

# Uruguay

## Greenhouse Gas Emissions Report for the Sovereign Sustainability-linked Bond (EMR-SSLB)<sup>1</sup>

Time series 1990-2021



Ministerio  
de Ambiente



Greenhouse Gas Emissions Report for the

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<sup>1</sup> This document shall not be considered as Uruguay's National Greenhouse Gas Emissions Inventory

## Sovereign Sustainability-linked Bond (EMR-SSLB)

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The preparation of the 1990-2021 Greenhouse Gas Emissions Report for the Sovereign Sustainability-linked Bond (EMR-SSLB) was coordinated by Uruguay's **Ministry of Environment (MA)** through the National Climate Change Response System (SNRCC) and developed by the **National Greenhouse Gas Inventories Working Group of the SNRCC**.

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# 1. Introduction

Uruguay's Sovereign Sustainability-linked Bond (SSLB) aligns Uruguay's sovereign financing strategy with its climate and nature conservation goals based on the commitments made under the Paris Agreement.

The SSLB framework<sup>2</sup> describes Uruguay's sustainable strategic priorities and sets targets for Key Performance Indicators (KPIs) linked to Greenhouse Gas (GHG) emissions intensity progression.

The Performance Targets (SPTs) are based on the 2025 quantitative targets set by Uruguay in its first Nationally Determined Contribution<sup>3</sup> (NDC).

The methodologies used to calculate KPI performance are the same as those used by Uruguay to report progress for the NDC<sup>4</sup>. The KPI-1<sup>5</sup> looks at aggregate GHG (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) emissions per real GDP unit (AR5 100-year GWP) from each contributing source, category, and sector for each GHG outlined in Uruguay's first NDC.

The National Greenhouse Gas Inventories Working Group (NGHGI-WG) of the National Climate Change Response System of Uruguay (SNRCC) prepares the GHG Emissions Report (EMR-SSLB) as input to estimate the SSLB's KPI-1.

## 1.1. Institutional Arrangements

Executive Decree No. 238/2009, dated May 20th, 2009, created the SNRCC as the coordinating body for national policies, plans, and actions on climate change. The Ministry of Environment (MA) chairs its Coordination Group, and the Ministry of Livestock, Agriculture and Fisheries (MGAP) and the Budgeting and Planning Office (OPP) co-chair.

Also, under the scope of the SNRCC, there are other thematic working groups made up of representatives of these institutions that deal with different climate change-related topics (NGHGI, loss and damage, programming, monitoring, reporting and verification (pMRV), adaptation, gender, among others). Some of these Working Groups are directly involved in preparing the country's reports to the United Nations Framework Convention on Climate Change (UNFCCC) and monitoring nationally determined contributions under the NDC. This is the case of the NGHGI-WG coordinated by the National Climate Change Directorate (DINACC) of the MA. The working group is made up of representatives of the different ministries involved in preparing the NGHGI.

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<sup>2</sup> [Uruguay's Sovereign Sustainability-linked Bond \(SSLB\) \(mef.gub.uy\)](https://mef.gub.uy)

<sup>3</sup> [Uruguay First Nationally Determined Contribution.pdf \(unfccc.int\)](https://unfccc.int)

<sup>4</sup> [Nationally Determined Contribution Progress Viewer \(gobiernoabierto.gub.uy\)](https://gobiernoabierto.gub.uy)

<sup>5</sup> [ficha-tecnica-co2-equivalente-espanol.pdf \(mef.gub.uy\)](https://mef.gub.uy)

Issuing a Sovereign Sustainability-linked Bond—due to the very nature of these bonds—requires a multidisciplinary and interministerial approach and a combined effort of all the Ministries involved: Ministry of Economy and Finance (MEF), MA, Ministry of Industry, Energy and Mining (MIEM) and MGAP. An institutional framework was developed to tackle the challenges around the estimation and reporting of the indicators on an annual basis and the efforts needed to coordinate their subsequent external review. This framework assigns different responsibilities and roles to ensure timely compliance with the legal and contractual obligations undertaken to issue a Sovereign Sustainability-linked Bond.

Uruguay has developed the institutional structure needed to ensure a robust design and operationalization of SSLBs. The government called in a new interministerial working group under the SNRCC: the SSLB Group. This group brings together representatives from five ministries: MEF, MA, MIEM, MGAP, and Ministry of Foreign Affairs (MRREE).

The SSLB Group coordinates efforts across Ministries, sets specific and measurable goals, timelines, and responsibilities, and ensures that the goals are communicated to and understood throughout the Public Sector during the bond's life. The SSLB Group oversees progress regarding the estimation, monitoring, reporting, and timely external review of KPIs for the SSLBs.

On September 19th, 2022, an *Interministerial Coordination and Cooperation Agreement for the Issuance of Sustainability-linked Bonds*<sup>6</sup> was signed by the MEF, MA, MIEM, MGAP, and MRREE, outlining the responsibilities of each ministry and the work schedule for the preparation and publication of the Annual SSLB Report.

Under the agreement, the MIEM, MGAP, and MA will submit to the NGHGI-WG the *Sectoral GHG Emissions Report for the previous year*<sup>7</sup>, required for the calculation of the SSLB KPI-1, together with a sectoral methodological note and electronically recorded data of GHG estimates (database, supporting spreadsheets), pursuant to the competencies established in Decree No. 181/020 of June 24th, 2020. This decree—which formalizes the NGHGI-WG—outlines a collaborative working arrangement between the MA, MIEM, and MGAP. This means that each ministry must report the greenhouse gas estimates for the specific sector under their scope.

As part of this methodology, and within the SSLB framework, the MA is responsible for the general coordination, the compilation of the sectoral information submitted by the other ministries, quality control, and preparation of the final report and the methodological note outlining the emissions estimation. The MA also estimates emissions and their evolution for the Industrial Processes and Waste sectors.

In turn, the MGAP estimates and reports greenhouse gas emissions and their evolution for the Agriculture sector and the MIEM for the Energy sector.

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<sup>6</sup> [acuerdo-biicc\\_final.pdf \(mef.gub.uy\)](#)

<sup>7</sup> For the first year only (in this case, 2022) the information submitted will comprise the preceding two years (2020 and 2021).

## 1.2. EMR-SSLB Reporting Cycle

The preparation of the EMR-SSLB report begins with the request for information from the different data sources to prepare sectoral estimates (Figure 1).

Each sector collects and processes the information to compile the GHG estimates required for KPI-1 estimation and the preparation of the report. The report is then submitted for internal review, including comments and suggestions raised throughout the process.

The SNRCC, through its Coordination Group, approves the report's final version. It is then submitted for quality assurance by an external reviewer, carried out by the United Nations Development Programme (UNDP) and the SSLB Group.

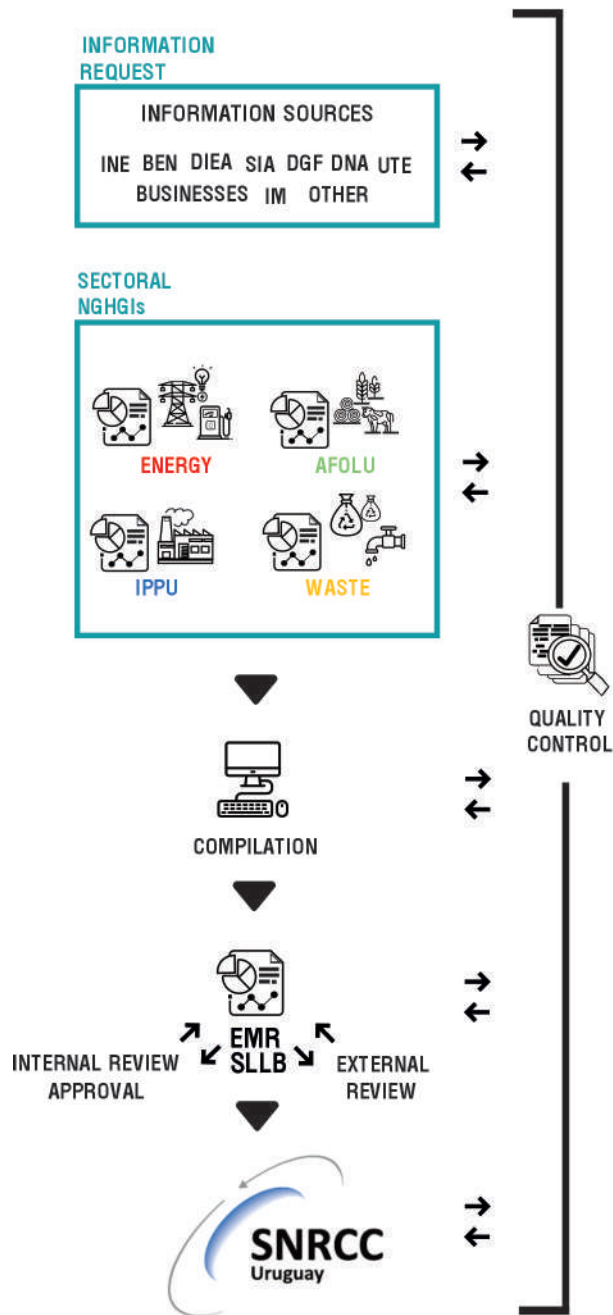


Figure 1. Report preparation cycle

Based on the EMR-SSLB Report and other required information, the Programming, Monitoring, Reporting, and Verification Working Group (pMRV-WG) of the SNRCC prepares the KPIs and the Indicator Report for the SSLB (IR-SSLB), which is also subjected to external review.

Finally, the SSLB Group prepares the final SSLB Government Indicator Report (GIR-SSLB) based on the EMR-SSLB, the IR-SSLB, and the external reviewer report.

### 1.3. Methodology

This GHG emissions report only includes the categories and sources emission considered in the global objectives for GHG emissions intensity regarding the evolution of the economy established in the First NDC. This means only direct GHG emissions CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O are considered for this report. HFC, SF<sub>6</sub>, and precursor or indirect GHG emissions (CO, NO<sub>x</sub>, NMVOC, and SO<sub>2</sub>) are not part of this report's scope but are estimated under the NGHGI.

The categories and sources included in the global targets and quantified in this report are those reported in the 2012 NGHGI included in the Fourth National Communication to the Conference of the Parties to the UNFCCC in 2016. This inventory was used as the basis for the First NDC. The emission intensity reduction commitments established in the First NDC apply to the Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry and Other Land Use (AFOLU), and Waste sectors.

The 2012 NGHGI was developed based on the revised *1996 IPCC Guidelines*, which provided methodologies for estimating GHG emissions from sectors: Energy, Industrial Processes, Solvent Use and Use of Other Products, Agriculture, Land Use and Land Use Change and Forestry, and Waste.

The 2014 NGHGI and subsequent NGHGIs were based on the *2006 IPCC Guidelines*, estimating emissions from the Energy, IPPU, AFOLU, and Waste sectors.

The change in the Guidelines meant a change in the name of the sectors and the incorporation of new emission categories and sources from those used in the First NDC. As the NGHGI undergoes continuous improvement, some of the currently estimated categories were not estimated in the NGHGI used to prepare the First NDC (2012 NGHGI).

Therefore, the only gases, sectors, categories, and sources used for the GHG emission estimation in this report are those of the 2012 NGHGI, which were used to set the intensity reduction target of the First NDC.

Thus, it should be noted that this report does not include all GHGs, sectors, categories, and sources currently estimated and reported in the latest National Greenhouse Gas Inventory - 2019 NGHGI.

For greater clarity, the categories and sources included in the GHG emissions estimates are outlined for each sector and in the methodological note of the EMR-SSLB Report. The same methodology used in the last NGHGI (2019) was used for this report.



Tier 1, 2, and 3 methodologies were used for the Energy and IPPU sectors, and Tier 1 and 2 methodologies were used for the AFOLU and Waste sectors. The EMR-SSLB methodological note provides further details per category.

IPCC inventory software v 2.691 was used for emissions estimation and compilation (Figure 2) via remote access for each sector. This made it possible to build a centralized database at the Ministry of the Environment facilities gathering all the information, activity data (AD), and emission factors (EF) for all the sectors under study. This information is stored in the NGHGI electronic document management system managed by the Ministry of Environment.

In addition, each sector has its own sectoral file and database in its ministry where activity data, emission factors, and sources are recorded.

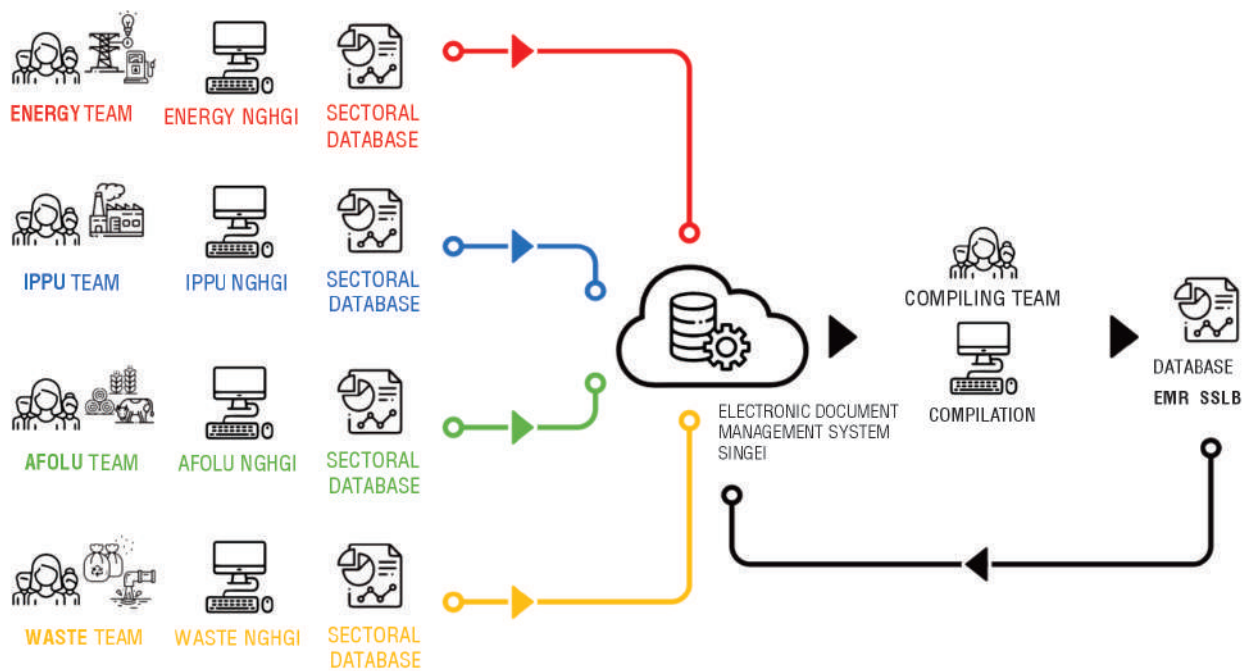


Figure 2. Information flow for the compilation of the EMR-SSLB database

All sectors also work with supplementary spreadsheets to process the information before entering it into the IPCC Inventory Software.

## 1.4. Quality Control and Quality Assurance

### 1.4.1. Quality Control

The quality control system includes:

- quality control and quality assurance procedure
- sectoral quality control checklists
- compilation checklist
- reporting document checklist
- list of observations and corrective measures adopted by sector

Each Ministry conducts internal sectoral reviews, and the Ministry of Environment carries out a global quality control of the estimates and reports.

*The Methodological Note describes the quality control activities specific to each sector.*

### 1.4.2. Quality Assurance

UNDP manages the quality assurance process through external reviewers.

## 2. Results

The following is a summary of annual results by GHG and sector.

### 2.1 Evolution of CO<sub>2</sub> emissions (Gg)

The global CO<sub>2</sub> emissions intensity target in relation to economy growth<sup>8</sup> looks at the emissions from categories estimated and reported in the 2012 NGHGI for the Energy and IPPU sectors, as outlined in the First NDC. This is why the emissions from the AFOLU and Waste sectors are not included.

Table 1. Evolution of CO<sub>2</sub> emissions (Gg), 1990-2021 time series

Sector	1990	1994	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2017	2018	2019	2020	2021
Energy	3630.1	3953.3	5389.1	5153.9	4097.5	5194.7	6080.9	7508.1	5964.1	8191.2	6192.2	6283.1	5818.0	6266.1	6129.8	6200.1	7576.3
IPPU:	209.0	253.3	469.0	356.4	229.2	304.7	370.2	419.4	400.5	421.5	409.1	431.1	479.3	484.8	413.0	430.1	565.1
AFOLU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

<sup>8</sup> See the target's methodological sheet in: [OBJ\\_01\\_FT\\_Objeto\\_Intensidad\\_CO2\\_Incondicional\\_2.0\\_1.pdf \(www.gub.uy\)](http://www.gub.uy)

## 2.2 Evolution of CH<sub>4</sub> emissions (Gg)

The global CH<sub>4</sub> emissions intensity target in relation to economic growth looks at emissions from the categories estimated and reported in the 2012 NGHGI for the Energy, AFOLU, and Waste sectors. There are no Methane emissions in the IPPU sector; therefore, emissions in this sector are not included.

Table 2. Evolution of CH<sub>4</sub> emissions (Gg), 1990-2021 time series

Sector	1990	1994	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2017	2018	2019	2020	2021
<b>Energy</b>	4.3	4.4	4.5	4.5	4.3	4.5	5.1	5.3	5.3	5.5	5.5	5.6	5.3	5.3	5.1	5.1	5.2
<b>IPPU:</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>AFOLU</b>	656.9	724.4	706.0	685.6	699.6	743.0	746.5	730.5	715.1	702.0	720.8	735.1	733.2	716.6	700.4	704.3	716.6
<b>Waste</b>	20.4	26.2	30.7	34.2	34.8	35.4	36.0	37.7	43.4	44.0	47.3	47.7	50.1	50.2	53.2	54.2	54.8

## 2.3 Evolution of N<sub>2</sub>O emissions (Gg)

The global N<sub>2</sub>O emissions intensity target in relation to economic growth looks at emissions from the categories estimated and reported in the 2012 NGHGI for the Energy, AFOLU, and Waste sectors, as outlined in the First NDC. This is why the emissions from the IPPU sector are not included.

Table 3. Evolution of N<sub>2</sub>O emissions (Gg), 1990-2021 time series

Sector	1990	1994	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016	2017	2018	2019	2020	2021
Energy	0.35	0.42	0.43	0.39	0.36	0.39	0.41	0.52	0.57	0.60	0.64	0.67	0.71	0.72	0.70	0.70	0.74
IPPU:	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AFOLU	23.2	25.0	25.2	23.9	23.7	26.5	27.2	26.9	26.5	30.6	28.7	26.8	26.7	26.4	24.0	26.9	29.9
Waste	0.20	0.23	0.23	0.24	0.22	0.22	0.23	0.23	0.24	0.24	0.24	0.24	0.23	0.24	0.24	0.24	0.24

## 3. Energy Sector

### 3.1 Methodology

GHG emissions from fuel combustion and fugitive emissions (or exhaust emissions without combustion) from the Energy sector for the categories and gases included in the SSLB are estimated in line with the global targets of Uruguay's First NDC.

Direct gas emissions (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) are considered, and precursors or indirect GHGs (CO, NO<sub>x</sub>, NMVOC, and SO<sub>2</sub>) are excluded. However, the latter are estimated for the NGHGI.

Estimates of direct GHGs in the International Bunkers category are also excluded, as are CO<sub>2</sub> emissions from biomass burning. They are only memo items and are not included in the NDC targets.

(CH<sub>4</sub> and N<sub>2</sub>O emissions from biomass burning are considered).

The methodology used for the SSLB categories is the same as in the last 2019 NGHGI. The following table summarizes the categories and gases reported and the methodology used in the SSLB framework.

*Table 4. Methods applied by GHG and subcategory, Energy sector*

Categories	Gas					
	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O	
	Method	EF	Method	EF	Method	EF
<b>1 Energy</b>						
<b>1.A Fuel combustion activities</b>						
<b>1.A.1 Energy industries</b>						
1.A.1.a Main Activity Electricity and Heat Production	T1	D	T1/T3	D	T1/T3	D
1.A.1.b Petroleum Refining	T1	D	T1/T3	D	T1/T3	D
1.A.1.c Manufacture of Solid Fuels and Other Energy Industries	NO					
<b>1.A.2 Manufacturing Industries and Construction</b>						
1A2a - Iron and steel	IE (1A2m)					
1A2b - Non-ferrous Metals	IE (1A2m)					
1A2c - Chemicals	T1	D	T1/T3	D	T1/T3	D
1A2d - Pulp, Paper and Print	T1	D	T1/T3	D	T1/T3	D
1A2e – Food Processing, Beverages and Tobacco	T1	D	T1/T3	D	T1/T3	D
1A2f - Non-metallic minerals	T1	D	T1	D	T1	D

1A2g - Transport equipment	IE (1A2m)					
1A2h - Machinery	IE (1A2m)					
1A2i - Mining (excluding fuels) an Quarrying	T1	D	T1	D	T1	D
1A2j - Wood and wood products	T1	D	T1/T3	D	T1/T3	D
1A2k - Construction	T1	D	T1	D	T1	D
1A2l - Textile and Leather	T1	D	T1/T3	D	T1/T3	D
1A2m - Non-specified Industry	T1	D	T1	D	T1	D
<b>1.A.3 Transportation</b>						
1.A.3.a Civil Aviation	T1	D	T1	D	T1	D
1.A.3.b Road Transportation	T1	D	T1/T3	D/CS	T1/T3	D/CS
1.A.3.c Railways	T1	D	T1	D	T1	D
1.A.3.d Water-borne Navigation	T1	D	T1	D	T1	D
1.A.3.e Other Transportation	T1	D	T1	D	T1	D
<b>1.A.4 Other Sectors</b>						
1.A.4.a Commercial / Institutional	T1	D	T1/T3	D	T1/T3	D
1.A.4.b Residential	T1	D	T1/T3	D	T1/T3	D
<b>1.A.4.c Agriculture/Forestry/Fishing/ Fish Farms</b>						
1.A.4.c.i Stationary	T1	D	T1	D	T1	D
1.A.4.c.ii Off-road Vehicles and Other Machinery	T1	D	T1	D	T1	D
1.A.4.c.iii Fishing (mobile combustion)	T1	D	T1	D	T1	D
<b>1.A.5 Non-Specified</b>	NO					
<b>1.B Fugitive Emissions from Fuels</b>						
<b>1.B.1 Solid fuels</b>	NO					
<b>1.B.2 Oil and Natural Gas</b>						
1.B.2.a Oil	T1	D	T1	D	NE (EF ND)	
1.B.2.a.i Venting	IE (1B2a.iii)					
1.B.2.a.ii Flaring	IE (1B2a.iii)					
1.B.2.a.iii All other	T1	D	T1	D	NE (EF ND)	
1.B.2.a.iii.1 Exploration	NO					
1.B.2.a.iii.2 Production and Upgrading	NO					
1.B.2.a.iii.3 Transport	T1	D	T1	D	NA	
1.B.2.a.iii.4 Refining	NE (EF ND)		T1	D	NE (EF ND)	
1.B.2.b Natural Gas	T1	D	T1	D	NE (EF ND)	
1.B.2.b.i Venting	NO					
1.B.2.b.ii Flaring	NO					
1.B.2.b.iii All other	T1	D	T1	D	NE (EF ND)	
1.B.2.b.iii.1 Exploitation	NO					
1.B.2.b.iii.2 Production	NO					
1.B.2.b.iii.3 Processing	NO					
1.B.2.b.iii.4 Transmission and Storage	NO					
1.B.2.b.iii.5 Distribution	T1	D	T1	D	NE (EF ND)	

<b>1.B.3 Other Emissions from Energy Production</b>	<b>NO</b>
<b>1.C Carbon Dioxide Transport and Storage</b>	<b>NO</b>

T1,2,3 (TIER 1,2,3) of the 2006 IPCC Guidelines; NO, Not Occurring, NE: Not Estimated, IE: Included elsewhere.  
D default; PE country-specific

The activity data (fuel consumption) used to estimate emissions come from the 2021 National Energy Balance (BEN) published by the National Energy Directorate (DNE)/MIEM<sup>9</sup> and related work files. Emissions were estimated based on the *2006 IPCC Guidelines* using IPCC Inventory Software version 2.691 and auxiliary spreadsheets.

The sectoral methodological note details the specific methodological aspects of each category.

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<sup>9</sup> <https://ben.miem.gub.uy/>



## 3.2 Evolution of emissions

Table 5. Evolution of CO<sub>2</sub> emission (Gg), Energy sector, 1990, 2020, and 2021.

O <sub>2</sub> emissions (Gg)	1990	2020	2021
<b>Energy</b>	<b>3630.1</b>	<b>6200.1</b>	<b>7576.3</b>
1A Fuel Combustion activities	3630.1	6200.1	7576.3
1A1 Energy Industries	507.8	925.7	1835.7
1A2 Manufacturing Industries and Construction	565.9	834.2	928.4
1A3 Transport	1538.8	3574.0	3929.6
1A4 Other Sectors	1002.8	866.2	882.6
1A4a Commercial/ Institutional	139.7	70.6	87.2
1A4b Residential	444.6	418.6	416.1
1A4c Agriculture/ Forestry/ Fishing/ Fish Farms	418.5	377.0	379.3
1A5 Non-specified	14.8	NO	NO
1B Fugitive Emissions from fuels	6.9E-04	4.8E-03	5.4E-03

NO: Not Occurring



Figure 3: CO<sub>2</sub> emission trends (Gg) by category, Energy sector, 1990-2021 time series

CO<sub>2</sub> emissions from the energy sector are highly variable due to fluctuations in emissions from electricity production. This is due to greater or lesser consumption of fossil fuels associated with rainfall conditions (and therefore the availability of hydropower) in a scenario of progressive growth in electricity demand. Although introducing renewables (wind, biomass, and solar) has played an essential role in mitigating this correlation, years of low rainfall such as 2021, can cause an increase on emissions. It should also be noted that the investments in energy infrastructure have made it possible for Uruguay to become an electricity exporter. This had an impact in 2021, as a significant part of CO<sub>2</sub> emissions came from the electricity produced to export to Brazil, which also suffered a severe drought that year.

Transport has historically been the leading emissions category in the sector, increasing from 1539 Gg in 1990 to 3930 Gg in 2021, mainly due to the increase in road transportation. It's been second only to the energy industries in the years of low rainfall before incorporating renewable sources.

Table 6. Evolution of CH<sub>4</sub> emissions (Gg), Energy sector, 1990, 2020 and 2021

<b>CH<sub>4</sub> emissions (Gg)</b>	<b>1990</b>	<b>2020</b>	<b>2021</b>
<b>Energy</b>	<b>4.3</b>	<b>5.1</b>	<b>5.2</b>
<b>1A Fuel Combustion Activities</b>	<b>4.29</b>	<b>4.94</b>	<b>5.02</b>
1A1 Energy Industries	1.0E-02	6.8E-02	1.1E-01
1A2 Manufacturing Industries and Construction	0.13	0.40	0.41
1A3 Transport	0.24	0.28	0.31
1A4 Other Sectors	3.91	4.19	4.19
1A4a Commercial/ Institutional	5.4E-02	0.28	0.28
1A4b Residential	3.83	3.69	3.69
1A4c Agriculture/ Forestry/ Fishing/ Fish Farms	2.9E-02	0.22	0.22
<b>1B Fugitive Emissions</b>	<b>3.9E-02</b>	<b>0.14</b>	<b>0.16</b>

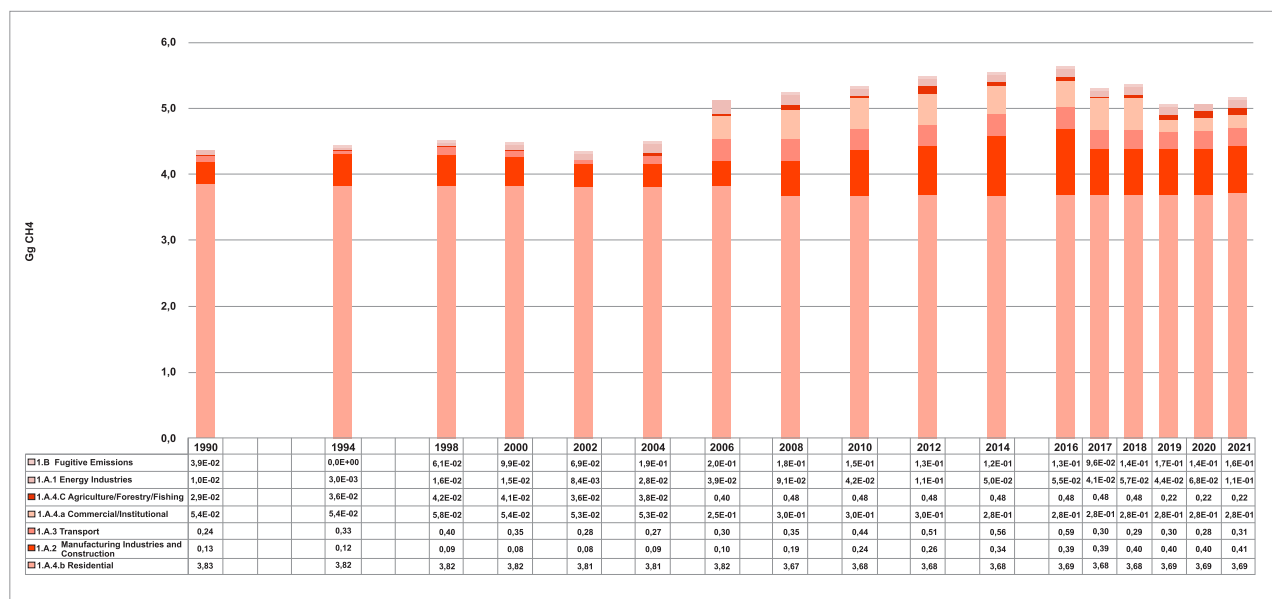


Figure 4: Evolution of CH<sub>4</sub> emissions (Gg) by category, Energy sector, 1990-2021 time series

The aggregate CH<sub>4</sub> and N<sub>2</sub>O contributions to the total energy sector, measured in CO<sub>2</sub> eq, have been less than 5% across the series. In the case of CH<sub>4</sub>, the residential sector is primarily responsible for emissions across the series due to firewood burning.

Table 7. Evolution of N<sub>2</sub>O emissions (Gg), Energy sector, 1990, 2020 and 2021

N <sub>2</sub> O emissions (Gg)	1990	2020	2021
<b>1- Energy</b>	<b>0.35</b>	<b>0.70</b>	<b>0.74</b>
<b>1A Fuel Combustion Activities</b>	<b>0.35</b>	<b>0.70</b>	<b>0.74</b>
1A1 Energy Industries	2.1E-03	2.9E-02	3.9E-02
1A2 Manufacturing Industries and Construction	6.9E-02	0.25	0.26
1A3 Transport	0.10	0.24	0.26
1A4 Other Sectors	0.18	0.17	0.18
1A4a Commercial/ Institutional	1.5E-03	4.0E-03	4.0E-03
1A4b Residential	5.3E-02	5.1E-02	5.1E-02
1A4c Agriculture/ Forestry/ Fishing/ Fish Farms	0.13	0.12	0.12

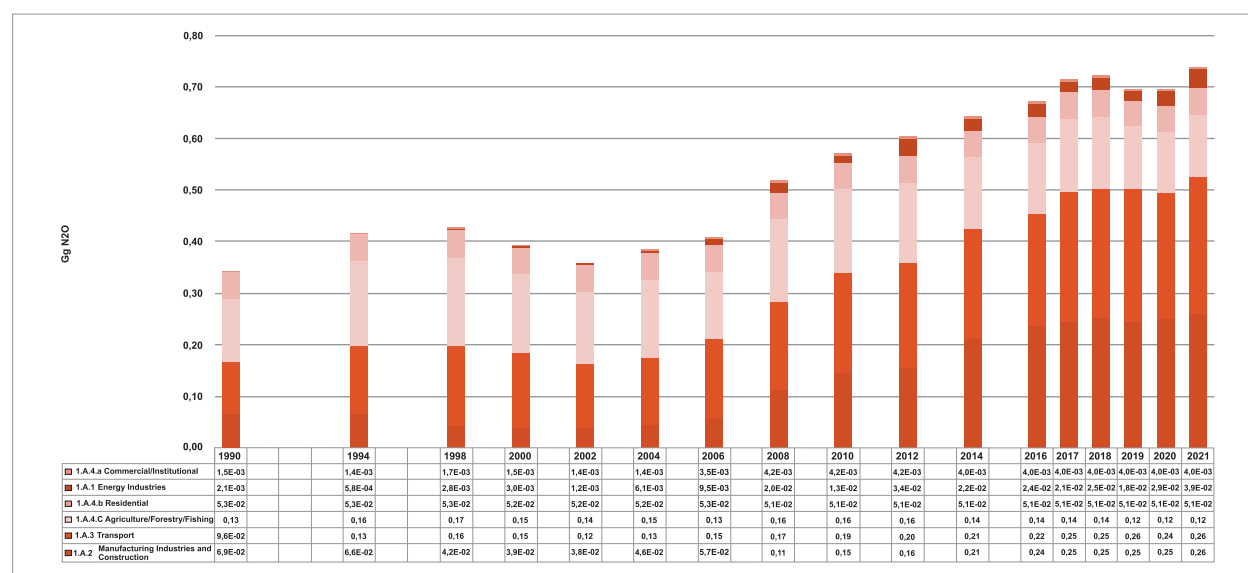


Figure 5: Evolution of N<sub>2</sub>O emissions (Gg) by category, Energy sector, 1990-2021 time series

As mentioned above, the aggregate CH<sub>4</sub> and N<sub>2</sub>O contributions to the total energy sector, measured in CO<sub>2</sub> eq, have been less than 5% across the series. In the case of N<sub>2</sub>O, the transport and industry categories are primarily responsible for emissions.

### 3.3 Recalculations

Table 8. Recalculations for the Energy sector

Year	Category	Fuel	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	Reason for recalculation
2012	1A2	Industrial Waste	CO <sub>2</sub>	0	9.6	The use of this energy source was included in the 2020 BEN
2012	1A2	Industrial Waste	CH <sub>4</sub>	0	2.0E-03	The use of this energy source was included in the 2020 BEN
2012	1A2	Industrial Waste	N <sub>2</sub> O	0	2.7E-04	The use of this energy source was included in the 2020 BEN
2014	1A2f	Industrial Waste	CO <sub>2</sub>	0	20.4	The use of this energy source was included in the 2020 BEN
2014	1A2f	Industrial Waste	CH <sub>4</sub>	0	4.3E-03	The use of this energy source was included in the 2020 BEN
2014	1A2f	Industrial Waste	N <sub>2</sub> O	0	5.7E-04	The use of this energy source was included in the 2020 BEN
2016	1A2f	Industrial Waste	CO <sub>2</sub>	0	41.9	The use of this energy source was included in the 2020 BEN
2016	1A2f	Industrial Waste	CH <sub>4</sub>	0	8.8E-03	The use of this energy source was included in the 2020 BEN
2016	1A2f	Industrial Waste	N <sub>2</sub> O	0	1.2E-03	The use of this energy source was included in the 2020 BEN
2017	1A2f	Industrial Waste	CO <sub>2</sub>	0	36.0	The use of this energy source was included in the 2020 BEN
2017	1A2f	Industrial Waste	CH <sub>4</sub>	0	8.0E-03	The use of this energy source was included in the 2020 BEN
2017	1A2f	Industrial Waste	N <sub>2</sub> O	0	1.1E-03	The use of this energy source was included in the 2020 BEN
2018	1A2f	Industrial Waste	CO <sub>2</sub>	0	41.1	The use of this energy was included in the 2020 BEN
2018	1A2f	Industrial Waste	CH <sub>4</sub>	0	1.1E-02	The use of this energy source was included in the 2020 BEN
2018	1A2f	Industrial Waste	N <sub>2</sub> O	0	1.5E-03	The use of this energy source was included in the 2020 BEN
2019	1A2f	Industrial Waste	CO <sub>2</sub>	0	41.5	The use of this energy source was included in the 2020 BEN
2019	1A2f	Industrial Waste	CH <sub>4</sub>	0	1.1E-02	The use of this energy source was included in the 2020 BEN
2019	1A2f	Industrial Waste	N <sub>2</sub> O	0	1.4E-03	The use of this energy source was included in the 2020 BEN
2019	1A2f	Petroleum coke	CO <sub>2</sub>	338.8	256.8	AD Corrected in 2020 BEN
2019	1A2f	Petroleum coke	CH <sub>4</sub>	3.5E-03	2.6E-03	AD Corrected in 2020 BEN
2019	1A2f	Petroleum coke	N <sub>2</sub> O	2.1E-03	1.6E-03	AD Corrected in 2020 BEN

It should be noted that the NGHGI 2019 was prepared using the 2019 BEN as the source for activity data, while this report used the 2021 BEN. Each edition of the BEN may incorporate improvements and corrections to previous editions, which may require the recalculation of emissions for the corresponding years. In this case, the industrial waste series, which began in 2011, was added to the 2020 BEN. Although these emissions were not estimated in the 2012 NGHGI, they should be considered since their consumption replaces other fuels.

## 4. Industrial Processes and Product Use Sector

### 4.1 Methodology

This sector estimates and reports GHG emissions caused by the transformation of raw materials as part of the processes carried out in the industries included in the SSLB. These align with the categories and GHGs used for the indicators of the NDC targets and within the scope of the 2012 NGHGI (target baseline year). This excludes emissions from the *non-energy uses of fuel and solvent products* and the emissions from IPPU sector categories that were not estimated in the 2012 NGHGI.

Only CO<sub>2</sub> is accounted for in the SSLB from the IPPU sector.

There are no CH<sub>4</sub> emissions in the sector. N<sub>2</sub>O emissions from *Manufacturing and use of other products* were not estimated in the 2012 NGHGI.

GHGs HFCs, SF<sub>6</sub>, and precursor or indirect GHGs, estimated in the 2012 NGHGI, are not included in the commitments of the First NDC and, therefore, are not considered in the SSLB.

The following table summarizes the categories and gases considered under the SSLB and the difference in scope with the 2019 NGHGI. Cells without shading are those included in the SSLB; shaded cells are excluded.

Table 9. NGHGI categories and GHGs within the scope of the SSLB and exclusions

Category	Subcategory	Gas		
		CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
2A Mineral Industry	2.A.1 / 2.A.2 / 2.A.4.b	✓	NA	NA
	2.A.3 / 2.A.4a / 2.A.4.c / 2.A.4.d / 2.A.5	✓	NO	NO
2.B Chemical Industry	2.B.1 to 2.B.10	✓	NO	NO
2.C Metal industry	2C.1	✓	NO	NA
	2.C.2 to 2.C.7	NO	NO	NA
2.D Non-Energy Products from Fuels and Solvent Use	2.D.1 to 2.D.4	✓	NA	NA
2.E Electronics Industry	2.E.1 to 2.E.5	NA	NA	NA
2.F Product Uses as Substitutes for Ozone Depleting Substances	2.F.1 to 2.F.6	NA	NA	NA
2.G Other Product Manufacture and Use	2.G.1 to 2.G.4	NA	NA	✓
2.H Other	2.H.1 to 2.H.3	NO	NO	NA
Notes:				
References NA, Not Applicable / NO, Not Occurring / ✓, estimated in NGHGI.				
		Included in SSLB		
		Not included in SSLB		

For estimating emissions from the sector categories included in the SSLB, the 2019 NGHGI methodology is maintained following the *2006 IPCC Guidelines*. The IPCC Inventory Software v 2.691 and auxiliary spreadsheets are used for the calculations. The following table summarizes the methods used per category and GHG type.

*Table 10. Methods used by GHG and subcategory, Industrial Processes Sector*

IPCC Code	Greenhouse gas source and sink categories	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O	
		Method <sup>a</sup>	EF <sup>b</sup>	Method	EF	Method	EF
2.A.	Mineral industry	T1, T2/3	D, CS, PS	NA		NA	
2.A.1.	Cement Production	T2/T3	CS, PS	NA		NA	
2.A.2.	Lime Production	T1	D	NA		NA	
2.A.4.	Other Process Uses of Carbonates	T1	D	NA		NA	
2.C.1	Iron and Steel Production	T2	D	NA		NA	

Notes:

- T1, 2,3 (TIER 1,2,3), Tier 1,2,3 Methods of the 2006 IPCC Guidelines; NA, Not Applicable.
- D default; CS country-specific; PS plant specific.

The activity data and other data needed to calculate emissions were primarily obtained from environmental declarations submitted by companies to the MA and available in the Environmental Information System (SIA), Customs data (imports), and direct requests for data to companies (annual quantities produced). The sectoral methodological note outlines the methodology and sources used in each case.



## 4.2 Emission evolution

Table 11. Evolution of CO<sub>2</sub> emissions (Gg), IPPU sector, 1990, 2020 and 2021

CO <sub>2</sub> emissions (Gg)	1990	2020	2021
<b>2 - Industrial Processes</b>	<b>209.0</b>	<b>430.1</b>	<b>565.1</b>
2A Mineral Industry	209.0	429.8	565.0
2.A.1 Cement Production	178.5	358.4	463.9
2.A.2 Lime Production	30.5	70.3	99.7
2.A.4. Other Process Uses of Carbonates	NE	1.0	1.3
2.A.4.b Other Uses of Soda Ash	NE	1.0	1.3
2.C Metal industry	NO	0.24	0.14
2.C.1 Iron and Steel Production	NO	0.24	0.14

NO: Not Occurring; NE: Not estimated

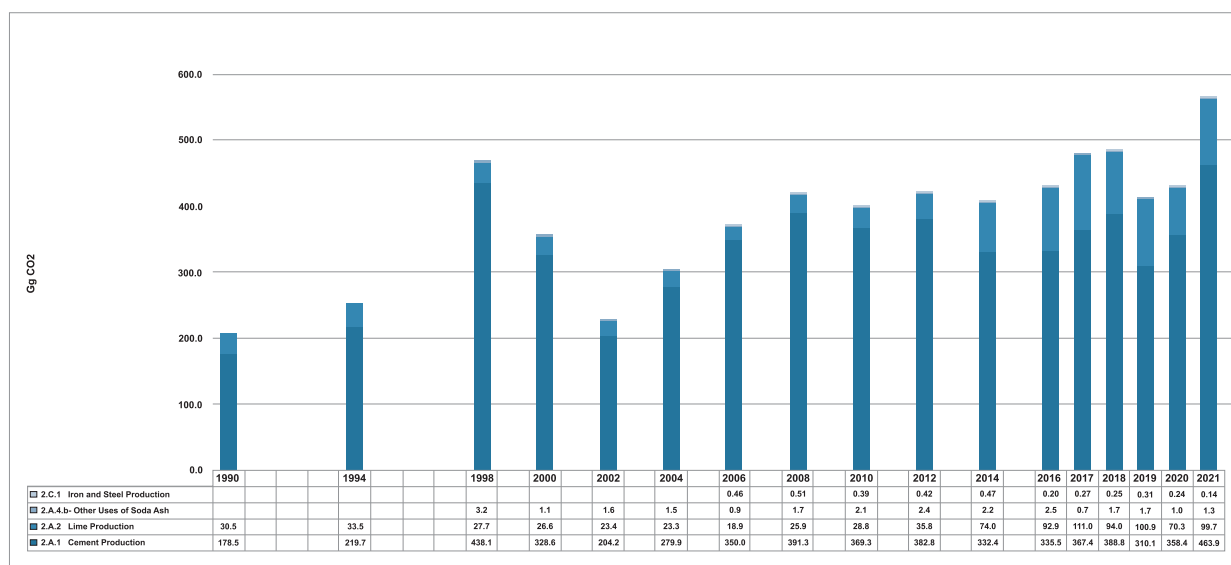


Figure 6: Evolution of CO<sub>2</sub> emissions (Gg) by category, Industrial Processes sector, 1990-2021 time series

In this sector, the SSLB looks at CO<sub>2</sub> emissions, and over 99% come from clinker production for cement (approx. 80%) and lime production (approx. 19.5%).

Emissions from the cement industry sector vary depending on its activity level, closely linked to the construction sector, which has seen a sharp increase since 2019. In particular, a new clinker and cement production plant started operations in 2020.

The second source is lime production. Changes in emissions are also linked to the level of activity. Production for export takes the lead and is followed by self-consumption in pulp mills.

## 4.3 Recalculations

Table 12. Recalculations for the IPPU sector

Year	Category	Subcategory	Gas	2019 NGHGI 2019 (Gg)	2021 SSLB (Gg)	Reason for recalculation
2017	2.A - Mineral Industry	2.A.2 - Lime Production	CO <sub>2</sub>	131.2	111.0	The activity data provided by the production plants are updated
2017	2.C - Metal industry	2.C.1 - Iron and Steel Production	CO <sub>2</sub>	0.37	0.27	The activity data provided by the production plants are updated
2018	2.A - Mineral Industry	2.A.2 - Lime Production	CO <sub>2</sub>	112.40	94.04	The activity data provided by the production plants are updated
2018	2.C - Metal industry	2.C.1 - Iron and Steel Production	CO <sub>2</sub>	0.35	0.25	The activity data provided by the production plants are updated
2019	2.A - Mineral Industry	2.A.2 - Lime Production	CO <sub>2</sub>	122.4	100.9	The activity data provided by the production plants are updated
2019	2.C - Metal industry	2.C.1 - Iron and Steel Production	CO <sub>2</sub>	0.36	0.31	The activity data provided by the production plants are updated

## 5.AFOLU Sector

### 5.1 Methodology

The emissions estimated and reported in this sector are those of the gases, categories, and sources estimated and reported for the Agriculture sector under the 2012 NGHGI, which was used as the basis for preparing the First NDC.

The differences between the categories reported in the 2019 NGHGI and in the sectoral emissions report for the SSLB are due to the fact that some of these categories were not estimated (NE) for the 2012 NGHGI, used for the preparation of the First INDC, and others were not included as emission categories in the 1996 rev. IPCC Guidelines and, therefore, were not included in the

definition of the mitigation targets of the First NDC and are not considered for the monitoring of these indicators.

Table 13. 1990-2019 NGHGI Categories

Categories (2006-IPCC)				Condition
3.A - Livestock	3.A.1 - Enteric Fermentation	3.A.1.a- Cattle	3.A.1.a.i - Dairy Cows	✓
			3.A.1.a.ii - Other Cattle	✓
		3.A.1.b- Buffalo		NE
		3.A.1.c- Sheep		✓
		3.A.1.d- Goats		✓
		3.A.1.e- Camels		NE
		3.A.1.f- Horses		✓
		3.A.1.g- Mules and Asses		✓
		3.A.1.h- Swine		✓
		3.A.1.j- Other		NO
	3.A.2 - Manure Management	3.A.2.a- Cattle	3.A.2.a.i - Dairy Cows	✓
			3.A.2.a.ii - Other Cattle	✓
		3.A.2.b- Buffalo		NE
		3.A.2.c- Sheep		✓
		3.A.2.d- Goats		✓
		3.A.2.e- Camels		NE
		3.A.2.f- Horses		✓
		3.A.2.g- Mules and Asses		✓
3.A.2.h- Swine		✓		
3.A.2.i - Poultry		✓		
3.A.2.j- Other		NO		
3.B- Land	3.B.1 - Forest Land (FL <sup>1</sup> )	3.B.1.a- Forest Land Remaining Forest Land		✓
		3.B.1.b- Land converted to FL	3.B.1.b.i - Cropland Converted to FL	✓
			3.B.1.b.ii- Grassland Converted to FL	✓
			3.B.1.b.iii- Wetlands Converted to FL	✓
			3.B.1.b.iv- Settlements Converted to FL	✓
			3.B.1.b.v- Other Land Converted to FL	✓
	3.B.2- Cropland (C <sup>2</sup> )	3.B.2.a- Cropland Remaining Cropland		✓
		3.B.2.b- Land Converted to Cropland	3.B.2.b.i- FL Converted to Cropland	✓
			3.B.2.b.ii- Grassland Converted to Cropland	✓
			3.B.2.b.iii- Wetlands Converted to Cropland	✓
			3.B.2.b.iv- Settlements Converted to Cropland	✓
			3.B.2.b.v- Other Land Converted to Cropland	✓
	3.B.3- Grassland (G <sup>3</sup> )	3.B.3.a- Grassland Remaining Grassland		✓
		3.B.3.b- Land Converted to Grassland	3.B.3.b.i- FL converted to Grassland	✓
			3.B.3.b.ii- C converted to Grassland	✓
			3.B.3.b.iii- Wetlands converted to Grassland	✓
			3.B.3.b.iv- Settlements converted to Grassland	✓
			3.B.3.b.v- Other Land converted to Grassland	✓
3.B.4.a.i- Peatlands Remaining Peatlands		NE		

Categories (2006-IPCC)				Condition
	3.B.4- Wetlands (W <sup>4</sup> )	3.B.4.a- Wetlands Remaining Wetlands	3.B.4.a.ii- Flooded Land Remaining Flooded Land	NE
		3.B.4.b- Land Converted to W	3.B.4.b.i- Land Converted to Peat Extraction	NE
			3.B.4.b.ii- Land Converted to Flooded Land	NE
	3.B.5- Settlements (S <sup>5</sup> )	3.B.5.a- Settlements Remaining Settlements		✓
		3.B.5.b- Land Converted to Settlements	3.B.5.b.i- FL Converted to Settlements	✓
			3.B.5.b.ii- C Converted to Settlements	✓
			3.B.5.b.iii- Grasslands converted to Settlements	✓
			3.B.5.b.iv- Wetlands converted to Settlements	✓
			3.B.5.b.v- Other Land Converted to Settlements	✓
	3.B.6- Other Land (OL <sup>6</sup> )	3.B.6.a- Other Land Remaining Other Land		✓
		3.B.6.b- Land converted to OL	3.B.6.b.i- FL converted to OL	✓
			3.B.6.b.ii- C converted to OL	✓
			3.B.6.b.iii- G converted to OL	✓
			3.B.6.b.iv- W converted to OL	✓
			3.B.6.b.v- S converted to OL	✓
3.C- Aggregate Sources and Non-CO <sub>2</sub> Emissions Sources on Land	3.C.1- Emissions from Biomass Burning	3.C.1.a- Emissions from Biomass Burning in FL		NE
		3.C.1.b- Emissions from Biomass Burning in C		✓
		3.C.1.c- Emissions from Biomass Burning in G		✓
		3.C.1.d- Emissions from Biomass Burning in OL		NE
	3.C.2- Liming			NE
	3.C.3- Urea Fertilization		✓	
	3.C.4- Direct N <sub>2</sub> O Emissions from Managed Soils		✓	
	3.C.5- Indirect N <sub>2</sub> O Emissions from Managed Soils		✓	
	3.C.6- Indirect N <sub>2</sub> O Emissions from Manure Management		✓	
3.C.7- Rice Cultivations		✓		
3.C.8- Other		-		
3.D- Other	3.D.1- Harvested Wood Products		-	
	3.D.2- Other		-	
<b>References</b>				
NE: Not estimated; NO: Not occurring;				
✓ : estimated in NGHGI;				
<sup>1</sup> FL: Forest land; <sup>2</sup> C: Cropland; <sup>3</sup> G: Grassland; <sup>4</sup> W: Wetlands; <sup>5</sup> S: Settlements; <sup>6</sup> OL: Other Lands.				

For the sectoral emissions report (agricultural sector), for the EMR-SSLB, several categories are not considered or reported (see table below). The gases reported are CH<sub>4</sub> and N<sub>2</sub>O

Table 14. Categories not reported to the SSLB, Agriculture sector

Categories ID	Description
3A.1.d	Enteric Fermentation - Goats
3A.1.g	Enteric Fermentation - Mules and Asses
3A.2.d	Manure Management - Goats
3A.2.g	Manure Management - Mules and Asses
3.B	Land
3.C.3	Urea Fertilization

3.C.4 - FSOM	FSOM: N in mineral soils that is mineralized, together with loss of soil carbon from soil organic matter as a result of land use changes
3.C.4 - FON	FON: N in animal manure, compost, sewage treatment sludge, others
3.C.4	FPRP - Goats, Mules and Asses
3.C.5	FON
3.C.5	FCR
3.C.5	FSOM
3.C.5	FPRP - Goats, Mules and Asses
3C.6	Indirect N <sub>2</sub> O Emissions from Manure Management

The GHG emissions from the AFOLU sector were estimated following the methodological guidelines included in the *2006 IPCC Guidelines*.

The following table outlines the methodology used by category.

*Table 15. Methods used by GHG and subcategory, AFOLU sector*

IPCC 2006 Code	Greenhouse gas source and sink categories	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O	
		Method	EF	Method	EF	Method	EF
3.A.1.a.i	Enteric Fermentation - Dairy Cows			T2	CS		
3.A.1.a.ii	Enteric Fermentation - Other cattle			T2	CS		
3.A.1.c	Enteric Fermentation - Sheep			T1	D		
3.A.1.f	Enteric fermentation - Horses			T1	D		
3.A.1.h	Enteric fermentation - Swine			T1	D		
3.A.2.a.i	Manure management - Dairy Cows			T2	CS		
3.A.2.a.ii	Manure Management - Other cattle			T2	CS		
3.A.2.c	Manure Management - Sheep			T1	D		
3.A.2.f	Manure Management - Horses			T1	D		
3.A.2.h	Manure Management - Swine			T1	D	T1	D
3.A.2.i	Manure Management - Poultry (layers and broilers)			T1	D	T1	D
3.C.1.b	Biomass Burning in Cropland			T1	D	T1	D

IPCC 2006 Code	Greenhouse gas source and sink categories	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O	
		Method	EF	Method	EF	Method	EF
3.C.1.c	Biomass Burning in Grassland			T1	D	T1	D
3.C.4	Direct N <sub>2</sub> O Emissions from Managed Soils					T1	D
3.C.5	Indirect N <sub>2</sub> O Emissions from Managed Soils					T1	D
3.C.7	CH <sub>4</sub> Emissions in Rice Cultivations			T1	D		

**References:**

T1 = Tier 1; T2 = Tier 2; D = Default; NO = Not occurring; CS=Country specific;  Not applicable

**Clarifications:**

C.4 and 3.C.5 emission factors are Tier 1, since the equation for determining the  $F_{PRP}$  is Tier 1. Notwithstanding the above, the  $N_{ex}$  parameter for dairy and non-dairy cows included in Equation 11.5 is country-specific (Tier 2). See details of the calculation in sections 1.2.3.1 and 1.2.3.2.

As outlined in the methodological note, the activity data used for the AFOLU sector estimates were mainly provided by the Agricultural Statistics Office (DIEA) of the MGAP, by the National Livestock Information System (SNIG) of the MGAP, and by other ministerial agencies.

## 5.2 Emission evolution

Table 16. Evolution of CH<sub>4</sub> emissions (Gg), AFOLU sector, 1990, 2020 and 2021

<b>CH<sub>4</sub> emissions (Gg)</b>	<b>1990</b>	<b>2020</b>	<b>2021</b>
<b>3 - Agriculture, Forestry and Other Land Uses</b>	656.9	704.3	716.6
<b>3.A - Livestock</b>	642.0	690.4	702.8
3.A.1 - Enteric Fermentation	627.6	676.2	688.4
3.A.1.a - Cattle	497.5	636.1	649.4
3.A.1.a.i - Dairy Cows	21.8	34.7	34.4
3.A.1.a.ii - Other Cattle	475.7	601.4	615.0
3.A.1.c - Sheep	121.9	32.3	31.4
3.A.1.f - Horses	7.9	7.7	7.5
3.A.1.h - Swine	0.27	0.12	0.13
3.A.2 - Manure Management	14.4	14.2	14.4
3.A.2.a - Cattle	9.7	12.3	12.5
3.A.2.a.i - Dairy Cows	0.37	0.58	0.57
3.A.2.a.ii - Other Cattle	9.4	11.7	11.9
3.A.2.c - Sheep	3.7	1.0	0.94
3.A.2.f - Horses	0.72	0.70	0.68
3.A.2.h - Swine	0.27	0.12	0.13
3.A.2.i - Poultry	0.04	0.16	0.16
<b>3.C - Aggregate Sources and Non-CO<sub>2</sub> Emissions Sources on Land</b>	14.9	13.9	13.8
3.C.1 - Emissions from Biomass burning	0.29	0.21	0.21
3.C.1.b - Biomass Burning in Cropland	0.18	0.10	0.10
3.C.1.c - Biomass Burning in Grassland	0.11	0.11	0.11
3.C.4 - Direct N <sub>2</sub> O Emissions from Managed Soils			
3.C.5 - Indirect N <sub>2</sub> O emissions from Managed Soils			
3.C.7 - Rice	14.6	13.6	13.5
3.C.8 - Other (please specify)			

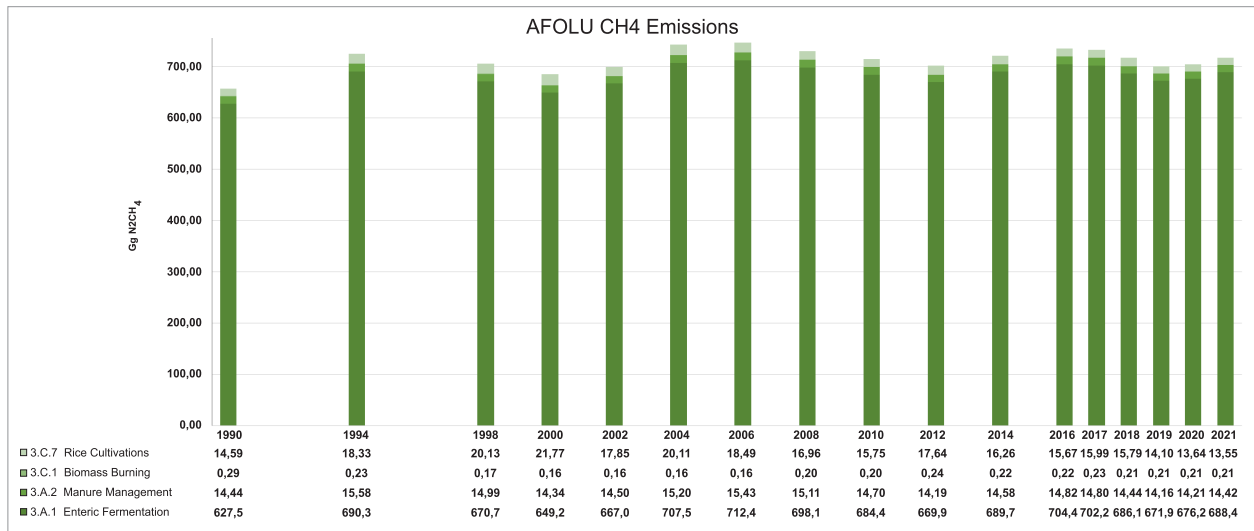


Figure 7: Evolution of CH<sub>4</sub> emissions (Gg) by category, AFOLU sector, 1990-2021 time series

As the figure above shows, methane emissions (the primary source of emissions from the livestock sector) remained constant for several years. They only showed slight fluctuations associated with variations in livestock stocks. Such variations included a sustained decline in the sheep herd throughout the time series, a cattle herd with an upward trend, and a steady growth in dairy cows until 2013, when the population began to drop.



Table 17. Evolution of N<sub>2</sub>O emissions (Gg), AFOLU sector, 1990, 2020, 2021

<b>N<sub>2</sub>O emissions (Gg)</b>	<b>1990</b>	<b>2020</b>	<b>2021</b>
<b>3 - Agriculture, Forestry and Other Land Uses</b>	23.2	26.9	29.9
<b>3.A - Livestock</b>	5,0E-02	2,6E-02	2,7E-02
3.A.1 - Enteric Fermentation			
3.A.1.a - Cattle			
3.A.1.a.i - Dairy Cows			
3.A.1.a.ii - Other Cattle			
3.A.1.c - Sheep			
3.A.1.f - Horses			
3.A.1.h - Swine			
3.A.2 - Manure Management	5,0E-02	2,6E-02	2,7E-02
3.A.2.a - Cattle	1,2E-02	7,0E-03	6,9E-03
3.A.2.a.i - Dairy Cows	1,2E-02	7,0E-03	6,9E-03
3.A.2.a.ii - Other Cattle			
3.A.2.c - Sheep			
3.A.2.f - Horses			
3.A.2.h - Swine	3,7E-02	1,6E-02	1,6E-02
3.A.2.i - Poultry	9,2E-04	3,3E-03	3,4E-03
<b>3.C - Aggregate Sources and Non-CO<sub>2</sub> Emissions Sources on Land</b>	23.1	26.9	29.8
3.C.1 - Emissions from Biomass burning	1,5E-02	1,3E-02	1,3E-02
3.C.1.b - Biomass Burning in Cropland	4,7E-03	2,7E-03	2,7E-03
3.C.1.c - Biomass Burning in Grassland	9,9E-03	9,9E-03	9,9E-03
3.C.4 - Direct N <sub>2</sub> O Emissions from Managed Soils	18.3	21.8	24.1
3.C.5 - Indirect N <sub>2</sub> O emissions from Managed Soils	4.9	5.1	5.7
3.C.7 - Rice			
3.C.8 - Other (please specify)			

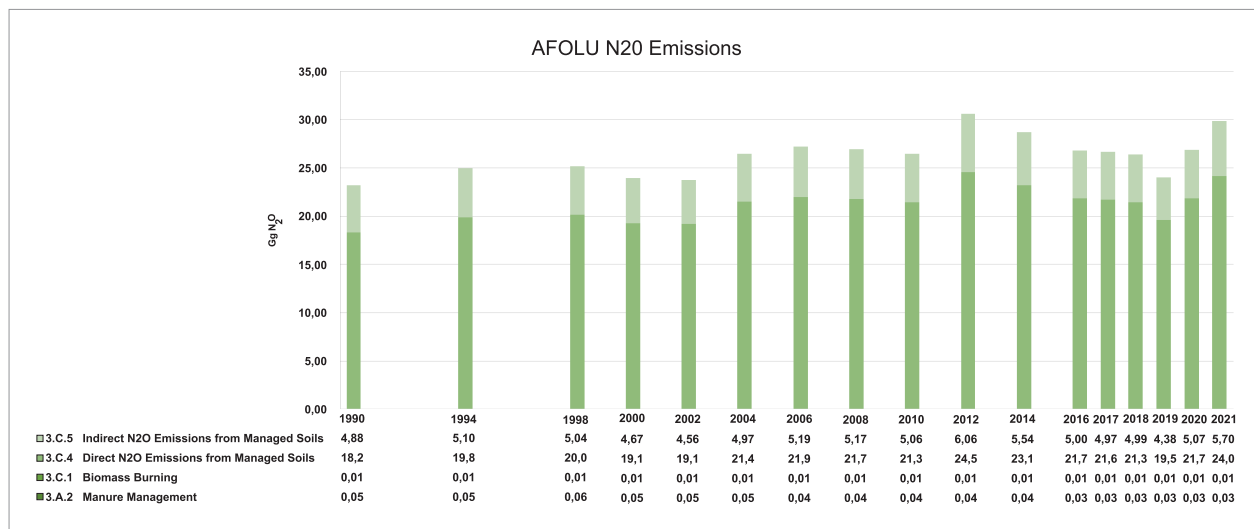


Figure 8: Evolution of N<sub>2</sub>O emissions (Gg) by category, AFOLU sector, 1990-2021 time series

In the case of nitrous oxide, the 1990-2018 period showed several fluctuations as a result of changes in the livestock stock, plus a rapid increase throughout the 2000-2012 period in the use of nitrogen fertilizers in agricultural soils; this trend was probably caused by a growth in agriculture and implanted pasture areas nationwide. The nitrogen fertilizer import data shows great variability year on year; due to the influence of fluctuations in agricultural activity, as well as external factors to the country, which were decisive in the last two years of the period.

## 5.3 Recalculations

Table 18. Recalculations for the AFOLU sector, N<sub>2</sub>O and CH<sub>4</sub> (Gg)

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
1990	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	9,01E-03	1,19E-02	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.
1990	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.13	17.53	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
1990	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	0.38	0.38	Errors detected in some years of the 1990-2019 Software series in the activity data ( synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
1990	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils – atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.24	2.28	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
1990	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.56	2.60	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
1994	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	1,35E-02	1,36E-02	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire revised time series is included.
1994	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	18.48	19.00	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
1994	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	0.35	0.35	Errors detected in some years of the 1990-2019 Software series in the activity data (synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
1994	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.33	2.38	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
1994	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.66	2.72	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
1998	3.A.2.a.i Manure management – dairy cows	N <sub>2</sub> O	1,51E-02	1,52E-02	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
1998	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.69	18.21	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
1998	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	1.26	1.26	Errors detected in some years of the 1990-2019 Software series in the activity data ( synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
1998	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.25	2.30	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
1998	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.67	2.73	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2000	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	1,13E-02	1,14E-02	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2000	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	16.92	17.44	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2000	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	1.10	1.10	Errors detected in some years of the 1990-2019 Software series in the activity data ( synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2000	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.09	2.14	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2000	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.47	2.53	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2002	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	1,14E-02	1,14E-02	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire revised time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2002	3.C.4. Direct N <sub>2</sub> O emissions from managed soils – N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.20	17.75	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2002	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	0.85	0.85	Errors detected in some years of the 1990-2019 Software series in the activity data ( synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2002	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.05	2.10	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2002	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.40	2.46	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2004	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	1,14E-02	1,15E-02	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2004	3.c.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	18.09	18.69	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2004	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	1.68	1.68	Errors detected in some years of the 1990-2019 Software series in the activity data ( synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2004	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.19	2.25	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2004	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.65	2.72	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2006	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	8,05E-03	8,07E-03	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.



YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2006	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	18.33	18.93	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2006	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	2.01	2.08	Errors detected in some years of the 1990-2019 Software series in the activity data ( synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2006	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.27	2.33	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2006	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.77	2.86	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2008	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	8,46E-03	8,47E-03	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2008	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.91	18.08	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2008	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	2.01	2.70	Errors detected in some years of the 1990-2019 Software series in the activity data ( synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2008	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.20	2.29	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2008	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.71	2.88	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2010	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	6,33E-03	6,33E-03	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2010	3.c.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.26	17.43	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2010	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	3.00	3.00	Errors detected in some years of the 1990-2019 Software series in the activity data ( synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2010	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.20	2.22	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2010	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.82	2.84	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2012	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	7,18E-03	7,18E-03	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2012	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.04	17.17	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2012	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	4.26	6.28	Errors detected in some years of the 1990-2019 Software series in the activity data (synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2012	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.30	2.52	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2012	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	3.07	3.54	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2014	3.A.1.a.ii Enteric fermentation - other cattle	CH <sub>4</sub>	615.56	606.94	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.
2014	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	7,38E-03	7,38E-03	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2014	3.A.2.a.ii Manure management - other cattle	CH <sub>4</sub>	12.03	11.81	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.
2014	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.85	17.86	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2014	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	2.43	4.26	Errors detected in some years of the 1990-2019 Software series in the activity data ( synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2014	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.20	2.38	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2014	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.75	3.16	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2016	3.A.1.a.i Enteric fermentation - dairy cows	CH <sub>4</sub>	34.66	34.74	Errors detected in auxiliary spreadsheets for 2016 were corrected.
2016	3.A.1.a.ii Enteric fermentation - other cattle	CH <sub>4</sub>	632.58	628.79	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.
2016	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	7,00E-03	7,00E-03	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.
2016	3.A.2.a.ii Manure management - other cattle	CH <sub>4</sub>	12.37	12.20	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.
2016	3.c.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	18.02	18.32	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2016	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	2.43	2.43	Errors detected in some years of the 1990-2019 Software series in the activity data (N in synthetic nitrogen fertilizers applied to the soil) were corrected. The entire time series is included.
2016	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.20	2.23	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2016	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.74	2.78	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2017	3.A.1.a.ii Enteric fermentation - other cattle	CH <sub>4</sub>	628.25	627.39	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.
2017	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	6,90E-03	6,90E-03	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.
2017	3.A.2.a.ii Manure management - other cattle	CH <sub>4</sub>	12.28	12.20	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.
2017	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.86	18.19	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2017	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	2.36	2.40	Errors detected in some years of the 1990-2019 Software series in the activity data (synthetic fertilizer N applied to soils) were corrected. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2017	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.17	2.21	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2017	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.71	2.76	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.
2018	3.A.1.a.ii Enteric fermentation - other cattle	CH <sub>4</sub>	613.74	610.54	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.
2018	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	7,09E-03	7,09E-03	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.
2018	3.A.2.a.ii Manure management - other cattle	CH <sub>4</sub>	11.93	11.87	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.
2018	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.51	17.73	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.



YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
					In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category ( $F_{PRP}$ of mules and asses and goats) are deducted for comparability. The entire time series is included.
2018	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	2.78	2.78	Errors detected in some years of the 1990-2019 Software series in the activity data (synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2018	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	2.18	2.20	Errors detected in the 1990-2019 Software series in the $N_{rate}$ and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category ( $F_{ON}$ , $F_{SOM}$ , $F_{CR}$ and $F_{PRP}$ from mules and asses and goats) are deducted for comparability. The entire time series is included.
2018	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.76	2.79	Errors detected in the 1990-2019 Software series in the $N_{rate}$ and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category ( $F_{ON}$ , $F_{SOM}$ , $F_{CR}$ and $F_{PRP}$ from mules and asses and goats) are deducted for comparability. The entire time series is included.
2019	3.A.1.a.ii Enteric fermentation - other cattle	CH <sub>4</sub>	599.12	596.20	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2019	3.A.2.a.i Manure management - dairy cows	N <sub>2</sub> O	7,14E-03	7,14E-03	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters were corrected. The entire time series is included.
2019	3.A.2.a.ii Manure management - other cattle	CH <sub>4</sub>	11.72	11.60	Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.
2019	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - N in urine and dung deposited by grazing animals on pasture, range and paddock	N <sub>2</sub> O	17.13	17.33	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameters for dairy cows and other cattle were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>PRP</sub> of mules and asses and goats) are deducted for comparability. The entire time series is included.
2019	3.C.4. Direct N <sub>2</sub> O emissions from managed soils - synthetic fertilizer N applied to soils	N <sub>2</sub> O	1.17	1.17	Errors detected in some years of the 1990-2019 Software series in the activity data (synthetic fertilizer N applied to soils) were corrected. The entire time series is included.
2019	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - atmospheric deposition of N volatilized from managed soils	N <sub>2</sub> O	1.98	2.00	Errors detected in the 1990-2019 Software series in the N <sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected. Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected. In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F <sub>ON</sub> , F <sub>SOM</sub> , F <sub>CR</sub> and F <sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.

YEAR	CATEGORY / SUBCATEGORY	Gas	2019 NGHGI (Gg)	2021 SSLB (Gg)	RECALCULATION
2019	3.C.5. Indirect N <sub>2</sub> O emissions from managed soils - N leaching/runoff from managed soils	N <sub>2</sub> O	2.36	2.38	<p>Errors detected in the 1990-2019 Software series in the N<sub>rate</sub> and TAM parameter for dairy cows and other cattle and synthetic fertilizer N applied to soils were corrected.</p> <p>Errors detected in auxiliary spreadsheets for the 2014-2019 period were corrected.</p> <p>In the 1990-2019 BUR 4 series emissions, emission sources that are not included in the SSLB estimate for this category (F<sub>ON</sub>, F<sub>SOM</sub>, F<sub>CR</sub> and F<sub>PRP</sub> from mules and asses and goats) are deducted for comparability. The entire time series is included.</p>

## 6. Waste Sector

### 6.1 Methodology

This sector estimates the emissions resulting from the decomposition of organic matter in solid urban waste and in domestic or industrial wastewater.

The categories and gases included in the SSLB Targets and Performance Indicators are those of the goals and indicators of the global intensity targets in relation to economic growth of the First NDC, which covers the categories and gases estimated in the 2012 NGHGI.

Emissions of the direct CH<sub>4</sub> and N<sub>2</sub>O gases are considered under the scope of the SSLB, but CO<sub>2</sub> and precursor or indirect GHGs (CO, NO<sub>x</sub>, NMVOC, and SO<sub>2</sub>) are excluded. These are, however, estimated for the NGHGI.

The following table summarizes the emissions considered for the SSLB, outlining the difference in scope with the NGHGI. Unshaded emissions are those included in the SSLB; shaded emissions are excluded.

Table 19. NGHGI categories and GHGs within the scope of the SSLB and exclusions

Category	Subcategory	Gas		
		CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
4 A Solid waste disposal	4.A.1 / 4.A.2 / 4.A.3	NA	✓	NA
4.B Biological Treatment of Solid Waste		NA	✓	✓
4.C Incineration and Open Burning of Waste	4.C.1 and 4.C.2	✓	✓	✓
4.D D Wastewater Treatment and Discharge	4.D.1 and 4.D.2	NA	✓	✓
References: NA, Not Applicable / NO, Not Occurring / ✓estimated in NGHGI.				
		Included in SSLB		
		Not included in SSLB		

For the estimation of emissions of the sector categories included in the SSLB, the NGHGI methodology is maintained following the *2006 IPCC Guidelines*. The IPCC Inventory Software v 2.691 and associated auxiliary spreadsheets are used for the calculations. The following table summarizes the methods used by category and GHG type.

Table 20. Methods used by GHG and subcategory, Waste Sector

IPCC Code	Greenhouse gas source and sink categories	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O	
		Method <sup>a</sup>	EF <sup>b</sup>	Method <sup>a</sup>	EF <sup>b</sup>	Method <sup>a</sup>	EF <sup>b</sup>
4.A	4.A.1 Managed Waste Disposal Sites 4.A.2 Unmanaged Waste Disposal Sites 4.A.3 Uncategorized Waste Disposal Sites			T2 (AD) T1 (EF)	D		
4.D.1.	Domestic Wastewater Treatment and Discharge			T1/T2	D	T1	D
4.D.2.	Industrial Wastewater Treatment and Discharge			T1/T2	D		

T1, 2,(TIER 1,2), 2006 IPCC Guidelines Tier 1,2 Methods;  
D default; AD: Activity Data; EF Emission Factor

The activity data and other data needed for calculating emissions (material compositions, etc.) are gathered through reports and statements submitted by the industries to the MA through the SIA, direct requests for data to the municipalities, and literature review (sector reports, other reports, dissertation papers, etc.), as applicable.

The methodology and sources used in each case are outlined in the methodological note.

## 6.2 Emission evolution

Table 21. Evolution of CH<sub>4</sub> emissions (Gg), Waste sector, 1990, 2020 and 2021

CH <sub>4</sub> emissions (Gg)	1990	2020	2021
4. Waste	20.4	54.2	54.8
4.A - Solid Waste Disposal	16.3	47.6	47.7
4.D Wastewater Treatment and Discharge	4.2	6.6	7.1
4.D .1 - Domestic Wastewater Treatment and Discharge	1.4	1.1	1.2
4.D .2 - Industrial Wastewater Treatment and Discharge	2.7	5.5	6.0

The largest source of methane gas emissions in the sector is solid waste disposal (86% of methane generated), and fluctuations are mainly explained by the population and GDP projections used to calculate the generation rate and, to a lesser extent, by the increase in the level of coverage (management parameters remained stable throughout the period).

In terms of domestic wastewater treatment, investments have been made since the 1990s in treatment plants (new plants and changes in existing ones) and in increasing the percentage of total population using sanitation networks. These transformations have had both a downward effect on emissions levels (change from anaerobic to aerated treatment) and an upward effect (increased coverage of anaerobic treatment). The anaerobic systems in place since 2014, and the associated network connection expansions explain the increase in emissions (for example, the new Ciudad de la Costa treatment plant).

Emissions from industrial wastewater treatment plants are directly associated with the activity levels. The fall in emissions since 2014 is primarily explained by the reduced participation of the textile industry (wool washing).

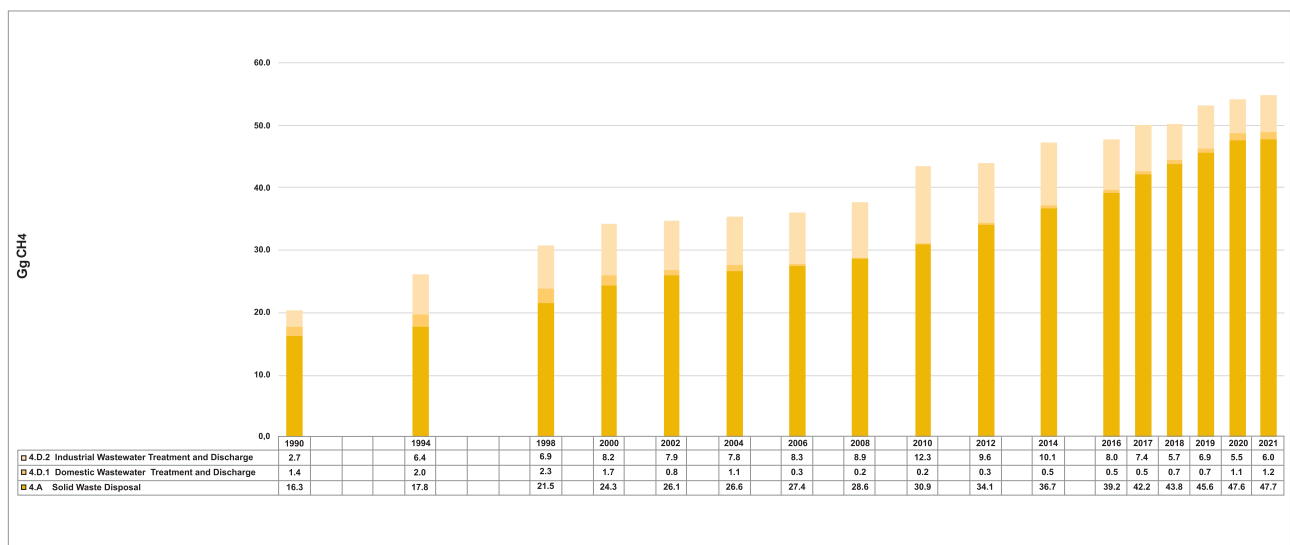


Figure 9: Evolution of CH<sub>4</sub> emissions (Gg), Waste sector, 1990-2021 time series

The following table shows the evolution of N<sub>2</sub>O emissions from the Waste sector. N<sub>2</sub>O emissions remain stable in line with the changes in population and per capita protein consumption levels.

Table 22. Evolution of N<sub>2</sub>O emissions (Gg), Waste sector, 1990, 2020 and 2021

N <sub>2</sub> O emissions (Gg)	1990	2020	2021
4. Waste	0.20	0.24	0.24
4.A - Solid Waste Disposal	-	-	-
4.D Wastewater Treatment and Discharge	0.20	0.24	0.24
4.D .1 - Domestic Wastewater Treatment and Discharge	0.20	0.24	0.24
4.D .2 - Industrial Wastewater Treatment and Discharge	-	-	-

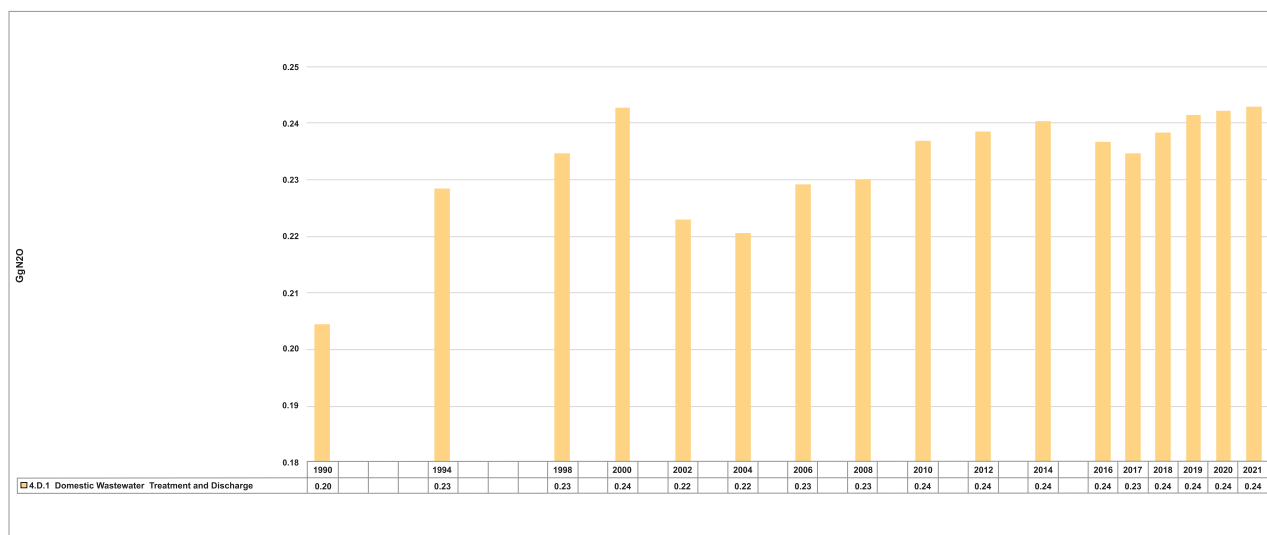


Figure 10: Evolution of N<sub>2</sub>O emissions (Gg), Waste sector, 1990-2021 time series



### 6.3. Recalculations

Recalculations were made after reviewing the information available on activity data. The table below shows the 2019 SSLB and NGHGI values (within the same scope as the SSLB), outlining the changes in methane emissions.

Table 23. Recalculations for the Waste Sector, CH<sub>4</sub> (Gg)

Year	Category	Subcategory	Gas	2019 NGHGI Gg	2021 SSLB Gg	Reason for recalculation
1990	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	15.72	16.26	MCF and coverage values were updated based on improved information available on final disposal sites management and generation rate by GDP adjustment
1994	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	17.11	17.76	
1998	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	20.69	21.51	
2000	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	23.39	24.31	
2002	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	25.06	26.05	

Year	Category	Subcategory	Gas	2019 NGHGI Gg	2021 SSLB Gg	Reason for recalculation
2004	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	25.53	26.56	
2006	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	26.31	27.41	
	4.D - Wastewater Treatment and Discharge	4.D .1 - Domestic Wastewater Treatment and Discharge	CH <sub>4</sub>	0.23	0.30	Updated based on new information on plants (1 new plant)
2008	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	27.47	28.62	MCF and coverage values were updated based on improved information available on final disposal sites management and generation rate by GDP adjustment
2010	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	29.66	30.93	
2012	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	32.64	34.06	
2014	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	35.09	36.66	

Year	Category	Subcategory	Gas	2019 NGHGI Gg	2021 SSLB Gg	Reason for recalculation
	4.D - Wastewater Treatment and Discharge	4.D .1 - Domestic Wastewater Treatment and Discharge	CH <sub>4</sub>	0.33	0.55	Updated based on new information on plants and changes in the sanitation system (2 new plants)
2016	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	37.38	39.18	MCF and coverage values were updated based on improved information available on final disposal sites management and generation rate by GDP adjustment
	4.D - Wastewater Treatment and Discharge	4.D .1 - Domestic Wastewater Treatment and Discharge	CH <sub>4</sub>	0.28	0.50	Updated based on new information on plants and changes in the sanitation system (2 new plants)
2017	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	40.23	42.15	MCF and coverage values were updated based on improved information available on final disposal sites management and generation rate by GDP adjustment
	4.D - Wastewater Treatment and Discharge	4.D .1 - Domestic Wastewater Treatment and Discharge	CH <sub>4</sub>	0.28	0.50	Updated based on new information on plants and changes in the sanitation system (2 new plants)
	4.D - Wastewater Treatment and Discharge	4.D .1 - Domestic Wastewater Treatment and Discharge	N <sub>2</sub> O	0.24	0.23	Protein intake value updated based on new information available

Year	Category	Subcategory	Gas	2019 NGHGI Gg	2021 SSLB Gg	Reason for recalculation
2018	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	41.68	43.81	MCF and coverage values were updated based on improved information available on final disposal sites management and generation rate by GDP adjustment
	4.D - Wastewater Treatment and Discharge	4.D .1 - Domestic Wastewater Treatment and Discharge	CH <sub>4</sub>	0.44	0.66	Updated based on new information on plants and changes in the sanitation system (3 new plants)
2019	4.A - Solid Waste Disposal	4.A - Solid Waste Disposal	CH <sub>4</sub>	43.21	45.55	MCF and coverage values were updated based on improved information available on final disposal sites management and generation rate by GDP adjustment
	4.D - Wastewater Treatment and Discharge	4.D .1 - Domestic Wastewater Treatment and Discharge	CH <sub>4</sub>	0.44	0.73	Updated based on new information on plants and changes in the sanitation system (3 new plants)

## 7. List of Acronyms

AR5	IPCC Fifth Assessment Report
BEN	National Energy Balance
CH <sub>4</sub>	Methane
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
DIEA	Agricultural Statistics Office
DINACC	National Climate Change Directorate
DINACEA	National Environmental Quality and Assessment Directorate
DNE	National Energy Directorate
EMR	GHG Emissions Monitoring Report
GHG	Greenhouse gases
GIR	Government Indicators Report
GWP	Global Warming Potential
HFC	Hydrofluorocarbons
IM	Municipality of Montevideo
IPCC	Intergovernmental Panel on Climate Change
IR	Indicator Report
KPIs	Key Performance Indicators
MA	Ministry of Environment
MEF	Ministry of Economy and Finance
MGAP	Ministry of Livestock, Agriculture and Fisheries
MIEM	Ministry of Industry, Energy and Mining
MRREE	Ministry of Foreign Affairs
N <sub>2</sub> O	Nitrous oxide
NGHGI	National Greenhouse Gas Inventory
NMVOC	Non-methane volatile organic compounds
NO <sub>x</sub>	Nitrogen oxides
OPP	Budgeting and Planning Office
OPYPA	Office of Agricultural Policy and Planning
pMRV	Programming, Monitoring, Reporting, and Verification
SF <sub>6</sub>	Sulfur hexafluoride
SIA	Environmental Information System
SNIG	National Livestock Information System
SNRCC	National Climate Change Response System
SO <sub>2</sub>	Sulfur dioxide
SPTs	Performance targets
SSLB	Sovereign Sustainability-linked Bond
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WG	Working group