and on which institutions were consulted. During the technical analysis, the Party clarified that in BUR tables 1–6 (chap. 4) the reported gaps, constraints and related financial, technical and capacity-building needs are aligned with related studies conducted between 2018 and 2020, and it also clarified that these needs were prioritized by the public institutions that constitute the Interministerial Committee on Climate Change before being systematized and reviewed by the Ministry of the Environment to ensure consistency of the results. The Party also clarified that in reference to the needs identified by the private sector reported in BUR table 7 (chap. 4) the private sector institutions which were consulted on these needs are highly representative of the related productive sectors.

116. Chile reported information on financial resources, technology transfer, capacity-building and technical support received in accordance with decision 2/CP.17, annex III, paragraph 15. In its BUR, Chile reported that it received USD 34,208,604 between 2018 and 2020 from donor countries and financial multilateral institutions to perform activities relating to the national climate agenda (national reporting, technical assistance, capacity-building activities, technology transfer and support for the COP 25 Presidency), including USD 352,000 from the Global Environment Facility for the preparation of the fourth BUR. The information reported also indicates that Chile received USD 17,821,820 for capacity-building and technical support mainly from donor countries (Germany, Japan and United Kingdom of Great Britain and Northern Ireland), donor funds and international institutions (Adaptation Fund, EUROCLIMA+, Global Environment Facility, Green Climate Fund, UNFCCC,

United Nations Development Programme and World Bank) and the Inter-American Development Bank.

117. Chile reported information on nationally determined technology needs with regard to the development and transfer of technology in accordance with decision 2/CP.17, annex III, paragraph 16. In its BUR, Chile reported that the technology needs assessment was nationally determined by the aforementioned surveys (see para. 111 above), and that it received technology transfer support for the following four initiatives: assessment and management of climate change risk for adaptation to climate change; determination of the number of buses with potential to run on electricity and be incorporated into the public transport system of Santiago; a bankability study related to electric buses within the urban reconversion programme and modernization of metropolitan public transport; and simulations of four decarbonization scenarios in the electricity generation sector in Santiago.

118. Information was not reported in the BUR on how the nationally determined technology needs that could be identified in related studies conducted between 2018 and 2020 were considered in BUR tables 1–6 (chap. 4), including which methodology was used to prioritize technology needs reported in these tables and details on specific technology transfer support related to the four initiatives indicated in paragraph 117 above. During the technical analysis, the Party clarified that the technology needs reported were aligned with the related studies conducted between 2018 and 2020, and prioritized by the public institutions that completed the surveys referred to in paragraph 111 above, before being systematized and reviewed by the Ministry of the Environment to ensure consistency of the results. The Party also provided details on technology transfer support included in the four initiatives mentioned in paragraph 117 above.

119. The TTE noted that the transparency of the information reported on constraints and gaps, and related needs and support received, could be enhanced by addressing the areas noted in paragraphs 115 and 118 above, which could facilitate a better understanding of the information reported on needs and support received.

120. In paragraphs 84–86 of the summary report on the technical analysis of the Chile's third BUR, the previous TTE noted areas where the transparency of the reporting on constraints, gaps, needs and support needed and received could be enhanced. The current TTE noted the improvements in paragraphs 112, 116 and 117 above related to this information and commends the Party for enhancing the transparency of its reporting.

121. During the technical analysis, Chile informed the TTE that it carried out initiatives in relation to South–South cooperation as a member of the Latin American Network on GHG Inventories with the support of Germany, the Global Environment Facility, the United Nations Development Programme, and the United Nations Environment Programme. Chile also provided support to Panama under the framework of Chile–Panama bilateral cooperation to strengthen the transparency of the Paris Agreement. The TTE commends Chile for reporting on these activities. One of the most important activities performed by Chile between 2018 and 2020 was assuming the Presidency and hosting of COP 25. The TTE noted that this information could be useful for understanding the circumstances of Chile with regard to support needed and provided.

5. Any other information

122. Chile reported some information on adaptation actions that may lead to GHG emission reductions, without providing estimations of such reductions, such as the National Programme of Urban Mobility for climate change mitigation and adaptation in Chile. The Party also stated that the draft Climate Change Framework Law, which includes the Party's intention to become carbon neutral by 2050, was presented to the National Congress in February 2020.

D. Identification of capacity-building needs

123. In consultation with Chile, the TTE identified the following needs for capacity-building that could facilitate the preparation of subsequent BURs and participation in ICA:

(a) Enhancing sectoral expertise, through training and workshops, including the participation of experts from SNICHILE and the proposed National Forecasting System, to identify the most appropriate methodologies and assumptions for estimating the GHG emission reductions or removals of sectoral mitigation actions, policies and measures;

(b) Enhancing the capacity to identify quantitative and qualitative indicators for each sectoral mitigation action;

(c) Enhancing the sectoral capacity of relevant ministries and institutions to enable the provision of estimates of expected and achieved GHG reductions and non-GHG mitigation benefits for prioritized sectoral mitigation actions, policies and measures through different means;

(d) Strengthening and managing the participation of the private sector in the implementation of emission reduction actions and the alignment of various financial mechanisms, in particular supporting existing working groups in the implementation of financial climate risk analyses in the banking sector and green tax mechanisms;

(e) Strengthening existing subnational capacities to meet the needs for reporting and monitoring at the subnational level under the Climate Change Framework Law, in particular for alignment and reporting of national and subnational measures;

(f) Developing a system for following up on mitigation actions over time, in different sectors and at different government levels with the aim to increase the capacity to track the results obtained by different actions, in particular regarding the capacity to nest, align and coordinate the accounting of those mitigation actions, considering different government levels, sectors and participants;

124. The TTE noted that, in addition to those identified during the technical analysis, Chile reported 83 capacity-building needs in BUR tables 1–8 (chap. 4) covering the following areas: preparing and reporting of BURs, NCs and NDCs; mitigation; preparing and reporting of GHG inventories; adaptation; international negotiations; cross-sectoral scope; participation in ICA; and needs for the private sector. Of these capacity-building needs, Chile highlighted the following cross-cutting areas:

(a) Maintaining and strengthening the technical teams and financial resources in national and sectoral institutions in order to fulfil national commitments under the UNFCCC and generate national policies, especially in the areas of data generation, specialized research, GHG inventory, mitigation, adaptation, coordination and preparation of national reports under the Convention and the Paris Agreement, and international negotiations;

(b) Building capacities of local and regional governments and institutions to respond to subnational and local policy needs and support the preparation of national reports under the Convention and the Paris Agreement.

125. In paragraphs 88, 96 and 97 of the summary report on the technical analysis of Chile's third BUR, the previous TTE, in consultation with Chile, identified 12 capacity-building needs and prioritized 10 of them. In its fourth BUR, Chile reflected that the status of all those capacity-building needs is ongoing:

(a) Enhancing and formalizing working relationships with private companies to ensure continuous and automated data collection for the GHG inventory;

(b) Involving international expertise in determining country-specific EFs and net calorific values of fuels consumed in the country, identifying the composition of solid waste and collecting data for estimating F-gas emissions;

(c) Monitoring mitigation actions and linking their estimated or observed impact to estimating emissions for the national GHG inventory;

(d) Developing methodological guidelines on information to be reported in the BUR;

(e) Building the capacity of all relevant ministries and institutions to provide the information needed for the BUR;

- (f) Training of national experts on the data requirements, characteristics and potential of the centralized MRV system;
- (g) Strengthening the national capacity to estimate emissions for categories currently reported as “NE” in the GHG inventory in accordance with national priorities;
- (h) Strengthening the national capacity to collect data for the GHG inventory through different activities such as workshops, sharing experience and enhancing awareness of the importance and relevance of good-quality data by, for example, involving international experts in their respective areas;
- (i) Cooperating and exchanging experience with other countries and agencies regarding collecting data and improving existing data, particularly for the agriculture sector (soil carbon and application of synthetic fertilizers);
- (j) Training subnational institutions to collect required data, monitor mitigation actions and estimate impact in terms of GHG emission reductions;
- (k) Enhancing technology transfer, acquiring equipment and training personnel in its use (particularly in the agriculture sector) to improve GHG inventory data;
- (l) Updating the national technology needs assessment with the aim of meeting the requirements of the centralized MRV system (i.e. a technology platform that could collate all existing information on climate change) and the information management system to ensure the preparation of NCs and BURs on a continuous basis.

III. Conclusions

126. The TTE conducted a technical analysis of the information reported in the fourth BUR of Chile in accordance with the UNFCCC reporting guidelines on BURs and concludes that the information reported is mostly consistent. It provides an overview of national circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis; the national inventory of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol, including an NIR; mitigation actions and their effects, including associated methodologies and assumptions; constraints and gaps, and related financial, technical and capacity-building needs, including a description of support needed and received; the level of support received to enable the preparation and submission of BURs; domestic MRV; and other information relevant to the achievement of the objective of the Convention, including initiatives to address climate change risks.

127. Chile also reported on its intention to become carbon neutral by 2050, which is included in the draft Climate Change Framework Law and in the Party’s NDC. During the technical analysis, additional information was provided by Chile on the road map to improve the scope of the “HuellaChile” carbon footprint management programme and activities being implemented to monitor the actions of the regions and the private sector. The Party also highlighted the importance of, and the advances made in developing, sectoral MRV systems that will become part of an enhanced national domestic MRV system. The TTE concluded that the information analysed is mostly transparent.

128. Chile reported an update on the institutional arrangements relevant to the preparation of its BURs and other reports to the UNFCCC, including information on the national climate institutional framework under which the Ministry of the Environment, through its Climate Change Office, works with the coordinating bodies on climate change and the sectoral institutional framework and is responsible for coordinating the preparation of national reports to the UNFCCC. Chile also reported an update on its domestic MRV arrangements at the national level, and ongoing initiatives and planned steps for developing an integrated MRV system, based on existing systems, processes and infrastructure. Chile further reported that it has initiated the design and implementation of the National Forecasting System, which will form the basis for continuous analysis of historical and projected emissions for monitoring and planning purposes and for compliance with requirements under the ETF.

129. In its fourth BUR, submitted in 2021, Chile reported information on its national GHG inventory for 1990–2018. This included GHG emissions and removals of CO₂, CH₄, N₂O,

HFCs, PFCs and SF₆ for all relevant sources and sinks as well as the precursor gases and black carbon. The inventory was developed using the 2006 IPCC Guidelines. The total GHG emissions for 2018 were reported as 112,312.62 Gg CO₂ eq (excluding LULUCF) and 48,320.72 Gg CO₂ eq (including LULUCF). A total of 45 categories with corresponding gases were identified as key categories by level or trend. The Party's GHG inventory is fully complete, although emissions for some minor categories are still reported as "NE". The BUR and the NIR are generally transparent, but some information was not reported, such as information on the distribution of manure management systems and descriptions of animal subcategories, and information on the QA/QC procedures applied to some IPPU categories. Further, Chile provided detailed information on the uncertainty assessment results, but information on the underlying assumptions for uncertainty values used, and specifically on how the Party dealt with asymmetric uncertainties in its calculations, was not provided.

130. Chile reported information on mitigation actions and their effects in both tabular and narrative format, including objectives, stage of implementation, description, GHGs covered and emission reduction targets, and framed its national mitigation planning and actions in the context of its national strategy. Chile reported planned, implemented, ongoing and completed actions related to energy, transport, mining, buildings, urbanization and public infrastructure, use of F-gases, AFOLU and waste. In addition, the Party provided information on mitigation actions at the regional and local level, and in the private sector. The mitigation actions focusing on the energy sector cover different areas such as promoting renewable energy (e.g. geothermal, green hydrogen and solar), energy efficiency and fuel switching. Other mitigation actions reported focus on the reduction of HFC emissions, the sustainable management and recovery of forest land, solid waste management and promotion of sustainable building practices. The Party reported the progress of implementation of its mitigation actions and the results achieved, including estimated emission reductions for some mitigation actions. Chile also reported actions with mitigation co-benefits, including the social price of carbon and regional climate change efforts that include adaptation co-benefits. The Party also reported information on its involvement in international market mechanisms and MRV arrangements.

131. The Party did not provide information on the gases covered for most mitigation actions owing to oversights in the reporting, or information on methodologies and assumptions, and progress indicators for a number of sectoral mitigation actions owing to challenges in identifying the required information for these actions. Related information on local and regional mitigation actions was not reported owing to challenges in designing, identifying and monitoring these actions at the local and regional level. The results achieved, such as estimated outcomes and estimated emission reductions, were not provided for most mitigation actions owing to lack of human resources as a consequence of the intense work required to prepare Chile's updated 2020 NDC, great involvement of staff needed to prepare for and organize COP 25 and to support Chile in its capacity as the Presidency of the COP, as well as the impact of coronavirus disease 2019, as clarified by the Party during the technical analysis.

132. Chile reported information on key constraints, gaps and related capacity-building needs, including preparing and reporting of BURs, NCs and NDCs; mitigation; preparing and reporting of GHG inventories; adaptation; international negotiations; cross-sectoral scope; participation in ICA; and needs for the private sector. Information was reported on the financial, technical, technology transfer and capacity-building support received, including support for activities relating to the national climate agenda (national reporting, technical assistance, capacity-building need activities, technology transfer and support for the COP 25 Presidency) and for the preparation of the fourth BUR. The Party also reported that it received financial support between 2018 and 2020 of USD 34,208,604 from donor countries and financial multilateral institutions to perform activities relating to the national climate agenda and USD 352,000 from the Global Environment Facility for preparing its fourth BUR. The Party further reported information on the transfer of technology received, including support for the implementation of four initiatives relating to assessment and management of climate change risk, potential introduction of electric buses into the public transport system of Santiago, bankability of electric buses within urban reconversion and modernization of public transport and simulation of decarbonization scenarios for the electricity generation sector.

133. The current TTE noted improvements in the reporting in the Party's fourth BUR compared with that in its previous BUR analysed. The information reported on the GHG inventory, mitigation actions and their effects, needs and support reported in Chile's fourth BUR demonstrates that the Party has taken into consideration the areas for enhancing the transparency of the information reported, as noted by the TTE in the summary report on the technical analysis of the third BUR. However, improvements are ongoing, and the Party has taken note of outstanding areas for future improvements.

134. The TTE, in consultation with Chile, identified the six capacity-building needs listed in chapter II.D above and needs for capacity-building that aim to facilitate reporting in accordance with the UNFCCC reporting guidelines on BURs and participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention. Chile identified the following as high-priority capacity-building needs:

(a) Enhancing the sectoral capacity of relevant ministries and institutions to enable the provision of estimates of expected and achieved GHG reductions and non-GHG mitigation benefits for prioritized sectoral mitigation actions, policies and measures through different means;

(b) Strengthening existing subnational capacities to meet the needs for reporting and monitoring at the subnational level under the Climate Change Framework Law, in particular for alignment and reporting of national and subnational measures;

(c) Developing a system for following up on mitigation actions over time, in different sectors and at different government levels with the aim to increase the capacity to track the results obtained by different actions, in particular regarding the capacity to nest, align and coordinate the accounting of those mitigation actions, considering the different government levels, sectors and participants.

135. Chile also identified the following as medium-priority capacity-building needs:

(a) Enhancing sectoral expertise, through training and workshops, including the participation of experts from SNICHILE and the proposed National Forecasting System, to identify the most appropriate methodologies and assumptions for estimating the GHG emission reductions or removals of sectoral mitigation actions, policies and measures;

(b) Enhancing the capacity to identify quantitative and qualitative indicators for each sectoral mitigation action;

(c) Strengthening and managing the participation of the private sector in the implementation of emission reduction actions and the alignment of various financial mechanisms, in particular supporting existing working groups in the implementation of financial climate risk analyses in the banking sector and green tax mechanisms.

136. The Party reported 83 capacity-building needs in BUR chapter 4. During the technical analysis, Chile identified from those capacity-building needs the following cross-cutting areas as priorities:

(a) Maintaining and strengthening the technical teams and financial resources in national and sectoral institutions in order to fulfil national commitments under the UNFCCC and generate national policies, especially in the areas of data generation, specialized research, GHG inventory, mitigation, adaptation, coordination and preparation of national reports under the Convention and the Paris Agreement, and international negotiations;

(b) Building capacities of local and regional governments and institutions to respond to subnational and local policy needs and to support the preparation of national reports under the Convention and the Paris Agreement.

(i)

Annex I**Extent of the information reported by Chile in its fourth biennial update report**

Table I.1

Identification of the extent to which the elements of information on greenhouse gases are included in the fourth biennial update report of Chile

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, paragraph 41(g)	The first BUR shall cover, at a minimum, the inventory for the calendar year no more than four years prior to the date of the submission, or more recent years if information is available, and subsequent BURs shall cover a calendar year that does not precede the submission date by more than four years.	Yes	Chile submitted its fourth BUR on 18 January 2021. The BUR contains information on the GHG inventory for 1990–2018.
Decision 2/CP.17, annex III, paragraph 4	Non-Annex I Parties should use the methodologies established in the latest UNFCCC guidelines for the preparation of NCs from non-Annex I Parties approved by the COP or those determined by any future decision of the COP on this matter.	Yes	Chile used the 2006 IPCC Guidelines.
Decision 2/CP.17, annex III, paragraph 5	The updates of the section on national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol should contain updated data on activity levels based on the best information available using the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF; any change to the EF may be made in the subsequent full NC.	Yes	Chile submitted an NIR as a technical annex to its fourth BUR, containing updated AD and EFs for all sectors.
Decision 2/CP.17, annex III, paragraph 6	Non-Annex I Parties are encouraged to include, as appropriate and to the extent that capacities permit, in the inventory section of the BUR:		
	(a) The tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF;	Yes	Chile applied the 2006 IPCC Guidelines and comparable tables were provided in both the BUR and the NIR.
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Yes	Chile applied the 2006 IPCC Guidelines and comparable tables were provided in both the BUR and the NIR.
Decision 2/CP.17, annex III, paragraph 7	Each non-Annex I Party is encouraged to provide a consistent time series back to the years reported in its previous NCs.	Yes	Chile provided an update of the previously reported inventory and reported a complete time series (1990–2018), including recalculations by category.
Decision 2/CP.17, annex III, paragraph 8	Non-Annex I Parties that have previously reported on their national GHG inventories contained in their NCs are encouraged to submit summary information tables of inventories for previous submission years (e.g. for 1994 and 2000).	Yes	Chile provided updated information on its national GHG inventory, including summary tables for 1990–2018.
	The inventory section of the BUR should consist of an NIR as a summary or as an update of the information	Yes	The inventory chapter of the BUR (chap. 2) contains

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 9	contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including: (a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors); (b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF ₆).	Yes Yes	summary information from the NIR. Chile reported tables on GHG emissions and removals and precursor gases for 1990, 1994, 2000, 2010, 2013, 2016 and 2018 in its BUR (annex 3) and NIR (table 12). Chile reported tables on emissions of HFCs, PFCs and SF ₆ for 1990, 1994, 2000, 2010, 2013, 2016 and 2018 in its BUR (annex 3) and NIR (table 18).
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	Yes	The Party submitted an NIR as a technical annex to its fourth BUR.
Decision 17/CP.8, annex, paragraph 12	Non-Annex I Parties are also encouraged, to the extent possible, to undertake any key source analysis as indicated in the IPCC good practice guidance to assist in developing inventories that better reflect their national circumstances.	Yes	In its BUR (table 3, chap. 2) and NIR (table 11) Chile provided a summary of the key category analysis (level and trend) using approaches 1 and 2 from the 2006 IPCC Guidelines.
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved.	Yes	Information on the procedures and arrangements for collecting and archiving data is provided in the NIR and summarized in the BUR.
Decision 17/CP.8, annex, paragraph 14	Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of: (a) CO ₂ ; (b) CH ₄ ; (c) N ₂ O.	Yes Yes Yes	
Decision 17/CP.8, annex, paragraph 15	Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of: (a) HFCs; (b) PFCs; (c) SF ₆ .	Yes Yes Yes	
Decision 17/CP.8, annex, paragraph 16	Non-Annex I Parties are encouraged, as appropriate, to report on anthropogenic emissions by sources of other GHGs, such as: (a) Carbon monoxide; (b) NO _x ; (c) Non-methane volatile organic compounds.	Yes Yes Yes	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as sulfur oxides, and included in the Revised 1996 IPCC Guidelines may be included at the discretion of Parties.	Yes	The Party reported SO ₂ emissions in NIR table 12.
Decision 17/CP.8, annex, paragraph 18	Non-Annex I Parties are encouraged, to the extent possible, and if disaggregated data are available, to estimate and report CO ₂ fuel combustion emissions using both the sectoral and the reference approach and to explain any large differences between the two approaches.	Yes	
Decision 17/CP.8, annex, paragraph 19	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report emissions from international aviation and marine bunker fuels separately in their inventories:		
	(a) International aviation;	Yes	
	(b) Marine bunker fuels.	Yes	
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO ₂ eq should use the GWP provided by the IPCC in its AR2 based on the effects of GHGs over a 100-year time-horizon.	NA	Chile used the GWP provided in the AR4.
Decision 17/CP.8, annex, paragraph 21	Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol, including a brief explanation of the sources of EFs and AD. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, EFs and AD used in their estimation of emissions, as appropriate. Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building:		
	(a) Information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol;	Yes	Chile used the 2006 IPCC Guidelines. Annex 1 to the BUR contains a summary of the methodologies used for estimating emissions and removals. The NIR specifies in detail which EFs were used for each category reported in the GHG inventory.
	(b) Explanation of the sources of EFs;	Yes	Chile used the 2006 IPCC Guidelines. The NIR specifies in detail which EFs were used for each category reported in the GHG inventory.
	(c) Explanation of the sources of AD;	Yes	The BUR (table 2, chap. 2) contains a summary of the most significant AD used for estimating emissions. The NIR specifies in detail which AD

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
			were used for each category reported in the GHG inventory.
	(d) If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe:	Yes	
	(i) Source and/or sink categories;		Chile reported on country-specific sources of black carbon emissions as a precursor gas in the BUR (chap. 2, section 9).
	(ii) Methodologies;		Detailed information on the methodologies used for black carbon estimates was provided in the NIR (annex 5).
	(iii) EFs;		Detailed information on the EFs used for black carbon estimates was provided in the NIR (annex 5).
	(iv) AD;		Detailed information on the AD used for black carbon estimates was provided in the NIR (annex 5).
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	Yes	
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1–2 of the guidelines annexed to decision 17/CP.8 in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14–17. In preparing those tables, Parties should strive to present information that is as complete as possible. Where numerical data are not provided, Parties should use the notation keys as indicated.	Yes	Chile reported comparable information on its national GHG inventory (BUR table 4, chap. 2) on a gas-by-gas basis for CO ₂ , CH ₄ and N ₂ O and in CO ₂ eq for F-gases, and reported such information on a gas-by-gas basis and in units of mass in annex 3 to the BUR.
Decision 17/CP.8, annex, paragraph 24	Non-Annex I Parties are encouraged to provide information on the level of uncertainty associated with inventory data and their underlying assumptions, and to describe the methodologies used, if any, for estimating these uncertainties:		
	(a) Level of uncertainty associated with inventory data;	Yes	The BUR contains information on the overall uncertainty of the inventory (chap. 2, section 1.6). The NIR contains uncertainty information by category in annex 2.
	(b) Underlying assumptions;	Yes	Chile provided the assumptions associated with the uncertainty of the inventory data (AD and EFs) in annex 2 to the NIR and in the sectoral chapters.

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
	(c) Methodologies used, if any, for estimating these uncertainties.	Yes	Annex 2 to the NIR provides information on the methodology used to estimate uncertainties.

Note: The parts of the UNFCCC reporting guidelines on BURs on reporting information on GHG emissions by sources and removals by sinks in BURs are contained in decision 2/CP.17, paras. 3–10 and 41(g). Further, as per para. 3 of those guidelines, non-Annex I Parties are to submit updates of their national GHG inventories in accordance with paras. 8–24 of the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties, contained in the annex to decision 17/CP.8. The scope of such updates should be consistent with the non-Annex I Party’s capacity and time constraints and the availability of its data, as well as the level of support provided by developed country Parties for biennial update reporting.

Table I.2

Identification of the extent to which the elements of information on mitigation actions are included in the fourth biennial update report of Chile

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 11	Non-Annex I Parties should provide information, in tabular format, on actions to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol.	Yes	Detailed information on actions for mitigating climate change is provided in both tabular and narrative format in the BUR.
Decision 2/CP.17, annex III, paragraph 12	For each mitigation action or group of mitigation actions, including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing country Parties shall provide the following information, to the extent possible:		
	(a) Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), quantitative goals and progress indicators;	Partly	Information on gases covered was not reported for most mitigation actions. The Party used the notation key “S/I” or left cells blank for cases where gases covered were not reported. In some instances, the information reported contained errors.
	(b) Information on:		
	(i) Methodologies;	Partly	Information on methodologies was not reported for most mitigation actions.
	(ii) Assumptions;	Partly	Information on assumptions was not reported for most mitigation actions.
	(c) Information on:		
	(i) Objectives of the action;	Yes	
	(ii) Steps taken or envisaged to achieve that action;	Partly	Information on steps taken or envisaged was not reported for some mitigation actions. In some cases, the notation key “S/I” was used.
	(d) Information on:		

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
	(i) Progress of implementation of the mitigation actions;	Yes	
	(ii) Progress of implementation of the underlying steps taken or envisaged;	Partly	Information on the progress and the underlying steps taken or envisaged was not reported for some mitigation actions. In some cases, the notation key “S/I” was used.
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	Partly	Information on results achieved, such as estimated outcomes and emission reductions, was not reported for most mitigation actions. In some cases, the notation key “S/I” was used; in other cases, cells were left blank.
	(e) Information on international market mechanisms.	Yes	
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on domestic MRV arrangements.	Yes	

Note: The parts of the UNFCCC reporting guidelines on BURs on the reporting of information on mitigation actions in BURs are contained in decision 2/CP.17, annex III, paras. 11–13.

Table I.3

Identification of the extent to which the elements of information on finance, technology and capacity-building needs and support received are included in the fourth biennial update report of Chile

<i>Decision</i>	<i>Provision of the reporting requirements</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 14	Non-Annex I Parties should provide updated information on: (a) Constraints and gaps; (b) Related financial, technical and capacity-building needs.	Yes Yes	
Decision 2/CP.17, annex III, paragraph 15	Non-Annex I Parties should provide: (a) Information on financial resources received, technology transfer and capacity-building received; (b) Information on technical support received from the Global Environment Facility, Parties included in Annex II to the Convention and other developed country Parties, the Green Climate Fund and multilateral institutions for activities relating to climate change, including for the preparation of the current BUR.	Yes Yes	
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on: (a) Nationally determined technology needs; (b) Technology support received.	Yes Yes	

Note: The parts of the UNFCCC reporting guidelines on BURs on the reporting of information on finance, technology and capacity-building needs and support received in BURs are contained in decision 2/CP.17, annex III, paras. 14–16.

Annex II

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 1997. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. JL Houghton, LG Meira Filho, B Lim, et al. (eds.). Paris: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency. Available at <https://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html>.

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IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html>.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl>.

B. UNFCCC documents

Fourth BUR of Chile. Available at <https://unfccc.int/BURs>.

NC4 of Chile. Available at <https://unfccc.int/non-annex-I-NCs>.

Summary reports on the technical analysis of the third BUR of Chile, contained in document FCCC/SBI/ICA/2019/TASR.3/CHL. Available at <https://unfccc.int/ICA-reports>.

C. Other documents

The following references were provided by the Party in response to requests for technical clarification during the technical analysis and may not conform to UNFCCC editorial style as some have been reproduced as received:

National Installed Capacity (reference for figure 10, p.91 of the fourth BUR). Available at <http://energiaabierta.cl/visualizaciones/capacidad-instalada/>.

National Long-term Energy Planning. Available at <https://energia.gob.cl/planificacion-energetica-de-largo-plazo-nueva-pelp-quinquenal-2023-2027>.

National Green Hydrogen Strategy. Available at https://energia.gob.cl/sites/default/files/national_green_hydrogen_strategy_-_chile.pdf.

Law 20698 extending the energy matrix to non-conventional renewable sources. Available at <https://www.bcn.cl/leychile/navegar?idNorma=1055402>.

Monthly report on non-conventional renewable energy, issued by the National Energy Commission, tracks compliance with law 20698. For example, see section 4 (p.6) of the report for May 2021. Available at https://www.cne.cl/wp-content/uploads/2021/05/RMensual_ERNC_v202105.pdf.

[Bulletin 13191-12](https://www.senado.cl/appsenado/templates/tramitacion/index.php?boletin_ini=13191-12). Draft Climate Change Framework Law (January 2020). Available at https://www.senado.cl/appsenado/templates/tramitacion/index.php?boletin_ini=13191-12.

Nationally Determined Contribution (2020). Available at https://cambioclimatico.mma.gob.cl/wp-content/uploads/2020/08/NDC_2020_Espanol_PDF_web.pdf.

Chilean NDC mitigation proposal: Methodological approach and supporting ambition (2019). Available at https://mma.gob.cl/wp-content/uploads/2020/03/Mitigation_NDC_White_Paper.pdf.

The Inter-American Cement Federation. CO₂ road map. Available at <http://hojaderuta.ficem.org/hoja-de-ruta.php>.

Chilean Chamber of Construction. Macroeconomics and construction (2015). Available at <https://issuu.com/camaraconstruccion/docs/mach42-2015?e=2518658%2F13713822>.
