

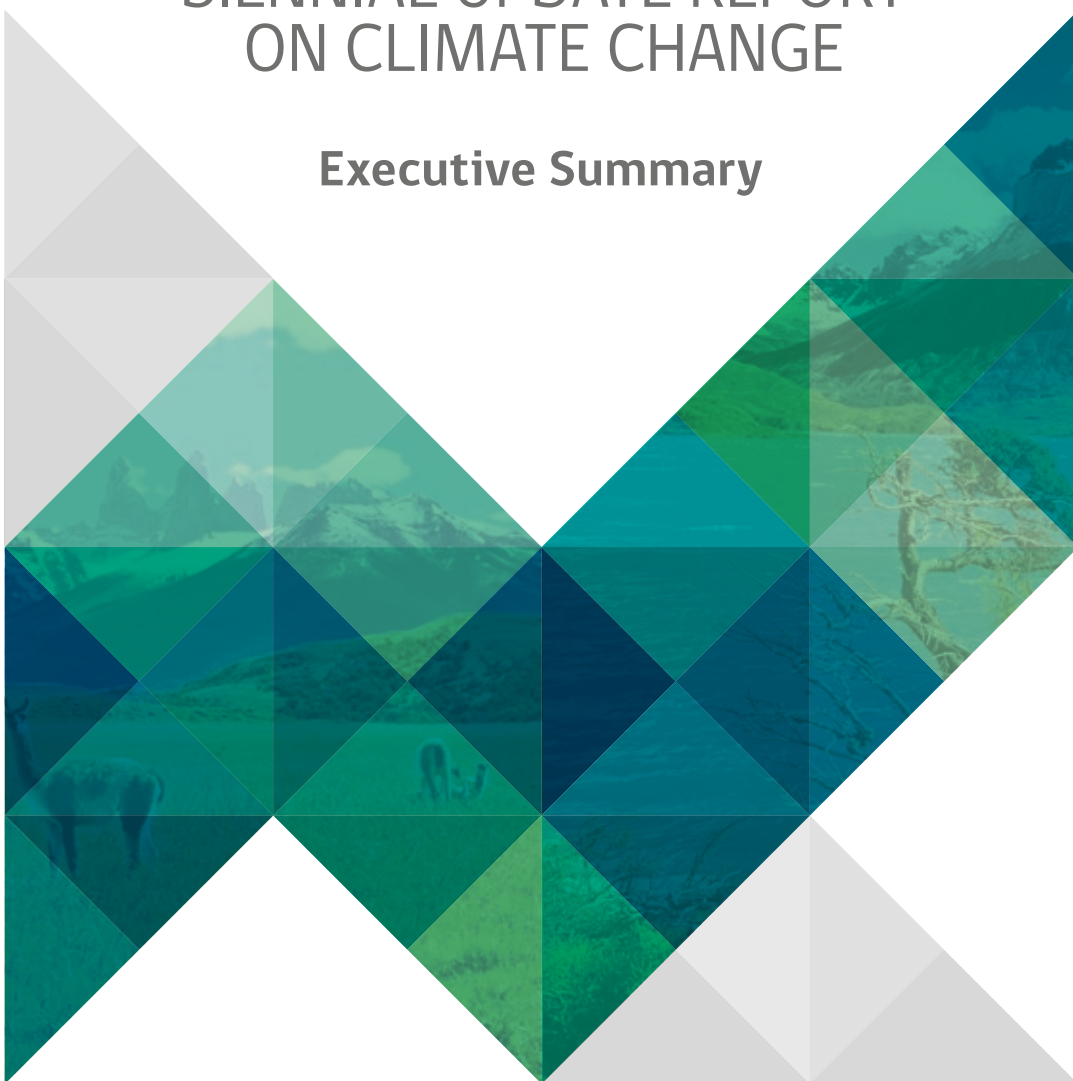
CHILE'S SECOND BIENNIAL UPDATE REPORT ON CLIMATE CHANGE

Executive Summary

2016

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Chile's Second Biennial Update Report
To the United Framework Convention on Climate Change

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Prologue

Chile presents its Second Biennial Update Report after the recently signed Paris Agreement. This climate agreement, the most important one in history, included a call for countries to send quality information about the conditions in which their institutions are functioning and how they are implementing climate action locally. Responding to this call, this report provides extensive, accurate, and up-to-date information on the progress of Chile in its recent climate activity, with a view to strengthening the implementation of the Paris Agreement itself, both within our borders, and internationally.



The information contained in this report covers actions taken in the country in the period running between the second half of 2014 to the first half of 2016, providing continuity to the results displayed in our First Biennial Update Report, presented to United Nations at the COP20 in December 2014. Just as Chile was the 4th country in the world to present its First Biennial Update Report, Chile will also present its Second Biennial Update Report in 2016, this time in the framework of the COP22 and following the two-year cycles agreed upon by the countries themselves. I also want to emphasize that Chile was one of the first countries to voluntarily submit its Biennial Report to the process of “International Consultation and Analysis” (ICA) receiving a congratulatory response in December 2015, being part of the first round of countries worldwide to participate in this process.

This time, Chile presents in detail one of the most important aspects of implementation in the international arena, that is, climate finance. In particular, this document includes the results of a systematic survey of public needs and support received in the climate area. The report of capacity building, technical assistance, and climate technology transfer has also been improved in the public and private sectors of our country.

The greenhouse gas emissions inventory deserves a special mention. In an unprecedented way, we have expanded both its sectorial coverage and timespan, by covering a reporting period between the

years 1990 and 2013. But what makes us most proud is that the preparation of the inventory has consolidated joint work among various ministries, which have permanently made experts available within their own services to this country effort. We believe we have achieved greater cross-cutting collaboration in the construction and results of the inventory as a whole, as well as the sectorial inventories that compose it, facilitating the use of its results as an instrument to support sectorial policies of the ministries themselves.

As in previous versions, our Ministry's Department of Climate Change was responsible for coordinating the preparation of this report to the United Nations. This time, they had to double their efforts because, together with this Biennial Report, during 2016, Chile will also submit its Third National Communication to the United Nations Convention, an activity that was also headed by this department. I thank them and each one of the ministries, services, and focal points that contributed to the information needed to complete both reports. In any case, we believe that this effort is a major contribution that Chile makes towards the increasingly necessary and evident transparency and proactivity that we hope will progressively materialize internationally. Our challenge is for Chile to have public sectorial climate change policies, which permanently integrate the climate agenda with ongoing ministerial actions.

It is also time to thank the financial and technical support provided to Chile to prepare this report, especially to international cooperation projects, including the Global Environment Fund, the Low Emission Capacity Building Program, and the German Government's Information Matters project.

Chilean President, Michelle Bachelet, has especially highlighted the work of our country in the national and international climate arena. Her permanent presence in UN forums in which this issue was addressed, as well as her attendance, in an unprecedented manner for a President of our country, to the high-level segments in the COP20 and COP21, personally delivering Chile's First Biennial Report to the highest authorities of the Convention, demonstrates the commitment of our President with climate change issues. The President emphasized this when addressing the 70th Session of the United Nations General Assembly, and announced the main contents of Chile's Intended Nationally Determined Contribution: "The 2030 Climate Agenda is a shared horizon, now we must act."

Pablo Badenier Martínez
Chilean Minister of the Environment
Santiago de Chile, November 2016





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1 National Circumstances and Institutional Arrangements



El Morado. Archivo MMA.

1.1. Geography

Chile is a tri-continental country, situated in south western South America, stretching from 17°30'S latitude in the north to 56°30' latitude in the south. The territory encompasses Easter Island in Oceania and Antarctica in the far south in an area between the meridians 53° and 90° west longitude to the South Pole. Its territory extends north to the maritime border with Peru, and south to the shores of the Antarctic continent. Although it has many different climates, mainly determined by the latitude and altitude, temperate climate characteristics prevail.

The Chilean population grew rapidly in the 20th century, a trend that has begun contracting during the first decade of the 21st century. The progressive development of the country has raised the quality of life of Chile's inhabitants. The positive evolution of the country's Human Development Index (HDI)¹ in recent years is undisputable proof of these transformations (UNDP, 2015).

¹ The Human Development Index assesses the progress of countries considering health (life expectancy), education (average and expected number of years of schooling), and income (GNI per capita).

1.2. Economy

Chile has an open and stable economic model, which promotes trade and investment. To a large extent, the economic growth of the country is based on exports of raw materials. In recent years, Chile's economic policy has focused on instruments that promote economic growth and maintain a controlled and stable inflation rate. In particular, it can be noted that fiscal policy, in the framework of the structural balance policy, has continued to play a stabilizing role in the Chilean economic cycle.

To summarize, Table ES1 presents some key indicators for Chile, obtained from the information presented at the Third National Communication of Chile to the 2016 United Nations Framework Convention on Climate Change (3CN).

Table ES1. Chile- Key indicators

Information		Source
Geography and population		
Surface area:		
Total surface area	2,006,096 km²	Instituto Geográfico Militar (IGM)
South American surface area	755,915 km²	
Oceania surface area (Eastern Island)	181 km²	
Land uses:		
Agricultural areas	4.4%	Corporación Nacional Forestal (CONAF), 2016²
Native Forests	18.9%	
Forest Plantations and mixed forests	4.2%	
Meadows and Thickets	27.1%	
Urban and Industrial Areas	0.5%	
Areas cleared of vegetation	32.5%	Ministry of Environment (MMA), 2016
Protected marine areas	45,111.4 thousand ha	
National System of Protected Wilderness Areas (SNASPE)	14,630.5 thousand ha	
Population:		
Population in the year 2010	17,066,142	National Institute of Statistics (INE)
Population in 2016 (estimated)	18,191,884	
Males in the year 2016 (estimated)	49.5%	
Females in the year 2016 (estimated)	50.5%	
Population in the year 2020 (estimated)	18,896,684	
Population in the year 2050 (estimated)	20,204,779	Ministry of Social Development, 2016
Rural population in 2015 (estimated)	12.7%	
Indigenous population in 2013	1,565,915	
Migrant population in 2013	354,581	

² With respect to the South American and Oceania Surface area

Information		Source
Social development		
Life expectancy in 2015	79.1 years	National Institute of Statistics (INE), 2015
Infant mortality rate in 2013 (for every 1,000 live births)	7.0	
Literacy rate in 2012	98.9%	UNICEF
Urban population connected to sewage system in 2014	96.7%	Superintendence of Sanitary Services (SISS), 2014
Urban population with drinking water supply in 2014	99.9%	
Waste water treated in treatment plants in 2014	99.9%	
Human development Index in 2014	0.832	United Nations Development Program (UNDP), 2015
Population in extreme poverty in 2015	3.5%	Ministry of Social Development
Population in poverty in 2015	11.7%	
Ratio between the richest 10% and poorest 10% in 2015	27.2	
Gini coefficient in 2015	0.495	
Economic activity		
GDP in 2015	240,215.7 million USD	World Bank
GDP per capita, in 2015	22,316 USD	
Estimated GDP growth at 2016	1.9% annual	
Estimated GDP growth at 2018	2.3% annual	
Exportation of raw materials in 2015	43.7% of total exports	
Export of goods and services in 2015	30.1% GDP	DIRECON
Trade balance in 2014	3,515 million USD	
Mining exports in 2014	54.2% of total exports	
agricultural and forestry exports in 2014	7.6% of total exports	
Industrial Exports in 2014	38.2% of total exports	

Source: Own elaboration

1.3. Institutional arrangements for climate change

1.3.1. Environmental institutional framework

National policies aimed at sustainable development are part of Chile's overall development strategy. The Constitution guarantees, as a fundamental right, living in a pollution-free environment. Granting the State the duty to protect and preserve the country's natural resources and environment (Government of Chile, 2002). The consolidation process of Chilean environmental institutions has been marked by the creation of the Ministry of Environment (MMA), the Environmental Assessment Service (SEA), and the Superintendence of Environment (SMA) in 2010, together with the Ministers Council for Sustainability.

1.3.2. Institutional framework and climate change policies in Chile

Since Chile ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and also became a signatory to its Kyoto Protocol in 2002, it has actively participated in discussions and international efforts, in addition to faithfully meeting its commitments as a developing country. Moreover, the Paris Agreement, adopted in December 2015, was signed by Chile in September 2016.



Palacio de La Moneda, Camila González.

Department of Climate Change, Ministry of Environment

A major milestone in the public management of climate change in Chile occurred in 2010 with the official creation of the Climate Change Office (OCC), directly under the Ministry of the Environment. In 2014, the OCC went on to form the “Department of Climate Change” (DCC), integrated with the MMA’s Air Quality and Climate Change Division. As successor to the OCC, the DCC has actively participated in international negotiation processes associated with the implementation of the UNFCCC. It is also the designated national authority for the Clean Development Mechanism (CDM) and for the Adaptation Fund and serves as a focal point for the Intergovernmental Panel on Climate Change (IPCC) and the Nationally Appropriate Mitigation Actions (NAMA) Registry. In addition, the DCC participates in various networks for information exchange, such as the Latin American Network of Climate Change Offices (RIOCC), the Regional Cooperation Program between the European Union and Latin America (EUROCLIMA), the Scientific Committee on Climate Change of the Pacific Alliance, and the Inter-American Institute for Global Change (IAI).

In her speech on May 21st, 2016³, in the presence of the full Congress, President Bachelet announced the upcoming establishment of the Chilean Agency on Climate Change and Sustainable Development, in order to have an implementing agency for the Country’s agreements in this area.

Sectorial institutional framework

National public institutional structure includes a number of institutions, agencies, or entities that do not belong to the MMA, but are linked to the issue of climate change. Most of the ministries that make up the Council of Ministers for Sustainability have defined some basic structure or person in charge of the climate change issue within their organization. A challenge is pending in this regard to increase interaction between the central government and the subnational levels of government although there are signs of greater participation in regional and municipal structures, especially in the area of adaptation to climate change.

³ A date on which Chilean presidents give the annual state of the nation speech.

2 Chile's National Greenhouse Gas Inventory, 1990-2013

Key points

- In 2013, Chile's total GHG emissions (excluding *FOLU*) amounted to 109,908.8 Gg CO₂ eq, an increase of 113.4% since 1990 and of 19.3% since 2010. The main GHG emitted by Chile was CO₂ (78.4%), followed by CH₄ (10.7%), N₂O (10.0%), and fluorinated gases (0.9%).
- The *Energy* sector is the largest GHG emitter in Chile (77.4%), mainly due to the consumption of coal and diesel for electricity generation and consumption of diesel in road transport.
- The *Agriculture, Forestry, and other land uses (AFOLU)* sector is the only sector that consistently removes CO₂ in the country, and remains as a sink for the entire time series. Net removals from the sector amounted to -26,119.2 Gg CO₂ eq mainly due to the increase in biomass in forest plantations and second-growth natural forest.
- In 2013, Chile's balance of GHG emissions and removals (including *FOLU*) amounted to 70,054.4 Gg CO₂ eq.

2.1. Introduction

This is the Fourth National Greenhouse Gas Inventory (NGHGI) submitted by Chile to UNFCCC in fulfillment of Article 4, paragraph 1(a) and Article 12, paragraph 1(a) of the UNFCCC and decision 1/CP.16 of the 16th Conference of the Parties (Cancun, 2010).

Chile's NGHGI is compiled according to *2006 IPCC Guidelines for national greenhouse gas inventories*, covering the entire national territory and including emissions and removals of carbon dioxide (CO₂) and emission of methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) in a series of time from 1990 to 2013.



Bosque de Araucarias, Charral Tala.

2.2. Institutional arrangements and preparation of Chile's NGHGI

Since 2012, the area of GHG Inventories of the Ministry of the Environment's Department of Climate Change (DCC) designed, implemented, and has maintained the National Greenhouse Gas Inventory System of Chile (SNICHILE), which contains the institutional, legal, and procedural steps for the biennial update of Chile's NGHGI, thus ensuring the sustainability of the preparation of GHG inventories in the country, the consistency of GHG flows reported, and the quality of the results. SNICHILE's ongoing work is divided into five lines of action:

- Operation of SNICHILE
- Updating of Chile's NGHGI
- Quality assurance and quality control system
- Capacity building
- Archiving and dissemination.

SNICHILE's work plan is organized in a two-year cycle of activities. During the first year the Sectorial Technical Teams update the Sectorial Greenhouse Gas Inventories (SGHGI), while in the second year the Coordinating Technical Team compiles the SGHGIs and develops the cross-cutting issues of Chile's NGHGI.

The preparation of the Fourth Chile's NGHGI began during the first half of 2015 and concluded in mid-2016. The Energy's SGHGI was updated by the Ministry of Energy's Foresight and Energy Policy Division; the IPPU's SGHGI was updated by the MMA's DCC; the AFOLU's SGHGI was updated by the Ministry of Agriculture through the Office of Agrarian Studies and Policies (ODEPA), the National Forestry Corporation (CONAF), the Forest Institute (INFOR), and the Agricultural Research Institute (INIA); the Waste's SGHGI was jointly updated by the Ministry of Environment's Waste and Environmental Risk Office and its DCC. Once the updating process was completed, the SGHGIs were compiled by the MMA's DCC for the preparation of Chile's NGHGI and the respective National Greenhouse Gas Inventory Report (NIR), which goes through a review process at the national and international levels.

In conclusion, Chile's NGHGI is the result of the collective and continuous efforts of the Ministries of Agriculture, Energy, and Environment, which have worked in coordination under the framework of SNICHILE. This work has strengthened the preparation of Chile's NGHGI by adding expert knowledge from the various sectorial ministries involved.

2.3. Trends in Chile's greenhouse gas emissions

In 2013, the balance of GHG⁴ emissions and removals in Chile amounted to 70,054.4 Gg CO₂ eq, while total GHG emissions⁵ in the country amounted to 109,908.8 Gg CO₂ eq, an increase of 113.4% since 1990 and of 19.3% since 2010 (Table ES2). The key drivers of this trend in the GHG balance were the *Energy* and the *AFOLU* sectors. The values observed that fall outside of the trend (Figure ES1) are primarily the consequence of forest fires accounted for in the *AFOLU* sector.

Table ES2. Chile's NGHGI: GHG emissions and removals (Gg CO₂ eq) by sector, 1990-2013

Sector	1990	2000	2010	2011	2012	2013
1. Energy	33,219.5	52,122.9	69,423.7	78,527.0	82,076.6	85,075.4
2. IPPU	3,127.5	6,449.6	6,008.1	6,868.3	7,214.9	6,619.4
3. AFOLU	-30,866.3	-32,819.2	-30,514.4	-24,339.9	-18,410.7	-26,119.2
Agriculture	12,633.5	13,580.7	12,879.8	12,741.7	13,285.0	13,735.2
FOLU	-43,499.8	-46,399.9	-43,394.2	-37,081.6	-31,695.8	-39,854.4
4. Waste	2,526.1	3,348.3	3,802.6	3,939.8	4,019.2	4,478.8
Balance (with FOLU)	8,006.8	29,101.5	48,719.9	64,995.1	74,899.9	70,054.4
Total (without FOLU)	51,506.6	75,501.4	92,114.2	102,076.7	106,595.6	109,908.8

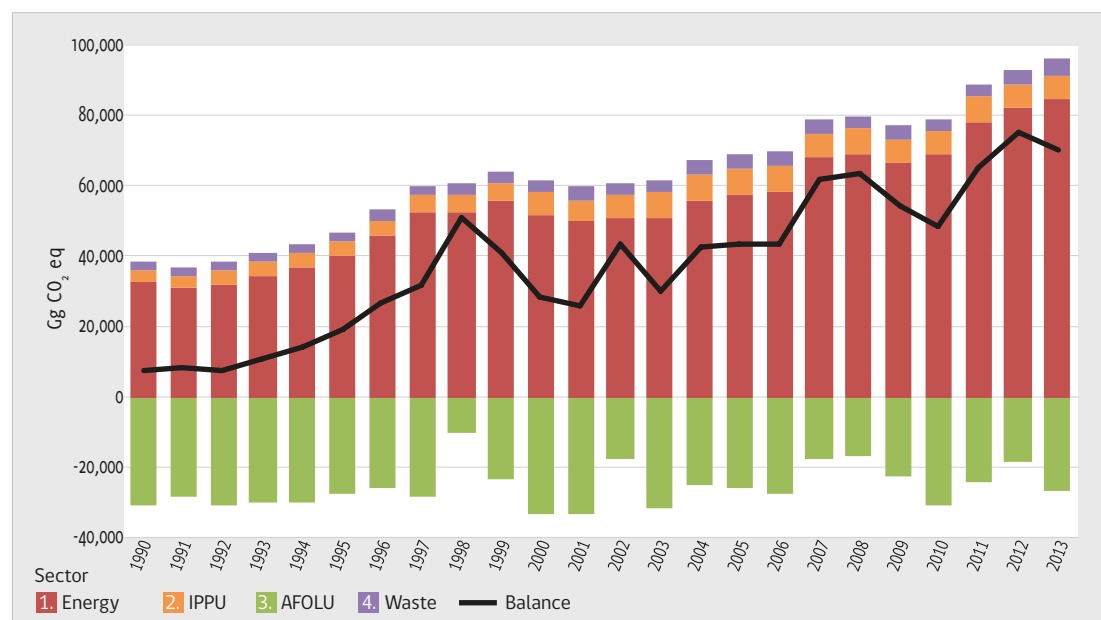
Source: MMA's Coordinating Technical Team

IPPU= Industrial processes and product use; AFOLU= Agriculture, forestry and other land use; FOLU= Forestry and other land use

In 2013, the total GHG emissions were dominated by CO₂, accounting for 78.4%, followed by CH₄ (10.7%) and N₂O (10.0%). Fluorinated gases collectively accounted for 0.9% of total GHG emissions in the country.

⁴ In this report, the terms "balance of GHG emissions and removals" or "GHG balance" refer to the sum of emissions and removals of greenhouse gases, expressed in carbon equivalent (CO₂ eq). This term includes the entire AFOLU sector.

⁵ In this report, the term "total GHG emissions" refers to the sum of national GHG emissions only, expressed in carbon dioxide equivalent (CO₂ eq). This term excludes sources of emissions and sinks from forestry and other land uses (FOLU) of the AFOLU sector, but includes greenhouse gas emissions from Agriculture.

Figure ES1. Chile's NGHGI: GHG emissions and removals (Gg CO₂ eq) by sector, 1990-2013

Source: MMA's Coordinating Technical Team

IPPU= Industrial processes and product use; AFOLU= Agriculture, forestry and other land use; FOLU= Forestry and other land use

The *Energy* sector is the leading GHG emitter in Chile, accounting for 77.4% of total GHG emissions in 2013. That year, GHG emissions from the sector amounted to 85,075.4 Gg CO₂ eq, an increase of 156.1% since 1990 and of 22.5% since 2010. In general, this is mainly due to the increase in energy consumption in the country, including the consumption of coal and natural gas for electricity generation and consumption of liquid fuels, mostly diesel and gasoline, for road transportation. With regard to subcategories, the *Energy Industries* (mainly *Main activity electricity and heat production*) is the leading source of GHG emissions within the sector, with 45.3% share in 2013, followed by 28.9% from *Transport* (mainly road transportation), 16.8% from *Manufacturing industries and construction*, and 8.0% derives from *Other sectors* (mainly *Residential*). The *Oil and natural gas* subcategory accounted for 0.9%, while *Solid fuel* accounted for 0.1%.

The *IPPU* sector accounted for 6.0% of total GHG emissions in 2013. In the same year, GHG emissions from the sector amounted to 6,619.4 Gg CO₂ eq, an increase of 111.7% since 1990 and of 10.2% since 2010. Overall, this is mainly due to the sharp increase in production of iron and steel, lime, nitric acid, and cement. With regard to categories, 37.7% of GHG emissions from the sector correspond to the *Mineral industry*, followed by 23.9% from the *Metal industry*, 21.2% from the *Chemical industry*, 10.4% from *Product use as substitutes for ozone depleting substances*, 4.7% from *Other product manufacture and use*, and, finally, 2.1% from *Non-energy products from fuels and solvent use*.



Central termoelectrica. Archivo MMA.

The *AFOLU* sector is the only sector that consistently removes CO₂ in the country, making it the most relevant due to its mitigation potential. In 2013, the GHG balance from the sector amounted to -26,119.2 Gg CO₂ eq, reducing its sink condition by 15.4% since 1990 and by 14.4% since 2010. Overall, this is because the *Land* category decreased their removals, while GHG emissions from categories associated with agricultural activities (*Livestock* and *Aggregate sources and non-CO₂ emissions sources on land*) have remained stable during the 1990-2013 series. Regarding emissions and removals of greenhouse gases in absolute terms by category, 73.8% correspond to *Land*, followed by 15.5% from *Aggregate sources and non-CO₂ emissions sources on land* and, finally, 10.6% correspond to *Livestock*.

The *Waste* sector accounted for 4.1% of total GHG emissions in 2013. In the same year, GHG emissions from the sector amounted to 4,478.8 Gg CO₂ eq, an increase of 77.3% since 1990 and of 17.8% since 2010. In general, the key driver is the sustained increase in solid waste generation and its final disposal in landfills. With regard to categories, 72.0% of GHG emissions from the sector correspond to *Solid waste disposal*, followed by 26.7% from *Wastewater treatment and discharge*, 1.3% from *Biological treatment of solid waste* and, finally, 0.01% from *Incineration and open burning of waste*.

In accordance with the requirements of the UNFCCC and the 2006 IPCC Guidelines, GHG emissions generated by the consumption of fossil fuel in international air and maritime transport and CO₂ emissions from biomass burned for energy purposes were quantified and reported as *memo items*, but were excluded from the balance of GHG emissions and removals in the country.

3 GHG Mitigation Policies and Actions



Atardecer Sigo., Jenny Mager.

Nationally, the actions that contribute to the reduction of GHG emissions have been developed in a sectorial context. The Ministry of Environment, in its role as coordinator of climate change issues in Chile, has gathered information on national policies and initiatives with benefits in GHG mitigation, enhancing this variable as an indicator of the country's efforts to comply with the objectives of the UNFCCC.

At COP 15 (2009, Copenhagen) the Minister, President of the National Environment Commission (CONAMA) expressed Chile's voluntary pledge, which affirms that "Chile will take nationally appropriate mitigation actions to achieve a 20% deviation below the "Business as Usual" emissions growth trajectory by 2020, as projected from the year 2007". The statement also specified that "To accomplish this objective, Chile will need a relevant level of international support." This voluntary commitment has led to the development of various mitigation activities in the country focused on reducing GHG emissions.

For the first time the Paris Agreement, adopted in December 2015, involves all parties in a common cause to make ambitious efforts to fight climate change and adapt to its effects and called on countries to make their best efforts in their Intended Nationally Determined Contributions. As part of the preparation of this agreement, Chile developed its Intended Nationally Determined Contributions (INDC).

3.1. Chile's Intended Nationally Determined Contribution (INDC)

Chile has submitted its INDC to the secretary of the UNFCCC in September 2015. The country's commitments are divided into 5 pillars: i) Mitigation, ii) Adaptation, iii) Capacity building, iv) Technology Development and Transfer and v) Financing.

In the case of the mitigation pillar, Chile has chosen to present its contribution using the format of emissions intensity (tons of CO₂ equivalent per unit of gross domestic product (GDP) in millions of CLP\$ at 2011). Methodologically, it was decided to separate the Land Use, Land-use change, and Forestry (LULUCF) sector from the national commitment to mitigation, due to the high annual variability of sinks and emissions from the sector, and for being less dependent on the trajectory of economic growth.

Chile's Intended Nationally Determined Contribution (INDC) in Mitigation Issues

Carbon Intensity Target:

- a) Chile is committed to reduce its CO₂ emissions per GDP unit by 30% below their 2007 levels by 2030, considering a future economic growth which allows to implement adequate measures to reach this commitment.
- b) In addition, and subject to the grant of international monetary funds, the country is committed to reduce its CO₂ emissions per GDP unit by 2030 until it reaches a 35% to 45% reduction with respect to the 2007 levels, considering, in turn, a future economic growth which allows to implement adequate measures to achieve this commitment.

Specific contribution from the forestry sector:

- a) Chile has committed to the sustainable development and recovery of 100,000 hectares of forest land, mainly native, which will account for greenhouse gas sequestrations and reductions of an annual equivalent of around 600,000 tons of CO₂ as of 2030. This commitment is subject to the approval of the Native Forest Recovery and Forestry Promotion Law.
- b) Chile has agreed to reforest 100,000 hectares, mostly with native species, which shall represent sequestrations of about 900,000 and 1,200,000 annual equivalent tons of CO₂ as of 2030. This commitment is conditioned to the extension of Decree Law 701 and the approval of a new Forestry Promotion Law.

3.2. Sectorial mitigation actions

Chile has implemented a series of cross-cutting and sectorial actions, which, although they have been designed with sectorial purposes, due to their characteristics, they have had an impact on GHG emissions in the country. During 2015 and 2016, the Chilean government prepared its National Action Plan on Climate Change (PANCC), which includes a strategic line of mitigation whose main objective is to *“create the enabling conditions for the implementation, compliance, and monitoring of the commitments to the UNFCCC to reduce Chile’s GHG emissions and to contribute consistently to the country’s sustainable development and to low growth in carbon emissions.”*

This report covers the progress of actions and policies in diverse sectors. Regarding the Energy sector, which is regulated by the Ministry of Energy, the increasing share of renewable sources in the energy matrix of the country, the policies promoted by the sector that have contributed to reducing emissions thanks to the inclusion of clean energy, and the efficient use of energy, among others, can be highlighted. The development of the Energy Agenda and the Energy Policy of Chile - Energy 2050- with a long-term view, align the strategy and vision of this sector with the country’s environmental objectives, specifically with regard to the commitments on mitigation of GHG emissions.

Regarding the Transportation sector, the Ministry of Transportation and Telecommunications, through its Undersecretary of Transportation, is responsible for generating policies, regulations, and conditions for the development of transport systems. This sector has motivated and promoted technological improvements and alternative transport modes and has worked on management and planning. Initiatives such as the Green Zone in Santiago and the “National Strategy for Sustainable Transport” can be highlighted, which are in the local application process for the Green Climate Fund and intend to develop actions to ensure that public transport in Chile be at the forefront of technological development and innovation and be environmentally-friendly with low carbon emissions in order to improve the quality of life of Chileans.

With respect to the Agriculture and Land Use Change sector, the net contribution to GHG emissions is negative since its ability to capture CO₂ exceeds its emissions. Carbon sinks are mainly from second-growth natural forest; from regeneration of managed native forest, and from mostly exotic forest plantations. Due to the contribution to the mitigation capacity from the LULUCF sector, in its INDC, Chile shows a specific contribution for this sector, associated with sustainable forest management and recovery. As a key instrument to meet this forest goal, the National Forestry Corporation (CONAF) is formulating and implementing the National Strategy on Climate Change and Plant Resources (ENCCRV) in order to establish a legal, technical, operational, and financial platform to regulate and promote the conservation, recovery, and rational use of plant resources, from a perspective that contributes to mitigation and adaptation to climate change, and to the consequent desertification, drought, and land degradation processes, with emphasis on those territories with greater social, economic, and environmental vulnerability in the country.



Altos de Pemehue, Archivo CONAF.

In the Waste sector, most of Chile's GHG are generated by Municipal Solid Waste, which management is handled by municipalities through the Organic Constitutional Law of Municipalities and regulated by the Sanitary Code. The Ministry of Environment is responsible for the design and implementation of policies, plans, and programs on environmental issues, including waste management programs. Currently, the policy of comprehensive solid waste management is in the updating stage. A milestone in this context is Law No. 20,920, enacted in 2016, which sets the framework for waste management, increased responsibility of manufacturers and the promotion of recycling, and requires manufacturers and importers of six top products to recover a percentage of their products once they have completed their useful life.

In addition to these sectorial actions, in Chile there are other initiatives that contribute to GHG mitigation, including cross-cutting measures, such as the Clean Production Agreements; actions in the housing and urban development sector; local initiatives in the framework of the Chilean Network of Municipalities on Climate Change; and actions taken by the private sector. Among the latter, we can mainly highlight those carried out by the Mining, Cement, and Steel sectors, which have made significant investments for calculating emissions responding to the companies' own needs and to the report to international sectorial associations.

3.3. Nationally Appropriate Mitigation Actions

Chile was the first country in the world to submit a NAMA to the UNFCCC, in October 2012. In the country six sectorial NAMAs were identified with different levels of maturity and information available. Five of the latter were registered in the NAMA Registry of the UNFCCC; some of the NAMAS have undergone major design changes since the publication of the first BUR. The NAMAS are complementary to sectorial mitigation actions described in the previous section.

Table ES 3: Chile's NAMAS

Name	Sector and Gases	Period	Reduction of estimated GHG	Situation
Self-supply renewable energies in Chile (SSREs)	Energy CO ₂	2015-2021	1.5 MtCO ₂ eq	Underway
Green Zone for Transport in Santiago	Transport and infrastructure CO ₂	2014-2022	1.43 MtCO ₂ eq	Underway and developing its MRV system
Design and Implementation of Strategy on Climate Change and Plant Resources	LULUCF CO ₂	2013-2025	42 MtCO ₂ eq	Underway
Clean Production Agreements (APL) in Chile	Transversal	2012-2020	18.4 MtCO ₂ eq	Underway
Energy recovery from industrial waste program (former National Program for Industrial and Commercial Catalyzation and Organic Waste Management in Chile)	Energy, Waste CO ₂ ; CH ₄	To be defined	Reduction potential under estimation	In design stage
Carbon sequestration through sustainable land management	Agriculture, Forestry/AFOLU CO ₂	To be defined	65 a 80 MtCO ₂ eq	Being designed, seeks support for its implementation

3.4. Transversal actions of support towards a low carbon economy

In addition to the actions described, the Chilean Government has developed a number of initiatives supported by international funding that have allowed creating a national vision of low-carbon growth. This is how the MAPS-Chile Project evaluated different possible mitigation scenarios for Chile with various sectorial measures. This information, in turn, was one of the main inputs for the construction of Chile's INDC, a commitment that will set the course in mitigation issues for the coming years. In addition, the Low Emission Capacity Building (LECB-Chile) project, that started in 2012 and supported capacity-building for mitigation in the country with four components, specifically supported the improvement of the National Inventory system and the design of the HuellaChile (carbon footprint) program, as a link between the public and private sectors.

As for economic instruments, in 2014 the Chilean Government enacted the Tax Reform Act. This included, for the first time in Chile, the introduction of three "green taxes". The first applies to light vehicles according to their urban performance and NO_x emissions, and the second applies

to fixed sources and taxes SO_2 , NO_x and PM emissions into the atmosphere. It is expected that these taxes have important, but indirect, co-benefits in reducing GHGs. The third is a direct tax on CO_2 emissions at US\$5 per ton. The possible introduction of a system of emissions trading as a complement to the tax and the modifications that could be introduced into the latter, are being evaluated by the Partnership for Market Readiness (PMR) project, led by the Ministry of Energy in conjunction with the MMA.

3.5. Measurement, reporting, and verification of mitigation actions

In Chile, measurement, reporting, and verification (MRV) seeks to foster transparency in GHG mitigation actions implemented in the country through mechanisms that allow monitoring compliance with its objectives. Although Chile reports the implementation of their mitigation actions to the international community through the Biennial Update Reports (BUR) and through its national communications as requested by the UNFCCC, it is necessary to understand that having MRV systems for individual actions is key to assessing the effectiveness of those actions.

In this regard, since 2011, Chile has been working on independent MRV systems which have served as management tools for NAMAs as well as building capacities in this area through the international support of various projects, such as, support for the preparation of the “Guidelines for a Generic Framework of MRV for NAMAs” in 2014. This document explains how to measure, report, and verify impacts on GHG emissions and other co-impacts generated through the implementation of mitigation actions. Although this was developed for NAMAs, this framework can be used for any type of action that generates the mitigation of GHG emissions.



Vicuña, Archivo CONAF

4 Needs and Support Received in the Area of Climate Change

Chile is extremely vulnerable to climate change; the various foreseen impacts translate into significant social and economic losses. That is why the country has been proactive in both mitigation and adaptation, which is reflected in its INDC submitted to the UNFCCC in 2015. However, there are still needs and gaps to be addressed through national efforts, but also, importantly, by means of international support.

4.1. Methodology and timeframe

As a methodological framework, the DCC has applied the Convention Guidelines for the submittal of the biennial update reports from Parties not included in Annex I of the Convention (Annex III, Decision 2/CP.17⁶) to provide updated information on needs and support received on climate change. Both subjects were divided into the following areas: financial resources, capacity-building, technical assistance and technology transfer; identifying gaps and barriers for each area. In turn, these areas were subdivided into five different areas: reporting, mitigation, adaptation, national



PN Tolhuaca CONAF, Charif Tala.

⁶ <http://unfccc.int/resource/docs/2011/cop17/spa/09a01s.pdf#page=>



Primer bus eléctrico, Archivo MMA.

inventory of climate change and international negotiation; thus maintaining the same structure used for the first BUR.

For gathering information, a process was developed with five main stages: i. identification of initiatives and international support on climate change; ii. Validation of these initiatives with public institutions involved and incorporation of new information; iii. Workshop with said public institutions for participatory identification of needs, barriers, opportunities, etc.; iv. Cross-check on support received, from donors and implementers; and v. Bilateral meetings to validate previously gathered information.

The information presented covers the period immediately following the information gathering phase of the first BUR (from the second half of 2014 to the first half of 2016).

4.2. Needs

The development of Chile's institutional structure and capacity-building on climate change issues in Chile, have shown substantial progress in recent years. However, it is still possible to identify needs, gaps, and barriers that hinder the development of more effective climate action in the country. The main needs that cut across all areas are related to the generation of appropriate institutions to facilitate the development of actions on climate change in the country and a funding strategy which is consistent with the requirements that are generated during the process.

With the approval of the National Plan for Adaptation to Climate Change in December 2014, an operating structure was proposed that has served as the basis for strengthening the institutional framework for climate change in recent years. This structure is made up of an Inter-Ministerial Technical Team on Climate Change (ETICC) and 15 Regional Committees on Climate Change (CORECCs). However, it is still necessary to develop and strengthen such institutions, by developing regulations that support their construction beyond sectorial intentions. Financial needs are also detected ranging from access to international funds to the capacity to receive financial resources, particularly in the public sector.

4.2.1. Reporting

The greatest challenge facing reporting activities continues to be the earmarking of the budget for the installation of permanent reporting systems. Capacity-building to systematize and provide timely and appropriate information for the different types of reports is an urgent necessity, as well as the development of technologies to improve and expand the coverage of the information generated and reported.

4.2.2. Mitigation

In the period reported, Chile has advanced with robust sectorial policies aimed at low carbon development. However, this effort is insufficient when considering the commitments acquired internationally, since, for their compliance, additional efforts at the country level are still required in terms of information systems and local capabilities, as well as the need for significant international support.

In regard to the strengthening of the measurement, reporting, and verification systems (MRV), through the development of institutional capacities, significant efforts have been made. However, it is a priority that this strengthening be applied to all institutions that develop actions that have the potential for reducing GHG emissions. With regard to local capacities, it is of particular importance to strengthen Regional Governments and Municipalities to implement and monitor mitigation measures.

From the point of view of technology transfer, the introduction of innovative equipment and processes is necessary to reduce energy use, with low emission technologies, and technologies to harness the energy potential of the country, in order to design and implement mitigation measures in the various sectors.

4.2.3. National Greenhouse Gas Inventory (NGHGI)

With respect to the NGHGI, the main need is to have the largest possible number of permanent and competent professionals, hired by the State, which constitute stable technical teams to ensure the sustainability of the system and the quality of GHG estimates. In addition, we expect to have the



HuellaChile MMA.

largest number of country-specific emission factors in order to reflect the national situation more accurately in terms of GHG emissions and removals.

From the point of view of financial resources, it is necessary to have permanent national funding for hiring new professionals for the different technical teams as well as permanent funding for scientific research and development of country-specific emission factors.

As for technology transfer, adequate teams are required for scientific research and the development of country-specific emission factors, especially in the *AFOLU* sector.

4.2.4. Adaptation

The ongoing line of work that the DCC has done on issues of adaptation, allowed the preparation and approval of the National Climate Change Adaptation Plan PAN (MMA, 2014), a commitment assumed in the National Climate Change Action Plan 2008-2012. In addition to the specific sectorial plans of the Agriculture and Forestry sector (2013) and the Biodiversity sector (2014), the specific sectorial plan of the Fisheries and Aquaculture sector (2015) was approved and the Health sector plan is on verge of approval. Five other sectorial adaptation plans are in various stages of development and will focus on the Infrastructure (2017), Cities (2017), Water Resources (2018), Energy (2018), and Tourism (2018) sectors. However, for efficient adaptation it is extremely important to achieve proper coordination between national and sectorial policies, in regard to the development policies of regional governments; as well as financing requirements arising from the need to maintain permanent full-time staff in the different sectorial

institutions, allowing to articulate and provide continuity to the various adaptation plans (implemented and under development).

In relation to the needs of technology transfer, requirements were identified in the introduction of diverse technologies to adapt to water scarcity, to increase energy efficiency, and to expand the coverage of the systems and information products to support climate risk management, among others.

4.2.5. International Negotiation

In regard to international negotiations, the main need is to expand the current negotiating team in the country and establish permanent teams in the relevant sectorial ministries, with adequate financial and technical capacity for the preparation and full strategic monitoring of the negotiations and appropriate coordination mechanisms.

4.2.6. Private Sector

In Chile, the private sector has played a key role in both the investment and the implementation of innovative measures to mitigate and adapt to climate change. However, there are situations that discourage the transversal actions of this sector, such as the lack of climate change regulations to clearly establish the objectives and requirements for this sector, the lack of capacities at the sectorial level, and the lack of incentives to catalyze the actions of the private sector.

4.2.7. Needs identified in the analysis process and the International Consultation of the First BUR

During 2015, Chile's first Biennial Update Report (BUR) was the subject of the International Consultation and Analysis (ICA) process whose main objective is to help the non-Annex I countries identify their capacity-building needs. The main needs declared by Chile primarily relate to: i) Ensuring a technical staff to increase the quality of national inventories; ii) Developing activities for capacity-building in the energy sector to address knowledge gaps resulting from a constant change in the professional teams; iii) Addressing technical and information gaps to enable the systematic collection of data and sectorial information; iv) Establishing specific procedures and arrangements to ensure the involvement of relevant institutions in the collection, compilation, and validation of the information reported; v) Capacity-building and exchanging of successful experiences in implementing MRV systems in the development of NAMAs of different sectors; and vi) Capacity-building to assess technological requirements relating to data collection for the BUR and the implementation of MRV systems. These requirements are in line with those identified internally in the country.

4.3. Support for Climate Action

Information on support received (international) and delivered (national) earmarked for climate change activities, is presented below.

4.3.1. Support received for activities related to climate change

During the reporting period (June 1, 2014 to July 30, 2016), the donor countries and institutions have approved a total of US\$ 22,150,625 for Chile to carry out national climate agenda activities. The projects carried out, and underway, to strengthen climate change action and policies, with international financial support, include: Mitigation Options for Addressing Climate Change (MAPS Chile), Low Emission Capacity Building - Chile (LECB-Chile), the Partnership for Market Readiness (PMR), and activities funded by the Carbon Partnership Fund.

Regarding financial resources channeled to private sector projects, the financial flows for the projects amount to US\$ 217,700,000. This category includes financial flows (loans) from development bank institutions as well as institutions and funds focused on finance actions to mitigate climate change and the transition towards a low carbon emissions economy.

The support received in the area of capacity building and technical assistance has come from national and international sources through projects, workshops, studies, and specific programs, which have had a positive impact on increasing the technical capacity installed in the country. Chile has also received support for the development of national communications training activities, mainly directed to government officials in Chile.

Finally, with regard to technology transfer, the support has focused on renewable energy technologies and productive applications in the agriculture and forestry sector.

4.3.2. Domestic support for activities related to climate change

Even though Chile has received significant financial support and diverse types of support, in recent years it has earmarked domestic funds to co-finance actions to address climate change locally. The total amount of co-financing channeled through the International Cooperation Agency of Chile for the 2014-2016 period reached USD \$20,370,000.

On the other hand, in the context of developing a strategy for climate financing (INDC commitment), the Chilean Government is implementing a methodology for defining and assessing public resources earmarked for climate change actions.





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