



# **Verification Report of the 2022 Key Performance Indicators Report of Uruguay's Sovereign Sustainability-Linked Bond**

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May 2024



## **Verification Report of the 2022 Key Performance Indicators Report of Uruguay's Sovereign Sustainability-Linked Bond**

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## Introduction

Pursuant to the signing of the Agreement for the provision of development services dated September 19, 2022 (hereinafter, the Agreement), the Government of Uruguay requested the United Nations Development Programme (UNDP) to fulfill the role of external verifier of the key performance indicators (KPIs) included in the Sovereign Sustainability-Linked Bond (SSLB) Framework<sup>1</sup> published in September 2022.

On May 2023, UNDP published the first verification report<sup>2</sup> for KPI-1 and KPI-2 presented in the 2020-2021 KPI Report for the SSLB (2020-2021 KPIR).

During 2024, UNDP has carried out the verification process of KPI-1 and KPI-2 presented in the 2022 KPI Report for the SSLB (2022 KPIR) dated April 2024, and calculated on the basis of the SSLB Emissions Report (EMR time series 1990-2022, hereinafter, EMR)<sup>3</sup>.

The 2022 KPIR and EMR were provided to UNDP by the Government of Uruguay between January and April 2023, according to schedule, together with the following documents and files:

- Database with the information needed to calculate the KPIs; INI BIICC spreadsheet-version2024.04.04
- Methodological note on the estimation of greenhouse gas emissions for the preparation of the EMR;
- EMR auxiliary spreadsheets (quality control spreadsheets, recalculations and sectoral spreadsheets);
- KPI-1 GHG emissions estimates included in IPCC inventory software v 2.691;

The Government of Uruguay is responsible for the preparation of the 2022 KPIR, the EMR time series 1990-2022, and the other documents, database and files provided to UNDP.

As per the Agreement, the Government of Uruguay warrants to UNDP the accuracy, integrity, quality, reliability and completeness of all technical data, files, documents, test data, sample results, emission reports, databases or sheets, KPI value calculations and technical records, as well as any other data and materials made available to UNDP pursuant to the Agreement.

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<sup>1</sup> Available at: [http://sslburuguay.mef.gub.uy/innovaportal/file/30690/20/uruguay\\_sslb\\_framework\\_2.pdf](http://sslburuguay.mef.gub.uy/innovaportal/file/30690/20/uruguay_sslb_framework_2.pdf)

<sup>2</sup> Available at: [https://www.undp.org/es/uruguay/projects/verificacion\\_externa\\_BIICC](https://www.undp.org/es/uruguay/projects/verificacion_externa_BIICC)

<sup>3</sup> Available at: <http://sslburuguay.mef.gub.uy/30672/20/areas/reporting-methodology-and-sslb-annual-report.html>



## Scope of verification

The verification carried out in 2024 includes the key performance indicator KPI-1<sup>4</sup> included in the Sovereign Sustainability-Linked Bond (SSLB) Framework published in September 2022 and reported in the 2022 KPIR dated April 2024 prepared by the Government of Uruguay:

**KPI-1: Reduction of aggregate gross CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> emissions (in CO<sub>2</sub>eq) per real GDP unit with respect to reference year 1990 (in %).** For the calculation of this KPI, the emissions are those reported in the December 2023 EMR, which exclusively considers the emissions corresponding to the gases, sectors, categories and sources estimated and reported in the 2012 National Greenhouse Gas Inventory (NGHGI), on which the 2017 Nationally Determined Contribution's emissions intensity reduction commitment was established. For real GDP, the latest official series published by the National Accounts System (Sistema de Cuentas Nacionales, SCN) of the Central Bank of Uruguay (Banco Central de Uruguay, BCU) in March 2024 is used, retropolated to 1990 using the variation rate method as a statistical splicing technique.

For the 2022 KPIR there is no verification of KPI-2 as the estimation frequency of KPI-2 is every four years and the Agreement establishes that the external verification process of KPI-2 is carried out every four years, and it was carried out for the year 2021 contained in the 2020-2021 KPIR.

## Verification Methodology

The technical review of the EMR time series 1990-2022 of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from Energy, Industrial Processes, Agriculture and Waste Sectors is conducted according to the methodology contained in the United Nations Framework Convention on Climate Change's (UNFCCC) Guide for Peer Review of National Greenhouse Gas Inventories (NGHGI), specifically concluding on:

- i. adherence to the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories;
- ii. whether the key Inventory requirements of Decisions 17/CP.8 (UNFCCC, 2002), 2/CP.17 (UNFCCC, 2011) and 18/CMA.1 (UNFCCC, 2018) are met, when applicable;
- iii. the quality of the EMR, assessed primarily through the review of inventory principles, Transparency, Accuracy, Consistency, Comparability and Completeness (TACCC principles), TACCC established for reporting in the IPCC 2000 and 2003 Good Practice Guidance and also incorporated into the 2006 IPCC Guidelines.

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<sup>4</sup> Verification for KPI-2 is not applicable for KPIR 2022 because the estimation Frequency for this indicator is four years, and the Agreement establishes that the external verification of KPI-2 is performed every four Years, and it was done for 202-2021 KPIR.



- iv. the relevance and quality of the revision of historical GHG emission values, derived from inventory adjustments, including additional data sources and recalculations due to methodological improvements.

Also, the application of the calculation methodology for KPI-1 established in the SSLB framework is verified. Methodologies are presented in detail in the corresponding technical sheets: Technical Data Sheet for KPI-1<sup>5</sup> and Technical Data Sheet for Real GDP series<sup>6</sup> and Technical Sheet for KPI-2<sup>7</sup>.

## Declaration of Competence and Independence

The verification activities were carried out between January and May 2024 by a qualified, multidisciplinary team of UNDP experts with wide experience in technical review of NGHGI.

The verification complied with the requirements of independence, impartiality and other ethical requirements established in the UNDP Code of Ethics, which is based on the principles of integrity, accountability, transparency, professionalism, mutual respect and results orientation.

## Activities performed

The technical review of the CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> emission estimates of KPI-1 was carried out according to the methodology of the United Nations Framework Convention on Climate Change (UNFCCC) Guidelines for the Peer Review of National Greenhouse Gas Inventories (NGHGI).

The following documents provided by the Government of Uruguay were analyzed: EMR time series 1990-2022, database with the information needed to calculate the KPIs, KPIR Excel spreadsheet version 2024.04.04, methodological note on the estimation of greenhouse gas emissions for EMR preparation; EMR auxiliary spreadsheets (quality control spreadsheets, recalculations and sectoral spreadsheets); KPI-1 GHG emissions estimates included in IPCC inventory software v 2.691.

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<sup>5</sup> Available at: <http://sslburuguay.mef.gub.uy/innovaportal/file/30671/19/technical-data-sheet-co2-equivalent-english.pdf>

<sup>6</sup> Available at: <http://sslburuguay.mef.gub.uy/innovaportal/file/30671/19/technical-data-sheet-real-gdp-english.pdf>

<sup>7</sup> Available at: <http://sslburuguay.mef.gub.uy/innovaportal/file/30671/19/technical-data-sheet-native-forest-english.pdf>



The calculation of the KPI-1 indicator contained in the 2022 KPIR was reviewed, replicating its calculation according to the methodology described in the technical data sheet of KPI-1, Gross aggregate GHG emissions intensity/GDP.

For the revision of real GDP, its calculation was replicated using the methodology described in the technical data sheet Real Gross Domestic Product Series for Uruguay at constant prices since 1990. Virtual consultations were held with those responsible for preparing the reports, from the NGHG Inventory Working Group and the pMRV Working Group of the National Climate Change Response System.

The technical review reports of the SSLB EMR and SSLB KPIR are presented in the Annex<sup>8</sup> of this report.

## Verification Results

### KPI-1

KPI-1 estimation comply with the principles of quality in terms of Transparency, Completeness, Consistency, Comparability, and Accuracy, established for reporting in the Good Practice Guidance incorporated into the 2006 IPCC Guidelines. In the next paragraphs, the compliance with each principle is explained:

- KPI-1 complies with the principle of transparency, as the SSLB EMR and its methodological note present sufficient detailed and clear documentation so that it is possible to understand how emissions were estimated, including the sources of information, assumptions, expert judgment, and methodologies used, as well as the processes and justification for the selection of methodologies.
- KPI-1 complies with the principle of completeness, as the scope of KPI-1 is clearly defined and aligned with the scope of Uruguay's first NDC. The emissions estimates presented in the SSLB EMR effectively cover all gases, sources, and categories within the scope of the KPI-1 and cover the full time series from 1990 to 2022. Any exclusion of emissions from the SSLB EMR with respect to Uruguay's latest published NGHGI is clearly identified and justified, and therefore, no omissions are identified in KPI-1.
- KPI-1 complies with the principle of consistency, as the same methods and data sources are used for the estimation of emissions for the different years, gases, and categories, using appropriate splicing techniques in accordance with the 2006 IPCC Guidelines. Recalculations are properly performed according to IPCC good practices under a continuous improvement framework.
- KPI-1 complies with the comparability principle, as the estimation of emissions covered by the KPI-1 fully employs the guidance, classifications, definitions,

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<sup>8</sup> Annex:

- Technical review of the Emissions Report (EMR) and the KPIs Report (KPIR) for the KPI-1 of the Sovereign Sustainability-Linked Bond (SSLB) of Uruguay



methodologies and reporting formats of the 2006 IPCC Guidelines. The SSLB EMR is comparable with Uruguay's NGHGI in terms of definitions, nomenclature, assumptions, data sources, methodology and categorization of gases and sources by category, clearly indicating any deviation in the scope of the KPI-1 with respect to the NGHGI.

- KPI-1 complies with the accuracy principle, as KPI-1 contains no under- or over-estimates by using appropriate methods from the 2006 IPCC Guidelines with high quality country-specific data and default emission factors appropriate to the circumstances in Uruguay, incorporating improvements in data quality as they become available and performing time series recalculations as appropriate.

The EMR time series 1990-2022, fully complies with the fundamental inventory requirements of Decisions 17/CP.8, 2/CP.17 y 18/CMA.1<sup>9</sup>, where applicable:

- The SSLB EMR fully complies with the reporting requirements in the BURs and national communications stipulated in Decisions 2/CP.17 and 17/CP.8 with regard to GHG emissions.
- The SSLB EMR complies with the vast majority of the BTR reporting requirements stipulated in Decision 18/CMA.1 regarding GHG emissions, noting that these requirements will come into effect in December 2024.

The KPI-1 estimation complies with the good practice of the 2006 IPCC Guidelines for NGHGI elaboration at both cross-cutting and sectoral levels.

The KPI-1 estimation process has a robust institutional framework that enables effective planning, oversight, management, and implementation of annual KPI-1 estimation, including its documentation, archiving, quality control and technical review for continuous improvement, following the good practices of the 2006 IPCC Guidelines.

The KPI-1 estimation process demonstrates a strong commitment to continuous improvement enabled by a robust quality assurance and quality control system, which integrates the review and recalculation of historical values to improve the quality of KPI-1 according to the good practices of the 2006 IPCC Guidelines as methodological improvements and access to better quality data emerge, as well as planning for future improvement of the KPI-1 estimation process.

According to the review procedures carried out, no deficiencies have been detected in the methodology applied for the estimation of real GDP for SSLB KPI-1 for 2022 in the calculation of KPI-1. No errors or discrepancies were detected between the numerical and percentage values of emissions, GDP and the KPI-1 included in the Excel calculations, the SSLB EMR files, and the SSLB KPI-1 files.

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<sup>9</sup> Decision 18/CMA.1 applies as of December 2024



The trends and annual variations of emissions, GDP, and KPI-1 indicator adequately reflect the national context according to the official national information presented in official documents submitted to the UNFCCC.

## Conclusions

In UNDP's opinion, KPI-1 reported in the 2022 Key Performance Indicators Report for the Sovereign Sustainability-Linked Bond has been prepared in accordance with the methodologies established in Uruguay's Sovereign Sustainability-Linked Bond (SSLB) Framework.


KPI-1 adheres to the methodology and good practices established in the 2006 IPCC Guidelines for the preparation of National Greenhouse Gas Inventories and to the requirements of Decisions 17/CP.8, 2/CP.17 y 18/CMA.1, where applicable:

The Emissions Report 1990-2022 and the 2022 KPI Report comply with the quality principles in terms of Transparency, Accuracy, Consistency, Comparability and Completeness established by the 2006 IPCC Guidelines.

The Emissions Report SSLB EMR preparation process is supported by a robust quality assurance and quality control system, which integrates the review and recalculation of historical values to improve the quality of KPI-1 according to the good practices of the 2006 IPCC Guidelines under a continuous improvement framework.

The Government of Uruguay submitted the Emissions Report 1990-2022 and the 2022 KPI Report, complying with the frequency and timelines established in the SSLB Framework.

The institutional arrangements for inter-ministerial coordination through the SSLB, pMRV and NGHGI Working Groups of the National Climate Change Response System, following the 2006 IPCC Guidelines, providing a robust institutional framework that enables effective planning, oversight, management, and implementation of annual KPI-1 estimation and ensure the effective operationalization of Uruguay's Sovereign Sustainability-Linked Bond.

DocuSigned by:  
  
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For UNDP

José Cruz Osorio

Manager, Regional Hub for UNDP Latin America and the Caribbean

Panamá City, May 15, 2024





## ANNEX

# **Technical review of the Emissions Report (EMR) and the KPIs Report (KPIR) for the KPI 1 of the Sovereign Sustainability-Linked Bond (SSLB) of Uruguay**

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May 2024



## **Technical review of the Emissions Report (EMR) and the KPIs Report (KPIR) for the KPI-1 of the Sovereign Sustainability-Linked Bond (SSLB) of Uruguay**

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First edition, May 2024.

This report covers the technical review of the Emissions Report (EMR) and the Key Performance Indicators Report (KPIR) for the KPI-1 of the Sovereign Sustainability-Linked Bond (SSLB) and is part of the technical documents used for the preparation of the Verification Report of the 2022 KPI Report for the Sovereign Sustainability-Linked Bond (SSLB), prepared by UNDP.

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## Executive Summary

The Oriental Republic of Uruguay has requested the United Nations Development Programme (UNDP) to act as the external verifier of the Key Performance Indicators (KPIs) of the Sovereign Sustainability-Linked Bond (SSLB).

KPI-1:

- Presents the gross aggregate greenhouse gas (GHG) emissions intensity with respect to the gross domestic product (GDP), used to assess the reduction of aggregate CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> emissions expressed in CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions per unit of real GDP with respect to 1990.
- Exclusively considers the emissions corresponding to the gases, sectors, categories, and sources estimated and reported in the national greenhouse gas inventory 1990-2012 (NGHGI 2012), from which the GHG emissions reduction commitments of the first Nationally Determined Contribution (NDC) were established in 2017.
- Aggregates the emissions of the greenhouse gases CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> within its scope through the 100-year Global Warming Potential (GWP) metric established in the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC).

The KPI-1 2022 is calculated based on the emissions reported in the Emissions Report (EMR) of December 2023, which exclusively considers the emissions corresponding to the gases, sectors, categories, and sources estimated and reported in the national inventory of greenhouse gases 1990-2012 (NGHGI 2012), from which the intensity reduction commitment of Uruguay's first Nationally Determined Contribution (NDC) was established in 2017.

The KPI-1 2022 is also calculated based on the latest official GDP series published by the National Accounts System (SCN, according to the Spanish acronym Sistema de Cuentas Nacionales) of the Central Bank of Uruguay (BCU, according to the Spanish acronym Banco Central de Uruguay), backpolated to 1990 using the variation rate method as a statistical splicing technique. The GDP is based on 2016, and a backpolation of the series between 1990 and 2015 was performed by the Ministry of Economy and Finance using available public information of National Accounts published by the BCU.

**This document presents the results of the technical review of the 2023 SSLB Emissions Report (EMR) for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from the Energy, Industrial Processes, Agriculture and Waste Sectors, as well as the results of the technical review of the 2024 SSLB KPIs Report (KPIR) for KPI-1 2022.**



The technical review of the 2023 SSLB Emissions Report (EMR) for KPI-1 2022 followed the methodology of the United Nations Framework Convention on Climate Change (UNFCCC) Guidelines for the Peer Review of National Greenhouse Gas Inventories (NGHGI), to specifically draw conclusions on:

- The adherence to the 2006 IPCC Guidelines for the preparation of NGHGIs.
- The fulfilment of the inventory requirements stipulated in Decisions 17/CP.8, 2/CP.17 and 18/CMA.1, where applicable.
- The quality of emissions reporting, assessed primarily through examination of the TACCC inventory principles set out for reporting in the Good Practice Guidance incorporated in the 2006 IPCC Guidelines, namely the principles of transparency, accuracy, completeness, consistency, and comparability.
- The relevance and quality of the revision of historical GHG emission values, derived from inventory adjustments, including additional data sources and recalculations due to methodological improvements.

The technical review of the GHG emissions estimates of the Energy, Industrial Processes, Agriculture, and Waste Sectors for the 1990-2022 series for the KPI-1 was conducted during the months of January to March 2024 using the following materials:

- 2023 SSLB Emissions Report (EMR) for KPI-1 2022 covering the 1990-2022 time series prepared by the NGHGI Group of the National System for Climate Change and Variability Response (SNRCC, according to the Spanish acronym Sistema Nacional de Respuesta al Cambio Climático y Variabilidad).
- 2024 SSLB KPIs Report (KPIR) which contains the calculation of KPI-1, carried out by the pMRV Group (programming, Monitoring, Reporting, and Verification) of the SNRCC.
- Methodological note on the estimation of GHG emissions for the preparation of the EMR for the 1990-2022 time series (hereinafter referred to as “methodological note”).
- Auxiliary spreadsheets (quality control spreadsheets, recalculations, and sectoral spreadsheets).
- KPI-1 emissions estimates included in the IPCC inventory software version 2.691.

And concluded that the 2023 SSLB EMR for KPI-1 2022:

- Fully adheres to the quality principles of transparency, accuracy, completeness, consistency, and comparability.
- Fully adheres to the 2006 IPCC Guidelines.
- Adheres to the requirements of Decisions 17/CP.8, 2/CP.17, and 18/CMA.
- Has a robust quality control system and review process for historical values under a continuous improvement framework for the inclusion of enhancements and implementation of recalculations.

**The technical review of the 2024 SSLB KPIs Report (KPIR) for KPI-1 2022**, focused specifically on the application of the calculation methodology defined in KPI-1 Fact Sheet: Reduction of aggregate gross greenhouse gas (GHG) emissions per unit of real



GDP, with respect to 1990, established under the SSLB framework, as well as the real GDP published by the BCU.

The review was carried out during the first half of April 2024 using the following materials:

- Technical fact sheet URUGUAY'S REAL GROSS DOMESTIC PRODUCT SERIES AT CONSTANTE PRICES, SINCE 1990 (SERIE DEL PRODUCTO INTERNO BRUTO REAL DE URUGUAY A PRECIOS CONSTANTES, DESDE 1990 in Spanish).
- Technical fact sheet INTENSITY OF AGGREGATE GROSS GHG EMISSIONS/GDP (INTENSIDAD DE EMISIONES AGREGADAS BRUTAS DE GEI/ PIB in Spanish).
- 2024 SSLB KPIs Report (KPIR).
- KPIR Spreadsheet called Excel file BIICC version 2024.04.04.

And concluded that:

- No deficiencies are detected in the methodology applied for the calculation of KPI-1 or in the estimation of the real GDP.
- No deficiencies are identified in the implementation of the KPI-1 methodology or in the process of calculating the real GDP.
- No discrepancies are detected when comparing the values of GHG emissions, GDP, and the KPI-1 indicator.
- KPI-1 adequately reflects the national context.

## Background

The Oriental Republic of Uruguay has implemented a pioneering framework for the issuance of a Sovereign Sustainability-Linked Bond (SSLB)<sup>10</sup>, a premium and penalty structure of symmetrical rates, linking the country's cost of capital to the achievement of its climate change mitigation and native forest protection targets set out in the commitments adopted under the Paris Agreement.

SSLB performance is monitored through two key performance indicators (KPIs) aligned with the objectives of Uruguay's first Nationally Determined Contribution (NDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2017, namely:

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<sup>10</sup> The SSLB framework is available at:  
<http://sslbuguay.mef.gub.uy/30694/20/areas/framework-for-the-sovereign-issuance-of-sslb.html>

SSLB KPI		SSLB Target	
KPI	Description	STP	Description
<b>KPI 1</b>	Reduction of aggregate GHG emissions (CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O) expressed in CO <sub>2</sub> e per real GDP unit <sup>11</sup> , with respect to the 1990 reference year (in %). <sup>12</sup>	<b>STP 1.1</b>	<u>NDC commitment</u> : Achieve at least 50% reduction by 2025.
		<b>STP 1.2</b>	<u>Outperformance compared to NDC commitment</u> : Achieve a reduction of more than 52% by 2025.
<b>KPI 2</b>	Maintenance of native forest area (in hectares) with respect to the 2012 reference year (in %). <sup>13</sup>	<b>STP 2.1</b>	<u>NDC commitment</u> : Maintain at least 100%.
		<b>STP 2.2</b>	<u>Outperformance compared to NDC commitment</u> : Achieve an increase higher than 3%.

Uruguay publishes annual SSLB reports no later than May 31<sup>st</sup> of the year after the KPI observation is made. As such, KPI-1 is measured annually with a lag of one year.

Under the SSLB framework, Uruguay conducts quality assurance and quality control defined by the Intergovernmental Panel on Climate Change (IPCC) as:

- **Quality Control (QC):** A system of routine technical activities implemented by the inventory development team for the purpose of measuring and controlling the quality of the inventory as it is developed.
- **Quality Assurance (QA):** A planned system of review processes conducted by personnel not involved in the inventory development process.

For quality control of the SSLB KPIs, internal sectoral reviews are carried out by each Ministry, and the Ministry of Environment performs a global quality control of the estimates and reports.

Under the SSLB KPI quality assurance framework, Uruguay has requested the United Nations Development Programme (UNDP) to act as external verifier of the two KPIs on an annual basis. The quality assurance process is managed through UNDP by contracting external reviewers to perform the technical review of the KPIs.

<sup>11</sup> The GDP technical fact sheet is available at:

<https://sslburuguay.mef.gub.uy/innovaportal/file/30671/20/real-gdp-technical-data-sheet.pdf>

<sup>12</sup> The KPI-1 technical fact sheet is available at:

<https://sslburuguay.mef.gub.uy/innovaportal/file/30671/20/co2-equivalent-technical-data-sheet.pdf>

<sup>13</sup> The KPI-2 technical fact sheet is available at:

<https://sslburuguay.mef.gub.uy/innovaportal/file/30671/20/native-forest-technical-data-sheet.pdf>



On May 31<sup>st</sup> 2023, Uruguay published the first SSLB Annual Report, covering the 1990-2021 time series, as well as the first annual external verification report of the SSLB KPIs covering the 2020-2021 period.

## Scope

This consultancy is part of the external verification activities carried out by the UNDP and specifically constitutes the annual technical review of KPI-1.

The annual external verification of KPI-1 focuses on the technical review of:

- SSLB Emissions Report (EMR) prepared by the National Greenhouse Gas Inventory (NGHGI) Group of the National System for Climate Change and Variability Response (SNRCC, according to the Spanish acronym Sistema Nacional de Respuesta al Cambio Climático y Variabilidad).
- SSLB KPIs Report (KPIR) containing the calculation of KPI-1, carried out by the pMRV (programming, Monitoring, Reporting, and Verification) Group of the SNRCC.

To support the technical review, the process also refers to:

- Methodological note on the estimation of GHG emissions for the preparation of the SSLB EMR (hereinafter referred to as “methodological note”).
- Auxiliary spreadsheets (quality control spreadsheets, recalculations, and sectoral spreadsheets).
- KPI-1 emissions estimates included in the IPCC inventory software version 2.691.

This document summarizes the findings of the technical review of the 2023 SSLB Emissions Report (EMR) for the 1990-2022 time series covering the review of Cross-Cutting Aspects, and the Energy, Industrial Processes, Agriculture and Waste sectors associated with the development of KPI-1 2022. Likewise, this report details the technical review of the 2024 SSLB KPIs Report (KPIR) corresponding to KPI-1 2022, a metric that assesses the reduction of gross aggregate CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> emissions in CO<sub>2</sub> equivalent (CO<sub>2</sub>e) per unit of real GDP (GHG/GDP) with respect to 1990. It is based on the SSLB framework and real GDP from the Central Bank of Uruguay (BCU, according to the Spanish acronym Banco Central de Uruguay).

The KPI-1 exclusively considers the GHG emissions corresponding to the gases, sectors, categories, and sources estimated and reported in the 2012 national greenhouse gas inventory (NGHGI 2012), on which the emissions intensity reduction commitment of the first NDC of Uruguay was established covering emissions of three direct GHGs (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O) from the Energy, Industrial Processes, Agriculture, and Waste sectors.

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





Uruguay adopted the 2006 IPCC Guidelines to prepare the national GHG inventory starting from the NGHGI 2014 onwards, estimating emissions derived from the Energy, Industrial Processes and Product Use, Agriculture, Forestry and Other Land Use, and Waste sectors. The change in the Guidelines not only implied a change in the denomination of the sectors, but also the incorporation of new gases, categories, and emission sources with respect to those encompassed by the first NDC of Uruguay.

In addition, due to the continuous improvement process of the Uruguayan GHG inventory, categories and gases that were not estimated in the NGHGI 2012 to establish the NDC commitments are currently estimated under recent editions of the NGHGI. Therefore, KPI-1 only considers direct GHG emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from the categories covered by NGHGI 2012. Direct GHG emissions of HFCs, PFCs, or SF<sub>6</sub>, indirect or precursor GHGs (CO, NO<sub>x</sub>, NMVOC and SO<sub>2</sub>), as well as any other categories included and estimated in Uruguay's national inventories subsequent to the NGHGI 2012 are outside the scope of the KPI-1.

This means that the SSLB EMR does not correspond to Uruguay's national GHG inventory and thus requires its own quality assurance and control processes.

## Methodology of the technical review

### Technical review of the SSLB Emissions Report (EMR)

This document presents the results of the technical review of the 2023 SSLB EMR for the 1990-2022 time series covering the review of Cross-Cutting Aspects, as well as the Energy, Industrial Processes, Agriculture and Waste sectors associated with the elaboration of the KPI-1 2022.

The technical review was conducted during the months of January to February 2024 by international reviewers in collaboration with the UNDP and in consultation with sectoral stakeholders involved in the compilation of the SSLB EMR.

The approach of the technical review followed the methodology of the UNFCCC's Guide for Peer Review of NGHGIs. The technical review evaluates the estimation of GHG emissions for the 1990-2022 series for the sectors, categories, sources, and gases included in KPI-1 according to the following criteria:

- The **adherence to the 2006 IPCC Guidelines** for the preparation of NGHGIs.
- The **fulfilment of the TACCC principles** set out in the Good Practice Guidance incorporated in the 2006 IPCC Guidelines, namely the principles of transparency, accuracy, completeness, consistency, and comparability.
- The relevance and quality of the **revision and recalculations of historical GHG emission values**, derived from inventory adjustments, including additional data sources and recalculations due to methodological improvements.
- The fulfilment of the **fundamental requirements** stipulated in Decisions 17/CP.8, 2/CP.17, and 18/CMA.1, where applicable.

The detailed review focused on the principles of transparency, accuracy, completeness, consistency, and comparability, taking into account the methods used, activity data, emission factors, parameters and estimated emissions as follows:

- To assess **transparency**, it was verified whether there is sufficient documentation and clear references to understand how the GHG emissions estimates for KPI-1 were made.
- The **completeness** of the emissions and removals were estimated by confirming if all gases and all relevant source and sink categories of the KPI-1 were included nationwide, whether notation keys were used, and how the absence of estimates were justified.
- The **consistency** of estimates for different years, gases, and categories was assessed, and it was verified whether annual trends are calculated using the same methods and data sources in all years, without being subject to changes resulting from methodological differences, including the revision and recalculation of historic values.
- **Comparability** was assessed by examining whether the guidance, classifications, definitions, methodologies, and values of the 2006 IPCC Guidelines were used.
- The **accuracy** of the data was also checked by reviewing whether each sector did not contain over- or under-estimates.

In each category included in KPI-1, the following aspects were reviewed:

- **Method:** It was evaluated what information was collected, how the data was obtained, and what methods were used. It was reviewed and evaluated whether the best method was used for each category, according to the available information and whether the assumptions used in the cases that were used are appropriate. The methodological and data changes that presented divergences with respect to the 2022 SSLB EMR were verified and how the recalculations were justified and carried out. The emissions estimation methodologies used and the adequacy of the methodological level (tier) to the relative weight of the category in the overall inventory, the emission factors applied and their comparison with the default emission factors, the completeness and consistency of the emission data series, the interannual differences in emissions, and the justifications provided were evaluated. This determined the degree of quality related to the inclusion of the best possible emission estimates, given the current state of scientific knowledge and data availability.
- **Activity Data:** Activity data at the national level was reviewed. The consistency in magnitude with respect to international parameters was reviewed and it was assessed whether the time series data are consistent by, in particular, observing the presence of outliers. The assumptions and criteria for the selection of activity data was reviewed, as well as the consistency of the data across categories. The temporal consistency in the input data for each category was verified, as well as the consistency in the method used for the calculations. At the same time, any unusual or unexplained trends reported for the activity data or other parameters across the time series was checked. The level of quality control performed by the stakeholders responsible for the preparation of the NGHGI was reviewed. Alternative data sources, such as data presented in the national energy balance,



were considered, comparing activity data from multiple references whenever possible.

- **Emission Factors (EF):** It was reviewed how the default IPCC tier 1 emission factors have been used. It was determined whether appropriate emission factors were used and the justifications for their use. The relevance of the IPCC default factors as well as country-specific factors were assessed by reviewing the quality of the data used and comparing them with the IPCC default values. The emission factors used were also compared with those of other Latin American countries which have submitted their Biennial Annual Reports (BURs). Consistency was additionally evaluated through the time series and the value of the implied emission factors (aggregate emissions divided by the activity data) were verified through the time series.
- **Parameters:** It was evaluated whether the IPCC default parameters have been used. If not, the justification of the values used was checked in order to assess transparency. Parameters that are common in the categories were identified in order to verify consistency. It was verified that the same data set is used for categories that share common data.
- **Emissions:** How the data was documented, the calculation tools used in the development of emissions and removals estimates, and the systems for producing the information and disaggregated data were evaluated. The completeness of the categories in the 1990-2022 series was verified. It was verified whether the estimates are presented for all categories present in the country which are included in KPI-1. It was verified whether there is a clear definition of the “Other” type categories. It was also checked that data whose unavailability is known, resulting in incomplete emissions estimates for a category, were documented (e.g., subcategories classified as ‘not estimated’). Estimates for each category were compared over the 1990-2022 series. If there were significant changes or deviations from expected trends, the estimates were rechecked, and the relevant stakeholders were asked to provide explanations for the differences. The consistency of the time series was assessed by further reviewing significant changes (>10%) in annual estimates for categories and subcategories and their justifications. Estimates made with top-down and bottom-up approaches were compared to verify that they were of similar orders of magnitude (sectoral and baseline approach in the Energy sector). It was verified that emissions are reported consistently, in terms of significant digits or decimal places, in the categories and that emissions data are aggregated correctly from the lowest to the highest reporting levels. Estimates were compared with other national or international estimates at the sector, sub-sector, gas, or national level, where possible. Intensity indicators were compared between countries of similar circumstances in order to check the accuracy of emissions. Measurements of biogas recovery at landfills were also reviewed and documentation and justification for any significant discrepancies were verified.

For each of the elements described above, it was evaluated whether:

- There is deviation from the general good practices of the IPCC.



- There are problems of transparency, accuracy, consistency, comparability, or completeness.
- There is satisfactory compliance with the requirements and reporting suggestions established both for the submission of Biennial Update Reports (BURs) under Decision 2/CP.17, National Communications under Decision 17/CP.8, as well as for the submission of the Biennial Transparency Reports (BTRs) that will replace them in 2024 under the Paris Agreement’s modalities, procedures and guidelines (MPGs) as stipulated in Decision 18/CMA.1. A requirement is any provision drafted with the auxiliary “shall”, whereas a suggestion is understood to be any provision drafted with the auxiliary “should” or with the verb “may” and “encourages”.

It should be noted that the scope of the technical review carried out is similar to the reviews officially carried out by the United Nations Framework Convention on Climate Change (UNFCCC) for the inventories of Annex I Parties<sup>14</sup>, far exceeding the information requirements of National Communications and BURs for non-Annex I Parties such as Uruguay, including the MPGs applicable for BTR reporting as of December 2024.

### **Technical review of the SSLB KPIs Report (KPIR)**

This report presents the conclusions of the 2024 SSLB KPIR for KPI-1 2022, an indicator that represents the reduction in gross aggregate GHG emissions intensity (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O) expressed in CO<sub>2</sub>e per unit of real GDP, with respect to the reference year 1990 (in %). This included a detailed review of the methodology used, comparisons with official data and documents, and recommendations to improve accuracy and transparency in the calculation process and presentation of results.

During the first half of April 2024, the technical review was carried out on the implementation of the calculation methodology established in the KPI-1 Technical Sheet: Reduction of aggregate gross greenhouse gas (GHG) emissions per unit of real GDP, with respect to 1990, established under the SSLB framework, as well as the real GDP published by the BCU.

The methodologies used were reviewed in detail, with reference to the corresponding data sheets:

- The methodology for calculating GDP was verified according to the fact sheet “URUGUAY’S REAL GROSS DOMESTIC PRODUCT SERIES AT CONSTANT PRICES, SINCE 1990”<sup>15</sup> (In Spanish, SERIE DEL PRODUCTO INTERNO BRUTO REAL DE URUGUAY A PRECIOS CONSTANTES, DESDE 1990), and the GDP calculation was replicated following the established instructions to detect any discrepancies in the application of the methodology.

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<sup>14</sup> The Parties of Annex I are presented on page 25 of the UNFCCC in the following link:  
<https://unfccc.int/resource/docs/convkp/convsp.pdf>

<sup>15</sup> The GDP technical fact sheet is available at:  
<https://sslburuguay.mef.gub.uy/innovaportal/file/30671/20/real-gdp-technical-data-sheet.pdf>



- The methodology for calculating KPI-1 was verified according to the fact sheet “INTENSITY OF AGGREGATE GROSS GHG EMISSIONS PER GDP”<sup>16</sup> (In Spanish, INTENSIDAD DE EMISIONES AGREGADAS BRUTAS DE GEI/PIB), and the corresponding calculation was replicated using the indicated methodology to detect any discrepancies in the application of the methodology.

Likewise, the following were assessed as part of the SSLB KPIR review:

- 2024 SSLB KPIs Report (KPIR).
- KPIR Spreadsheet called Excel file BIICC version 2024.04.04.

For the review, the numerical values and percentages presented for emissions, GDP, and the KPI-1 were contrasted with the Excel file BIICC version 2024.04.04 and with the 2023 SSLB Emissions Report (EMR) and its methodological note. Explanations on trends and annual variations of emissions, GDP, and KPI-1 were also evaluated in comparison with the national information presented in official documents such as the National Greenhouse Gas Inventory 1990-2019 presented to the UNFCCC in 2021, the fourth Biennial Update Report (BUR) and the sixth National Communication submitted to the UNFCCC in December 2021 and 2023, respectively, as well as the 2021 economic study conducted by the Economic Commission for Latin America and the Caribbean (CEPAL, Comisión Económica para América Latina in Spanish), based on official national figures.

## Adherence to the 2006 IPCC Guidelines

The main findings of the 2023 SSLB EMR technical review corresponding to the Energy, Industrial Processes, Agriculture and Waste sectors of KPI-1 2022 are presented below, with respect to the cross-cutting aspects of the 2006 IPCC Guidelines, namely: institutional arrangements, application of good practices, and continuous improvement.

Aspects of the 2006 IPCC Guidelines	Conclusions
<p><b>Institutional arrangements</b></p>	<p>The SSLB KPI-1 has a robust institutional framework that enables effective planning, oversight, management, and implementation of annual KPI-1 development, including documentation, archiving, quality control and technical review for continuous improvement. This framework is institutionalized by the Interministerial Coordination and Cooperation Agreement for the Issuance of Sovereign Sustainability-Linked Bonds, which defines the assignation of roles and responsibilities, as well as the work schedule of the different institutions involved in the elaboration of</p>

<sup>16</sup> The KPI-1 technical fact sheet is available at:  
<https://sslburuguay.mef.gub.uy/innovaportal/file/30671/20/co2-equivalent-technical-data-sheet.pdf>

the KPI-1 within the institutional framework of the SSLB, which ensures timely compliance with the legal and contractual commitments established for the sovereign issuance of the SSLB.

The design and operationalization of the SSLB is carried out through the SSLB Group, the inter-ministerial group within the SNRCC framework composed of representatives from the Ministry of Economy and Finance (MEF, 'Ministerio de Economía y Finanzas' in Spanish), Ministry of Environment (MA, 'Ministerio de Ambiente' in Spanish), Ministry of Industry, Energy and Mining (MIEM, 'Ministerio de Industria, Energía y Minería' in Spanish) and Ministry of Livestock, Agriculture and Fisheries (MGAP, 'Ministerio de Ganadería, Agricultura y Pesca' in Spanish) and with the support of the Ministry of Foreign Affairs (MRREE, 'Ministerio de Relaciones Exteriores' in Spanish).

The SSLB Group is tasked with coordinating between ministries, establishing concrete and measurable objectives, timelines, and responsibilities, and ensuring that the goals are communicated and understood throughout the public sector throughout the life of the bond. Among these responsibilities, the SSLB Group oversees progress on the estimation, monitoring, and timely reporting and external verification of KPIs for the SSLB. Having a single institution taking full responsibility and coordination of KPI-1 development will ensure knowledge and application of reporting requirements, good practices, and use of correct methodologies, as well as effective and efficient work.

The mentioned Interministerial Agreement established that MIEM, MGAP, and MA submit to the NGHGI Working Group the previous year's sectoral GHG emissions report, which is necessary for the calculation of the SSLB KPI-1, together with a sectoral methodological note and computational support of the GHG estimates (database, auxiliary spreadsheets), in accordance with the competencies established in Decree No. 181/020, of 24<sup>th</sup> June 2020, which formalizes the NGHGI Working Group.

In this way, the MA carries out the general coordination, compilation of the sectoral information submitted by the other Ministries, quality control and preparation of the final SSLB EMR document and the methodological note with specifications of the emissions estimation. Likewise, the MA carries out the estimation of emissions and their evolution for the Industrial Processes and Waste sectors, the MGAP does it for the Agriculture sector, and the MIEM does it for the Energy sector.

All relevant institutions that collect the necessary data for the estimation of KPI-1 emissions are involved in its elaboration. The existence of a common and adequate understanding of data needs and communication between the working groups involved in the development of the KPI-1 (SSLB Working Group, pMRV Working Group, and NGHGI Working Group) has been verified, which are

**Good  
practices**

crucial elements for the formulation of a quality indicator that complies with all TACCC principles.

In addition, there is an agreed annual cycle that includes a detailed work plan addressed to all institutions and experts involved in the process of developing the EMR and KPI-1.

The emissions covered by KPI-1 are estimated on the basis of the good practices of the 2006 IPCC Guidelines, and incorporate all of them, including the cross-cutting good practices described below.

It should be noted that the conclusions of the technical review were made considering a similar scope to the reviews officially carried out by the UNFCCC for the inventories of Annex I Parties. This reveals that the emissions estimates covered by KPI-1, as well as the preparation of the SSLB EMR of Uruguay far exceeds the reporting requirements of National Communications and BUR for non-Annex I Parties such as Uruguay, and even meets most of the MPGs applicable for BTR reporting as of December 2024.

KPI-1 complies with the following good practices for data collection:

- Data collection at a level of detail appropriate to the method used, with emphasis on improving the quality of key KPI-1 categories.
- Selection of data collection procedures to improve the quality of KPI-1, including selection of appropriate sources, scope, and quality of data.
- Documentation of data collection activities.
- Inclusion of agreements with data providers to provide consistent, reliable, and continuous information flows.
- Confirmation and documentation of time series consistency in the use of different data sources, as well as the selection of appropriate splicing techniques.
- Use of country-specific data to the greatest extent possible based on reliable and official sources.

KPI-1 complies with the following good practices for method selection:

- Use of the 2006 IPCC Guidelines decision trees to select the methodological tier according to data availability and national circumstances.
- Identification of key categories qualitatively and quantitatively as a basis for methodological selection.
- Emphasis on use of more advanced methods (tier 2 or higher) for key categories, including the use and refinement of country-specific data.
- Description of the reasons why it is only possible to use a tier 1 method for key categories, as appropriate, and inclusion of its methodological advancement in the improvement plan.

- Selection and use of the most appropriate splicing techniques from the 2006 IPCC Guidelines to ensure consistency in the time series.

KPI-1 complies with the following good practices for verification processes:

- Operation of a robust quality assurance and quality control (QA/QC) framework in accordance with the 2006 IPCC Guidelines, which seeks higher quality, higher accuracy, and lower uncertainty in the KPI-1, balanced with the need for timely KPI-1 submission and cost-effectiveness.

KPI-1 complies with the following good practices for documentation processes:

- The SSLB EMR includes extensive detailed and clear documentation to provide a transparent understanding of how KPI-1 emissions were estimated.
- The sources of information, assumptions, methodologies used, as well as the procedures for their selection and the input of expert judgment are clearly documented.

Recalculations of the entire KPI-1 time series are performed in accordance with good practice and the requirements of the 2006 IPCC Guidelines, providing a transparent indication of any recalculations performed and their impact on previously reported KPI-1 values. These recalculations are properly performed when:

- There are improvements in the availability of activity data, emission factors, and other parameters.
- Needed corrections of errors are identified.
- A category becomes a key category.
- Mitigation measures have been incorporated.
- Capacity for KPI-1 development has grown.
- Improvements have been incorporated into the NGHGI, which are introduced in a consistent manner in the improvement of the emissions estimate under the scope of the KPI-1.

The results of the technical review conclude that the SSLB EMR and the development of KPI-1 also comply with the specific good practices for the Energy sector, the Industrial Processes sector, the Agriculture sector and the Waste sector.

### Continuous improvement

KPI-1 has a robust quality control and quality assurance system and a continuous improvement plan, which includes ongoing review of historical values and recalculations of the time series, as appropriate, to improve the KPI-1 quality in accordance with the procedures and good practices of the 2006 IPCC Guidelines. This includes immediate correction of items identified during the KPI-1



development, as well as planning for future KPI-1 improvements in the short, medium, and long term.

It is worth noting the alignment of the continuous improvement of the SSLB EMR with the incorporation of improvements of the NGHGI of Uruguay for gases, sources, and categories under the scope of KPI-1.

The quality control system for the emissions used in Uruguay's KPI-1 has robust quality control procedures, sectoral quality control checklists, compilation checklist, reporting document checklist and list of observations found and corrective actions taken by sector. Internal sectoral reviews are performed by each Ministry, additionally the MA performs an overarching quality control check of the estimates and the final reports. Quality control checks are implemented annually to avoid errors due to oversights and/or inconsistencies in the estimation of emissions and in the presentation of the SSLB EMR. Quality control activities include general methods such as accuracy checks during data acquisition and calculation and the use of approved standardized procedures for emissions calculations. Quality control activities also include technical reviews of categories, activity data, emission factors and other parameters and calculation methods.

The quality control system applied to the indicator performs a rigorous quality control of each of the parameters, activity data, and emission factors, identifying calculation errors that are corrected prior to the submission of the GHG emissions estimates used in the KPI-1. For each of the emission categories included in the EMR, the consistency of the time series is analysed as part of this process, where the values of the auxiliary spreadsheets are thoroughly corroborated with the original data with respect to the data extracted from the IPCC Software, for the entire time series. Each of the activity data, parameters and emission factors are compared with respect to the original data source, auxiliary spreadsheets from which these data were extracted and other original sources, for each year of the historical series. Possible errors and inconsistencies in the data and parameters of the entire series are analysed and, if found, are modified, and reported in the corresponding recalculation spreadsheet.

To further enhance the identification of continuous improvement areas, the quality assurance system for the emissions used in Uruguay's KPI-1 includes external technical reviews currently managed by the UNDP.

## Adherence to the TACCC inventory principles

The main conclusions of the technical review of the emissions report for the Energy, Industrial Processes, Waste and Agriculture sectors of KPI-1 for each TACCC quality principle evaluated are presented below.

Quality Principle	Conclusions
<p><b>Transparency</b></p>	<p>The SSLB EMR methodological note documents in a clear, transparent, and rigorous manner the methodologies, and all data and underlying assumptions used to estimate KPI-1 emissions, using an appropriate combination of text, tables, and diagrams to facilitate understanding for each sector of Energy, Industrial Processes, Agriculture, and Waste.</p> <p>The SSLB EMR methodological note clearly and rigorously documents all sources of activity data, emission factors, parameters, and assumptions used in the different time series ranges for the estimation of emissions for each sector covered by the KPI-1, including the harmonization of country-specific data with the units and categorizations of the 2006 IPCC Guidelines. This includes detailed documentation of the reference documents, databases, and expert judgment used.</p> <p>In the methodological note, the SSLB EMR clearly and rigorously documents all the methods adopted to systematize the data and estimate KPI-1 emissions, as well as the process of selecting these methodologies according to the decision trees of the 2006 IPCC Guidelines, the availability of information, and assumptions. This includes a comprehensive and transparent documentation of:</p> <ul style="list-style-type: none"> <li>• The conditions that are (and are not) met for the selection of methodological tiers according to the decision trees of the 2006 IPCC Guidelines.</li> <li>• The conditions and assumptions for the applicability and selection of splicing techniques to fill data gaps and/or ensure time series consistency.</li> </ul> <p>The SSLB EMR includes sufficient and clear documentation so that the circumstances of each sector and the appropriate reflection of these by the KPI-1 can be understood.</p>

### Accuracy

Uruguay uses the methodologies of the 2006 IPCC Guidelines, including IPCC inventory software version 2.691 and auxiliary spreadsheets.

The SSLB EMR employs and clearly documents the use of the decision trees of the 2006 IPCC Guidelines for the appropriate selection of methodological tiers for estimating emissions for each sector, adopting more advanced methods (tier 2) for most of the key categories. Sensitive modifications have been included in the simpler methodological methods (tier 1) of the non-key categories to include country-specific data at the sub-national level and even at the emission source level to improve accuracy.

The SSLB EMR uses country-specific activity data from official and reliable sources, whose values are within the ranges for the region and for countries with similar circumstances stipulated in the 2006 IPCC Guidelines.

The SSLB EMR uses emission factors and other predefined parameters from the 2006 IPCC Guidelines, appropriately selected and adequately representative of national circumstances. For certain categories in the Energy, Industrial Processes and Agriculture sectors, country-specific or source-specific emission factors are used, which are appropriately selected and adequately represent national circumstances, thereby increasing the accuracy of emission calculations.

Uruguay demonstrates a strong commitment to continuous improvement by incorporating updated and more representative activity data at the sub-national level and/or by emission source and by performing the corresponding recalculations for all affected years in the time series.

No underestimates or overestimates have been identified in the emissions covered by the SSLB KPI-1.

### Completeness

Emissions included in KPI-1 include estimates for all sources and for all gases listed in the 2006 IPCC Guidelines in the entire national territory within scope of the indicator. All existing categories in the country that are part of KPI-1 have been estimated and reported for the time series 1990-2022.

Notation keys according to the 2006 IPCC Guidelines have been used appropriately.

### Consistency

The annual KPI-1 emissions trends have been estimated using the same method and a consistent approach of selecting and systematizing the activity data and underlying emission factors for each year over the period 1990 to 2022.

The SSLB EMR demonstrates a robust framework for selecting and applying splicing techniques to fill gaps in the activity data and ensure time series consistency for each sector by employing the various splicing techniques in accordance with the 2006 IPCC Guidelines.

When new sources of information or more advanced methods are incorporated during the time series, emissions are recalculated using the methods of the 2006 IPCC Guidelines. An explanation of the impact of each of these recalculations on the previously reported KPI-1 values, as well as the reasons for the need for each of these recalculations, is clearly presented in the SSLB EMR.

Moreover, the common data sources across KPI-1 categories, gases, sources and sectors remain consistent with each other.

### Comparability

The calculation of GHG emissions included in KPI-1 is consistent with Uruguay's NGHGI in terms of definitions, nomenclature, assumptions, data sources, methodology and categorization of gases and sources by category. The improvements incorporated in the SSLB EMR emissions estimates that have involved recalculations of KPI-1 are fully extracted from the NGHGI and are fully consistent with the improvements incorporated in the NGHGI of Uruguay for the gases, sources, and categories within the scope of KPI-1.

For the calculation of GHG emissions of the categories included in the KPI-1, Uruguay employs the 2006 IPCC Guidelines, including its allocation of categories, IPCC inventory software version 2.691, auxiliary spreadsheets and the TACCC principles' definitions. No misallocations, omissions, or double counting of gases and sources according to IPCC categories are detected.

The SSLB EMR uses the same reporting formats and methodologies recommended by the IPCC Guidelines.

## Compliance with the fundamental inventory requirements of Decisions 17/CP.8, 2/CP.17, and 18/CMA.1

The current compliance of the emissions included in KPI-1 for the Energy, Industrial Processes, Agriculture and Waste sectors was assessed against the inventory reporting requirements under BURs and national communications according to Decisions 17/CP.8 and 2/CP.17, as well as BTRs according to Decision 18/CMA.1.

As illustrated below, the 2023 SSLB EMR for KPI-1 2022 fully complies with all requirements of the inventory chapter of the BUR and national communications.

### BUR inventory chapter requirements

Requirement	Results
The last year of the SSLB EMR must not be older than four years prior to the year of submission of the first BUR.	Complies
The SSLB EMR is based on the methodologies of the IPCC Guidelines (1996 or 2006).	Complies
The SSLB EMR is based on updated activity variables using the best available information.	Complies
The SSLB EMR presents tables in CRF format.	NA
The SSLB EMR presents consistent series since the year presented in the latest national communication.	Complies
A comparison with previous SSLB EMRs is presented.	Complies
A table with GHGs and precursors is presented.	NA
A table with HFCs, PFCs, and SF <sub>6</sub> is presented.	NA
The SSLB EMR is accompanied by a report presenting sector-specific information.	Complies
Information is included on the procedures and arrangements for data collection and inventory archiving, as well as the efforts to implement a continuous process, along with the roles and responsibilities of the institutions involved.	Complies



Information is presented by gas in units of mass for CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O.	NA
Information is presented on the fluorinated gases, HFCs, PFCs, and SF <sub>6</sub> .	NA
Information is presented on the precursor gases, CO, NO <sub>x</sub> , and NMVOCs.	NA
Information is presented on SO <sub>x</sub> .	NA
Information is presented on CO <sub>2</sub> emissions from fuel combustion using the sectoral and reference approaches and explaining significant differences between the results of the two approaches.	NA
Emissions from international aviation and marine vessels are reported individually and separately from national emissions, and are not included (summed) in total national emissions.	Complies
Aggregated CO <sub>2</sub> equivalent emissions are presented using the appropriate global warming potentials.	Complies
Information is provided on the methodologies utilised.	Complies
Sources used for determining emission factors are explained.	Complies
Sources used for activity variables are explained.	Complies
Areas for future improvement are identified.	NA
An uncertainty analysis is presented, explaining the methodologies used and assumptions made to calculate the uncertainty.	NA

NA: Not applicable

As illustrated below, the 2023 SSLB EMR for KPI-1 2022 meets most of the requirements of the BTR inventory chapter, which will become effective in December 2024. Improvement recommendations are provided for full compliance with the BTRs to be considered in the next 2024 SSLB EMR cycle corresponding to KPI-1 2023.

## BTR inventory chapter requirements

Requirement	Results
The SSLB EMR principles are in line with the definitions of the 2006 IPCC Guidelines.	Complies
A framework of institutional arrangements and a legal and procedural framework for the ongoing work of the SSLB EMR is established and maintained.	Complies
The SSLB EMR presents information on the planning, preparation, and management of the SSLB EMR, including: (a) the entity in which the overall responsibility for the SSLB EMR lies; b) the process of preparing the SSLB EMR; c) the archiving of all information with respect to emission factors and activity data, data generation and aggregation, QA/QC processes, results of reviews, and planned improvements; a) d) the processes followed for formal review and approval.	Complies
The 2006 IPCC Guidelines are used for the preparation of the SSLB EMR.	Complies
The recommended methods (tiers) for the key categories according to the 2006 IPCC Guidelines are used, the rationale for the selection of methodological tiers for each category is clearly explained, and the use of methodologies appropriate to national circumstances is transparently explained.	Complies
Wherever possible, country-specific emission factors and activity data are used.	Complies
The SSLB EMR identifies the key categories for the first and last year reported.	NA
The SSLB EMR ensures time series consistency by using the same methods and a consistent approach to the time series.	Complies
The SSLB EMR uses splicing techniques from the 2006 IPCC Guidelines to ensure time series consistency to address missing activity data, emission factors and other parameters.	Complies
The SSLB EMR incorporates recalculations appropriately.	Complies
The SSLB EMR quantitatively estimates and qualitatively analyses uncertainty for all categories for at least the first and last reporting year, at least a qualitative analysis of uncertainty for the key categories.	NA
The SSLB EMR clearly identifies the categories, sources, and gases excluded from the scope of the SSLB EMR with respect to the 2006 IPCC Guidelines, along with an explanation of the reasons why they have not been taken into account.	Complies

Notation keys are used when completing common tables for the presentation of information.	NA
The SSLB EMR uses a QA/QC plan in accordance with the IPCC Guidelines.	Complies
The SSLB EMR uses the values of global warming potential for a 100-year time horizon given in the IPCC Fifth Assessment Report.	NA
The SSLB EMR uses the values of global warming potential for a 100-year time horizon given in the IPCC Fifth Assessment Report.	Complies
The SSLB EMR consists of an inventory document and common tables.	NA
The SSLB EMR presents information on the methods used, including the reasons why they were chosen, in accordance with the good practice developed in the IPCC Guidelines, including descriptions, assumptions, references, and sources of information used for emission factors and activity data, broken down as much as possible by category and gas.	Complies
The SSLB EMR provides a description of the key categories, with information on the method used to identify them by their contribution to both level and trend.	NA
The SSLB EMR provides the cumulative individual percentage contributions of the key categories with respect to both level and trend in accordance with the IPCC Guidelines.	NA
The SSLB EMR reports recalculations, explaining and justifying them, and indicating any relevant changes and their impact on emission trends.	Complies
The SSLB EMR reports the results of uncertainty analyses, including the methods used, for at least the first and last year of the time series.	NA
The SSLB EMR provides the reasons for any lack of completeness.	Complies
The SSLB EMR communicates the QA/QC plan.	Complies
The SSLB EMR reports emissions for all categories, gases, and sources covered by KPI-1, broken down by gas.	Complies
The SSLB EMR provides information on seven gases: CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs, SF <sub>6</sub> , and NF <sub>3</sub> , at a minimum, with CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O at a minimum for a developing country that need flexibility in light of its capabilities.	Complies
If HFCs, PFCs, SF <sub>6</sub> and NF <sub>3</sub> are reported, the actual emissions of these gases shall be reported, providing data broken down by chemical and category, in units of mass and CO <sub>2</sub> equivalents.	NA
The SSLB EMR reports information on the following sectors: energy, industrial processes and product use, agriculture, land use and waste, in accordance with the IPCC Guidelines.	NA





The SSLB EMR reports information on the following precursors: CO, NOx, SOx and NMVOC.	NA
The SSLB EMR reports indirect CO <sub>2</sub> emissions resulting from atmospheric oxidation of CH <sub>4</sub> , CO, and NMVOC.	NA
The SSLB EMR reports emissions from international aviation and marine bunker fuel in two separate entries and is not included in the national totals.	NA
The SSLB EMR clearly indicates how feedstocks or non-energy uses of fuels in the energy sector and industrial processes are reported according to the IPCC Guidelines.	Complies
The SSLB EMR provides detailed information on emissions and removals from natural disturbances on cultivated land.	NA
The SSLB EMR provides information on harvested wood products according to the IPCC Guidelines.	NA
The SSLB EMR provides a consistent annual time series starting in 1990.	Complies
The last year of the time series is no more than 2 years prior to the SSLB EMR submission date.	Complies

NA: Not applicable

## Conclusions of the review

### SSLB Emissions Report (EMR) for KPI-1

KPI-1 complies with the principle of transparency, as the SSLB EMR and its methodological note present sufficient detailed and clear documentation so that it is possible to understand how emissions were estimated, including the sources of information, assumptions, expert judgment, and methodologies used, as well as the processes and justification for the selection of methodologies.

KPI-1 complies with the principle of completeness, as the scope of KPI-1 is clearly defined and aligned with the scope of Uruguay's first NDC. The emissions estimates presented in the SSLB EMR effectively cover all gases, sources, and categories within the scope of the KPI-1 and cover the full time series from 1990 to 2022. Any exclusion of emissions from the SSLB EMR with respect to Uruguay's NGHGI is clearly identified, and therefore, no omissions are identified in KPI-1.

KPI-1 complies with the accuracy principle, as KPI-1 contains no under- or over-estimates by using appropriate methods from the 2006 IPCC Guidelines with high quality country-specific data and default emission factors appropriate to the circumstances in Uruguay, incorporating improvements in data quality as they become available and performing time series recalculations as appropriate.

KPI-1 complies with the principle of consistency, as the same methods and data sources are used to estimate the different years, gases, and categories, using appropriate splicing techniques in accordance with the 2006 IPCC Guidelines. Recalculations are properly performed according to IPCC good practices under a continuous improvement framework.

KPI-1 complies with the comparability principle, as the estimation of emissions covered by KPI-1 fully employs the guidance, classifications, definitions, methodologies and reporting formats of the 2006 IPCC Guidelines. The SSLB EMR is comparable with Uruguay's NGHGI in terms of definitions, nomenclature, assumptions, data sources, methodology and categorization of gases and sources by category, clearly indicating any deviation in the scope of the KPI-1 with respect to the NGHGI.

The SSLB EMR fully complies with the reporting requirements in the BURs and national communications stipulated in Decisions 2/CP.17 and 17/CP.8 with regard to GHG emissions.

The SSLB EMR complies with the vast majority of the BTR reporting requirements stipulated in Decision 18/CMA.1 regarding GHG emissions. It should be noted that these requirements will come into effect in December 2024, and therefore, slight recommendations are provided for consideration in the preparation of the next edition of the SSLB EMR for the issuance of KPI-1 for the year 2023. These recommendations suggest the inclusion of justification for the use of tier 1 for key categories instead of tier 2.

KPI-1 complies with the good practice of the 2006 IPCC Guidelines at both cross-cutting and sectoral levels.

KPI-1 has a robust institutional framework that enables effective planning, oversight, management, and implementation of annual KPI-1 development, including its documentation, archiving, quality control and technical review for continuous improvement, following the good practices of the 2006 IPCC Guidelines.

The KPI-1 demonstrates a strong commitment to continuous improvement enabled by a robust quality assurance and quality control system, which integrates the review and recalculation of historical values to improve the quality of the KPI-1 according to the good practices of the 2006 IPCC Guidelines as methodological improvements and access to better quality data emerge, as well as planning for future improvement of the KPI-1 development process.



## **SSLB KPIs Report (KPIR) for KPI-1**

According to the review procedures performed, no deficiencies have been detected in the methodology applied for the calculation of KPI-1 or in the estimate of the real GDP corresponding to the SSLB for 2022.

No errors or discrepancies were detected between the numerical and percentage values of emissions, GDP and KPI-1 included in the Excel, SSLB EMR and SSLB KPIR files.

Trends and annual variations of emissions, GDP and KPI-1 indicator adequately reflect the national context according to official national information presented in official documents submitted to the UNFCCC.



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