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Initiative for Climate Action Transparency – ICAT –

Scoping Report

Phase III - ICAT Brazil Project

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Date: 26 June 2023

PREPARED UNDER

The Initiative for Climate Action Transparency (ICAT), is supported by Austria, Canada, Germany, Italy, the Children's Investment Fund Foundation, and the ClimateWorks Foundation.

The ICAT project is managed by the United Nations Office for Project Services (UNOPS).

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1. Introduction

1.1 Country Context

Brazil is an emerging economy with continental dimensions, a growing population, and an agricultural sector that plays a significant role in the global economy. Brazil has been an active player in the international climate regime, ratifying the Paris Agreement in 2016 and committing to implement an ambitious Nationally Determined Contribution (NDC) aiming to reduce greenhouse gas (GHG) emissions by 37% below 2005 baseline levels in 2025, and a 43% reduction below 2005 baseline levels in 2030. Brazil also ratified the Doha Amendment to the Kyoto Protocol in 2017.

The country has submitted four National Communications (Nat Coms) to the United Nations Framework Convention on Climate Change (UNFCCC), the most recent being delivered in December 2020. The Nat Coms were submitted in 2004, 2010, 2016, and 2020, with the BURs submitted in 2014, 2017, 2019, and 2020. In addition, Brazil has submitted four Biennial Update Reports (BURs). Further, the country has gone through two rounds of international consultation and analysis (ICA) under the UNFCCC in response to the information provided in the BURs. These ICAs occurred in 2016 and 2019. The focal point in Brazil for the UNFCCC is the Ministry of Foreign Affairs, which is responsible for coordinating the preparation of BURs with the support of a task force involving many other ministries. The coordination of the Nat Coms is under the responsibility of the Ministry of Science, Technology, and Innovation (MCTI, the acronym in Portuguese). This ministry also coordinates the preparation of the national GHG inventory, convening different working groups and establishing partnerships for official statistics and data with government agencies.

A key partner in the production of inventories is the Brazilian Research Network on Global Climate Change (*Rede Clima,* the acronym in Portuguese), which involves experts from different thematic areas, such as universities and research institutions. Centro Clima/COPPE/UFRJ, a research center on climate change and environment of the Institute of Graduate Studies in Engineering of the Federal University of Rio de Janeiro, is a member of Rede Clima and was responsible for the elaboration of the first, third and fourth national GHG inventory of the energy sector of Brazil.

The National Policy on Climate Change (Law 12,187, enacted in 2009) and Law 12,114/2009, which established the National Fund for Climate Change, are the leading legal instruments for the governance of climate change in the country. Under this legal framework, the country made a voluntary national commitment to reduce GHG emissions by up to 38.9% compared to projected business-as-usual emissions in 2020. Moreover, Brazil established a governance structure for implementing the National Policy on Climate Change. That policy specifies mandates and assignments to governmental bodies and assisting roles to civil society organizations and academia, namely the Brazilian Forum on Climate Change (FBMC, the acronym in Portuguese) and the Brazilian Research Network on Global Climate Change (Rede Clima).

The Forum is constituted by government and civil society, is chaired by the President of Brazil, and includes government officials, the private sector, NGOs, and academia.

Brazil established concrete action plans for mitigation and adaptation to climate change through Executive Decree 7,390/2010, later revoked by Executive Decree 9,578/2018. This Decree established sectoral targets for the 2020 voluntary commitments, made the national GHG inventory a policy instrument (Bustamante et al., 2018), and established the legal base for the measurement, reporting, and verification (MRV) issues under the National Policy on Climate Change. In addition, the decree mandates the Ministry of Science, Technology, Innovation, and Communication (MCTIC) to elaborate, review, and publish the estimates of GHG emissions and removals and enhance the methodology to calculate the projections of GHG emissions. The country also established a national registry system for GHG emissions (*SIRENE*, the acronym in Portuguese) through Executive Decree 9172/2017 to confer security and transparency in preparing the national GHG inventory.

In September 2016, Brazil submitted an intended Nationally Determined Contribution (NDC) toward the achievement of the UNFCCC. This document sets out the intention to commit to economy-wide absolute GHG emission reductions of 37% from 2005 levels by 2025. Furthermore, in December 2020, Brazil confirmed its intention to a 43% reduction from 2005 levels by 2030 indicated provisionally in the 2016 commitment. Since the Paris Agreement, Brazil updated its NDC twice. The most recent update to Brazil's NDC was in March 2022. At present, a legal framework is required to support the implementation of the NDC and the correspondent system for the transparent reporting of information necessary to track progress in implementing and achieving the NDC. From March 2017 until mid-2019, the instance for discussing a road map for the implementation of the Brazilian NDC was the Brazilian Forum on Climate Change (FBMC). Centro Brasil no Clima had a crucial role in activating the FBMC and influencing the climate change agenda in this period. The FBMC promoted a discussion process for a roadmap for implementing the Brazilian NDC to be delivered to the President. From the first round of discussion, the Forum selected 40 actions and included them in a proposal for implementing the NDC. The roadmap was delivered in person to the then President Michel Temer, the Minister of Foreign Affairs, the Minister of Environment, and the President of the Congress and presented at a meeting of the Executive Group of Climate Change (comprising representatives of eight ministries and the FBMC). In addition, the road map was translated into English and widely distributed at the Conferences of Parties to the UNFCCC in 2018 and 2019 and to international partners.

Nonetheless, there are challenges ahead for the climate agenda in Brazil, particularly due to the economic situation in the country. Brazil was a country hard hit by the Covid-19 pandemic and is being simultaneously impacted by a global recession and by the consequences of the War in Ukraine. This points to the country being likely to face challenges in ensuring public finance sustainability, including at the lower subnational levels while re-enacting and strengthening many of the welfare packages promised to low-income citizens. It is expected that throughout 2023, Brazil's GDP growth continues to slow down to 0.8% primarily due to high inflation, monetary tightening, and generally subdued global demand (World Bank, 2023). Moreover, fully implementing a national-wide green transition that can support a more

resilient and fossil-independent growth model remains a challenge. Specialists argue that the country's reforms in the infrastructure sector, coupled with the federal administration's renewed interest in the climate agenda, offer synergistic opportunities for Brazil's green recovery and for lifting millions of Brazilians out of poverty (World Bank, 2023).

1.2 Summary: Objectives and Outcomes of Phases I and II

ICAT Brazil – Phase I

The core focus of the ICAT Brazil Phase I was to assist the country in establishing robust indicators to monitor and track the implementation of Brazil's NDC. The indicators resulting from the work done under the ICAT-funded project are an initial step towards a robust and transparent MRV process. Assessing mitigation actions that support Brazil's NDC and climate ambition is relevant to assure a transparent and participatory process that strengthens local institutions and makes coordination efforts effective.

During the ICAT Brazil Phase I, the project was successful in estimating a baseline scenario (Scenario A) representing current GHG emission trends in the country by 2030, considering pre-NDC commitments and policies, as well as current mitigation actions that support the NDC commitment. This assessment resulted in more realistic assumptions for the BAU scenarios in 2025 and 2030 and an estimation of the real effort necessary to meet the NDC goals.

Subsequently, the quantified mitigation actions necessary to meet the NDC targets were grouped into two other scenarios: scenario B, which includes mitigation actions with more emphasis in the agriculture, forestry, and land use (AFOLU) sector; and scenario C, a scenario that includes a more balanced set of mitigation actions with a substantial reduction of GHG emissions coming from other sectors than AFOLU. Those scenarios showed that it was possible to achieve GHG emission reduction much beyond the NDC targets. The main outputs of ICAT Brazil Phase I are listed in Table 1.

Table 1: List of Outputs achieved in the 1st Phase of the project ICAT Brazil

Outputs Phase I	Description of the Output
Output 1	An assessment and analysis of NDC implementation status, including ongoing mitigation actions and expected results related to GHG emission levels (scenario A).[1]
Output 2	An assessment of additional mitigation actions necessary to meet the NDC targets, as suggested by the Brazilian Climate Change Forum: a scenario B, with more emphasis in AFOLU sector; and a scenario C, with more balanced contributions from different sectors.

[1] The different mitigation scenarios respect the economy-wide NDC targets for 2025 and 2030, and are the following:

- Scenario A: based on current GHG emission trends, including sectoral quantified targets and measures defined in the NDC ("Real path scenario")
- Scenario B: includes a set of mitigation actions proposed by the Brazilian Climate Change Forum, with more emphasis on the AFOLU sector ("AFOLU scenario")
- Scenario C: includes another set of mitigation actions proposed by the Brazilian Climate Change Forum, with substantial emission reductions resulting from less use of fossil fuels in the transport sector and more balanced sectoral contributions ("Balanced scenario")

Output 3	A report proposing a methodology with indicators of progress that will contribute to the design of an MRV system to track the implementation of the NDC of Brazil; and a draft of an executive decree with technical and transparency guidelines for the Brazilian MRV. This executive decree was produced in the form of a draft bill for a national MRV system.

ICAT Brazil - Phase II

Building on the efforts, outputs, and overall foundation established by the 1st phase of ICAT Brazil, during the period of 2020 to 2021 the Centro Brasil no Clima (CBC), with technical support from Centro Clima/COPPE/UFRJ, completed phase 2 of the ICAT. In this second phase, the main objective was to develop a strategy to enable Brazilian Federal states to contribute to the achievement of Brazil's NDC goals. In this second phase, twelve outputs were produced. These are listed in Table 2 below.

The development of the ICAT Brazil project phase 2 at subnational level contributed to engage Brazilian states in the climate agenda. The elaboration of MRV indicators is a valuable input for states to advance with climate action, since it contributes for the establishment of institutional arrangements necessary for the attraction of climate finance.

Table 2: List of Outputs achieved in the 2nd Phase of the project ICAT Brazil

Outputs Phase II	Description of the Output
Output 1	A detailed work plan for the second phase of the ICAT work in Brazil.
Output 2	A report highlighting key achievements and lessons learned from a technical point of view from the work under the first phase of the ICAT work in Brazil.
Output 3	A report of the project kick-off workshop.
Output 4	A report assessing historical sectoral emissions and possible trends of the three selected states participating in the second phase of the ICAT work in Brazil
Output 5	A report with an assessment of the current emissions trends up to 2030 (the reference case scenario) of the three participating states, as well as an evaluation of the contribution of these states to Brazil's NDC targets.
Output 6	A report assessing the potential mitigation actions (mitigation scenario) of the three participating states, as well as an evaluation of the contribution of these states to Brazil's NDC targets.
Output 7	A report on workshops with participating states to deepen their engagement, and engage other potential participating states not yet committed to climate actions.
Output 8	A report outlining MRV indicators to track GHG emission pathways relevant to each participating states, that are consistent with the national MRV indicators developed in the first phase of the project.
Output 9	A report outlining key achievements and lessons learned from a technical perspective in this second phase of ICAT work in Brazil
Output 10	A final workshop report presenting the project results
Output 11	A report describing the policy to be assessed for transformation change.

Output 12	A report estimating ex-ante the impacts of the policy assessed for transformational change

1.3 Approach and key results Phases I and II

PHASE I:

In the first phase of ICAT I, the overarching objective in Brazil was to promote the country's initial steps towards establishing a robust, transparent, and participatory MRV process to assess options for mitigation measures that enable the achievement of Brazil's NDC targets.

A key contribution of ICAT Phase I in Brazil was the work and discussion on the implementation of the NDCs in the country supported by the establishment of an MRV system to support progress in a transparent and efficient manner. Other more specific results were the following:

- The project developed a new methodology for monitoring, reporting, and verification (MRV) of greenhouse gas emissions. This methodology was at the time new in the country and was designed to allow for its usage at national and subnational (state) levels.

- The project published GHG emission scenarios, which were disaggregated at the sector and sub-sector levels and contained quantification of the mitigation actions necessary to meet the NDC targets in the country. The ICAT Phase I project developed three scenarios with sectoral and sub-sectoral targets. It is important to flag that prepared data with this level of detail did not exist in Brazil before, and its availability is useful for any other projects related to the study of mitigation options at the state or federal level. Moreover, these scenarios can also be used to establish a more ambitious NDC.

- The project developed a law bill to create a national system for MRV of GHG emissions in line with Brazil's NDC. However, this bill was not delivered to a legislative actor because the Commission of Environment of the National Congress had not been nominated yet. This commission only took office in 2020 and is not yet active. There is at the moment a discussion in the senate about changing the National Policy on Climate Change, and the law bill for the national MRV system could be included in this discussion.

PHASE II:

This second phase of the ICAT Brazil project focused on the sub-national level. It applied technical work undertaken at the national level under ICAT Phase I to the level of the federal states within Brazil. CBC and Centro Clima/COPPE selected three states to participate in this second phase of the project**: Amazonas, Minas Gerais, and Rio de Janeiro**.

Figure 1: Map of Brazil showcasing the federal states selected to incorporate sub-state level activities.

Source: World Bank, 2023.

The selected states represent the different biomes in Brazil - Amazon, Cerrado, and Atlantic Forest. The primary sources of GHG emissions also differ across the three states. Work under this second phase adopted the Centro Clima's methodology for assessing the impacts of non-state and sub-national actions.

The project produced a series of connected results in each of the three participating states (Amazonas, Minas Gerais, and Rio de Janeiro). Combined, they provide a comprehensive overview of past emissions and trends in those emissions, projected increases in emissions under a reference scenario and a mitigation scenario, and how to track emissions and the drivers of emissions in the future. This work provided vital information to understand emissions trends and plan potential mitigation actions at the state level. In addition, such information is a valuable resource for broader national efforts to meet national GHG emission reduction commitments in Brazil's NDC. The four primary project results for Phase II were the following:

- The project produced an overarching assessment of GHG emissions by sectors for the three participating states, including a detailed analysis of the evolution of those emissions on a sector-by-sector basis from within that data.

- The project built off work developed under Phase I to assess possible trends in GHG emissions up to 2030 under the scenario before Brazil made its NDC commitments (reference scenario) for the three participating states. The results produced provides an indication of the contribution each state makes to the national emissions under this scenario and provides a baseline for future assessments of the impact of mitigation actions within the three participating states.
- The project produced an assessment of how the three participating states could contribute to meeting Brazil's NDC commitments under the mitigation scenario, as scoped out in phase 1 of the project. That scenario is applied to each state to produce state-specific scenarios of GHG emission on a sector-by-sector basis. The knowledge from these scenarios helps inform an understanding of how the states could contribute to meeting Brazil's NDC targets.

- The project applied the MRV indicators identified in phase 1 of the project to the results produced under the reference and mitigation scenarios. This provided additional detail on how these scenarios affected GHG emissions on a sector-by-sector in each state and illustrated how the MRV indicators can be used to track progress in GHG emissions and the drivers of those emissions in the future.

1.4 Lessons learned

ICAT Brazil Phase 1 and 2 were fruitful and each phase successfully achieved its goals to support Brazil with its transparency efforts and ultimately in enhancing capacity towards exploring pathways for enhanced climate mitigation ambition and implementation at a national and state level.

The results of the ICAT Brazil phase I project showed that, under a baseline scenario, emissions from energy supply are expected to increase by 89% between 2005 and 2030, whereas in a scenario with more mitigation actions the expected increase is 73%. This difference is provided mostly by the emission reduction in electricity generation due to the higher penetration of renewable sources, such as wind and solar photovoltaic, besides the no expansion of fossil fuel power generation capacity beyond the plants that won energy auctions until 2017.

The ICAT Brazil Project phase II switched the focus to the sub-national level aiming to assess the contribution of states' actions to the achievement of the Brazilian NDC. Reference and mitigation scenarios were developed for three states (Amazonas, Minas Gerais, and Rio de Janeiro) and MRV indicators were proposed to track the emissions in each of them. In addition, the project assessed the transformational impacts of the State Policy for the Energy Transition (PETE) in the state of Minas Gerais. The results show that the PETE could trigger moderate transformational impacts, partly because of income and job creation. The region of the state that concentrates the potential for solar power generation is one of the poorest in the country. We consider the work under Phases I and II to have successfully concluded.

As the project evolved into Phase III (which will be discussed in Section 2) a key lesson learned from ICAT Phase I and II can be a useful guide to the project partners.

Capacity building: The activities of Phase I and II demonstrated that the development of a system of MRV indicators applied to state-level scenarios provided the states with a more detailed understanding of the future sources of GHG emissions and the key drivers of those emissions. The stakeholder mix in Brazil is wide and diverse. In Phase I alone, the project engaged with approximately 108 participants from academia, government agencies, civil society organizations, and private sector organizations. Designing training activities that are suitable for the level of information and responsibility at each of the stakeholder levels is thus key. At a moment when climate action at the state and non-state levels gained prominence, trustable procedures to monitor the results are crucial for receiving international resources to support it.

At the state level, a key lesson learned is that state institutions often do not have the necessary resources to carry out all the assessments and calculate GHG emission estimates (e.g., to calculate GHG emissions from rates of deforestation). As such, support is further needed by the incumbent agencies to carry out data-collecting and GHG emission-calculating activities to ensure effective, consistent, and coordinated data-collecting and calculating efforts. It was noted that during the workshops, it was difficult for participants from different areas to understand what constituted a mitigation policy or action that could be quantified and considered in the analyses. Furthermore, data availability is limited at the state level, making some studies difficult, such as state-level GHG inventories. Moreover, a lesson learned is that in the future, tools could be used to assess capacity within participants ahead of workshops and develop materials, agendas, etc., to reflect the specific capabilities of the stakeholders.

2. ICAT Brazil Phase III

As presented, Centro Brasil no Clima (CBC), in partnership with Centro Clima/COPPE/UFRJ, supported by the Initiative for Climate Action Transparency (ICAT), completed two phases of a project aimed at the enhancement of the transparency framework in Brazil by developing MRV indicators to assess climate policies and actions at the national (ICAT Brazil Phase I) and sub-national (ICAT Brazil Phase II) level.

Overall, the development and completion of both phases were pivotal in providing critical insight for policy development at the national and sub-national levels and proposed MRV indicators to track the implementation of Brazil's NDC.

Following the rationale of the previous phases and building on the findings and outputs, ICAT Brazil Phase seeks to support the country's transparency efforts. It will do so by providing a detailed analysis of renewable energy generation capacity in Brazil, assessing the potential for expanding the country's renewable energy sources and biomass, and applying ICAT's Sustainable Development Methodology while providing an assessment of the country's just transition related to this expansion. ICAT Brazil has been kicked off in March 2023. In the subsequent sections, further details on the specifics of the project's third phase will be presented.

2.1 Objective

The analysis from Phases I and II highlighted the importance of Brazil's energy sector in being a catalyst for GHG emissions decrease and a just and fair transformational change. ICA Brazil Phase III will thus focus on the country's electricity generation sector, assessing, in particular, the climate change mitigation potential behind an expansion of viable renewable energy (e.g., wind, solar photovoltaic, and biomass), and the socio-environmental co-benefits associated with the scaled implementation of renewable energy sources in Brazil.

2.2 Content –Scope of Work & Objectives

As provided in ICAT Brazil's Phase III Scope of Work, to successfully achieve the specific objectives of the project, the work will be arranged into three components:

1. Evaluate the prospects of expanding electricity generation with renewable sources in Brazil by 2050 employing mathematical models to identify public policies that maximize the production and use of intermittent renewable energy in Brazil. A Current Policy Scenario (CPS) and a Deep Decarbonization Scenario (DDS) will be developed.
2. Analyze the impact of CPS and DDS on the NDC implementation and achievement of targets.
3. Assess the sustainable development (SD) impacts of specific policies in the context of the VRE scenarios. This assessment will be done by applying the ICAT Sustainable Development Methodology and will include stakeholder consultation processes. This will include the qualitative assessment of SD impacts, whereas a quantitative assessment will depend on the data availability.

It is important to highlight that the time horizon adopted for the assessments listed above will be 2050.

The project's objectives are the following:

Table 2: ICAT Brazil Phase III Objectives

Objectives Phase III	Description of the Objective
Objective 1	To estimate the potential expansion of variable renewable energy (VRE) and biomass sources and its impact in the national grid up to 2050;
Objective 2	To assess the sustainable development impacts of the VRE and biomass expansion in the Deep Decarbonization Scenario (DDS Brazil) in comparison with the expansion under the current policy scenario. This assessment will be done by applying the ICAT Sustainable Development Methodology and will include stakeholder consultation processes;
Objective 3	To consolidate a partnership network with stakeholders that can contribute to the assessments and to spread the results of the project for effective use in policy design and implementation.

2.3 Approach and Methodology

The ICAT Brazil Phase III will follow the guidelines and recommendations of the following methodologies and materials:

- MATRIZ (Energy Optimising Model)
- ICAT Sustainable Development Methodology (which can be further explored here)
- ICAT Stakeholder Participation Methodology (which can be further explored here)
- ICAT Methodology on Managing Transparency of Just Transitions (currently under development)

The methodology supporting ICAT Brazil Phase III is divided into three overarching axes, in accordance with the set specific objectives.

A. Potential expansion of variable renewable energy (VRE) and biomass sources
B. Sustainable development impacts of this expansion and just transitions
C. Partnership with stakeholders

An in-depth methodological discussion of each of the axes can be read in the Project's Scope of Work.

3. Continued and expected Impacts of the project in the country.

The expected impact of the project continues to relate to providing support to Brazil, in-country partners and relevant stakeholders with tools and mechanisms suitable for te country context as it evolves its transparency mechanism and climate change mitigation efforts. By zooming into the energy sector and focusing on the co-benefits associated with a decarbonized energy matrix, the project expects to support Brazil's Sustainable Development Goal (SDG) activities. By working with key stakeholders in the country, the project expects to continue to foment ad enable an open and transparent exchange, where policymakers, decision-makers, academia, civil society, and other non-state actors can engage and commonly contribute to Brazil's climate ambition.

In this context, the ICAT Brazil Phase III should contribute to the following KPIs defined under the ICAT monitoring and evaluation framework:

Table 3: ICAT Brazil Phase III projected KPIs

ICAT MEL U KPI	Description	The rationale for ICAT Brazil Phase III
KPI 4	ICAT partners (national and sub-national government and NSAs) actively participate in knowledge sharing with other countries on climate action transparency through peer-to-peer learning and knowledge sharing events, including non-ICAT events (e.g., trainings, workshops and webinars), disaggregated by a) ICAT partner country receiving direct capacity	Based on activities planned to take place in Brazil under Phase III, this KPI is expected to be achieved via peer-to-peer exchanges between Brazil and other ICAT countries. Brazil's experience and existing transparency efforts can be meaningful capacity building tools to inspire countries (ICAT and non-ICAT). Particular focus on potential capacity support from Brazil to other countries or between Brazilian states can be around previously and upcoming ICAT Methodologies applied/ to be applied.

	building support, and b) ICAT ReCATH countries.	
KPI 5	Number of ICAT country and subnational level projects / ICAT ReCATH countries that have resulted in at least one of the following: new or refined GHG inventory; new of refined MRV framework, new or refined NDC tracking framework; improved integration of subnational/NSA climate action; and/or new adaptation monitoring measures, plans or processes	This KPI can be applied to measure progress in ICAT Brazil Phase III, particularly in the context of the development of a Current Policy Scenario (CPS) and a Deep Decarbonization Scenario (DDS), which will feed into an analysis of the country's NDC implementation. Moreover, the objective to estimate the potential expansion of variable renewable energy (VRE) and biomass sources and their impact on the national grid up to 2050 can lead to an enhanced NDC ambition from the country.
KPI 6	Number of ICAT projects / ICAT ReCATH countries utilizing ICAT methodologies/ guides to assess the impact of their climate actions and policies (including adaptation).	This KPI is projected to be met via the application of three ICAT methodologies, namely: ▪ ICAT Sustainable Development Methodology ▪ ICAT Stakeholder Participation Methodology ▪ ICAT Methodology on Managing Transparency of Just Transitions
KPI 8	Number of ICAT partner countries that improve the quality of their reporting to the UNFCCC, disaggregated by a) ICAT partner country receiving direct capacity building support, and b) ICAT ReCATH country.	Phase III will analyze new scenarios which could lay the work ahead for Brazil's next round of NDCs. With the support received via the ICAT project, and ongoing efforts promoted internally by the country, it is expected that this KPI will be achieved.
KPI 11	Number of ICAT projects where intervention has contributed to early signs of transformational change.	Early signs of transformational change that can be attributed to the project's ongoing efforts in Brazil can be observed via e.g., increased sharing of experiences/replication of evidence in public forums, increased capacity, and increased finance and level of expertise.

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