Assessment of the policy framework's impact on the renewable energy generation expansion in the Brazilian power grid

ICAT Initiative for Climate Action Transparency
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Initiative for Climate Action Transparency – ICAT

ICAT Brazil Project phase 3

Assessment of the policy framework's impact on the renewable energy generation expansion in the Brazilian power grid

Outputs 4 and 7 – Report on workshop with stakeholders

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Assessment of the policy framework's impact on the renewable energy generation expansion in the Brazilian power grid

Deliverable #4 and #7

AUTHORS

Centro Brasil no Clima (in alphabetic order):

Beatriz Araújo
Guilherme Lima
Raiana Soares
Samara Andrade
William Wills

Sectoral experts

Renata Barreto – LULUCF
Ana Caroline Costa – Agriculture
Kathlen Schneider – Energy
Bruna Targino – Industry
Jussara Oliveira – Waste

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Forewords

This report is part of the ICAT Brazil Project phase 3, hereafter referred to as ICAT project, which is implemented by Centro Brasil no Clima (Brazil Climate Centre – CBC) in partnership with Centro Clima (PPE/COPPE/UFRJ) with support from the Initiative for Climate Action Transparency (ICAT) and technical support from the UNEP Copenhagen Climate Centre (UNEP CCC) and the World Research institute (WRI).

The previous phases of the ICAT project aimed at the enhancement of the transparency framework in Brazil by developing MRV indicators to assess climate policies and actions at the national (1st phase) and subnational (2nd phase) level. These phases developed mitigation scenarios that provide critical insight for policy development at the national and sub-national levels and proposed MRV indicators to track the implementation of the Brazilian NDC.

The third phase of the ICAT Brazil project, which started in March 2023, built off insight gained from the first two phases and proposed a detailed analysis of the electricity sector in Brazil. The project's original objective was to assess the potential expansion of the power sector in the country through variable renewable energies (wind and solar photovoltaic) and biomass, the sustainable development impacts of sectoral policies by applying the ICAT's Sustainable Development Methodology, and to contribute for the Just Energy Transition planning in Brazil.

In July 2024, based on the successful analyses on the SDG impacts of renewable energy polices and on Just Energy Transition aspects, the scope of the project was expanded to support the Ministry of the Environment and Climate Change (MMA) in the elaboration of the Climate Plan, particularly with the development of a Roadmap of Monitoring the Just Transition in the Climate Plan.

This report presents the outcomes of the workshop conducted with stakeholders to discuss the challenges, objectives and necessary transformations to promote a just transition for a low-carbon economy in Brazil. These outcomes will be later incorporated into the document that will be delivered to MMA to prepare the transversal strategy of Just Transition of the Climate Plan.

1. Introduction

The 1st Just Transition Workshop of the Climate Plan, held virtually by Centro Brasil no Clima (CBC) in partnership with the Ministry of the Environment and Climate Change (MMA), brought together various stakeholders – including government representatives, civil society, indigenous peoples, quilombolas[1] and traditional communities, the private sector, and academia – to discuss the current challenges, goals, and necessary transformations to promote a just transition toward a low-carbon economy in Brazil. The workshop is part of a project executed by CBC with support from the Initiative for Climate Action Transparency (ICAT), aiming to assist MMA in developing the Just Transition component of the Climate Plan – Mitigation.

The event sought to incorporate perspectives from different social groups to discuss aspects related to a just transition in the sectors of Land Use Change and Forests, Agriculture, Energy, Industry, and Waste. The primary objective of the workshop was to discuss and define the Just Transition goals for each sector, identifying the essential, non-negotiable aspects needed to achieve these transitions so that they can be incorporated into the Climate Plan currently being developed by the MMA.

To engage participants in the Climate Plan preparation process, a presentation was given on the activities, status, and next steps for drafting the plan. Following this, a presentation was held to provide context on the Just Transition theme, outlining the work plan of the project executed by CBC, which will result in a "Roadmap for Monitoring the Just Transition in the Climate Plan."

As part of the proposed methodology, participants were divided into sectoral breakout rooms, where they engaged in structured exercises to contribute their perspectives on the challenges and transformations needed to ensure a just transition. This document presents a summary of the Climate Plan and project presentations, as well as the contributions shared by participants during the sectoral discussions.

[1] Quilombolas are the remnants of ethnic-racial groups that share black ancestry, a history of resistance to the oppressions suffered by their communities, and a collective identity grounded in specific relationships with territory, ancestry and cultural practices (INCRA, 2020).
Available at: https://www.gov.br/incra/pt-br/assuntos/governanca-fundiaria/quilombolas

2. The 1st Just Transition workshop of the Climate Plan

The workshop was held on 10 March 2025, lasted approximately 4 hours and 30 minutes, and had the participation of more than 120 people. The agenda, the profile of the participants, and the exercise methodology adopted in the sectoral rooms, enabling participants to provide their contributions, will be detailed below.

2.1 Agenda

As shown in the following figure, the workshop began with an institutional opening, during which Guilherme Syrkis, Executive Director of the Centro Brasil no Clima, and Ana Toni, National Secretary for Climate Change at the Ministry of the Environment and Climate Change (MMA), delivered their remarks. This was followed by presentations on the Climate Plan and the ICAT Project: A Roadmap for Monitoring the Just Transition in the Climate Plan. Before the participants were directed to the sectoral rooms, some warm-up exercises were conducted using Mentimeter, followed by the division of participants according to their respective sectors. At the end of the workshop, upon returning to the plenary session, a summary of the discussions held in the rooms was presented.

Figure 1 – Workshop agenda
Source: elaborated by the authors.

Guilherme Syrkis, Executive Director of CBC, expressed his gratitude to the CBC team for leading the project, to the MMA for its dedication and commitment to the development of the Climate Plan, and to the participants, emphasising that they were carefully selected by CBC's technical team. Guilherme emphasised that CBC's primary goal is to contribute to accelerating the transition to a low-carbon economy, recognising that there are crucial social and economic issues that must be properly addressed.

He noted that the topic of Just Transition has gained significant traction in the energy sector; however, the challenge lies in expanding the discussion beyond this sector. For this reason, four other sectors from the mitigation pillar were included in the event, with Just Transition serving as an innovative component of the Climate Plan's mitigation strategy.

Ana Toni, National Secretary for Climate Change at the MMA, explained that the process of developing the Climate Plan began in 2023 with the aim of creating a detailed and robust plan, including seven sectoral mitigation plans and sixteen adaptation plans, with Just Transition as one of the cross-cutting components. Ana Toni reiterated that decarbonisation and adaptation must be closely linked to socio-economic development, making the focus on Just Transition absolutely essential. She emphasised that climate change is the greatest accelerator of inequalities and poverty, highlighting the need for an affirmative approach to Just Transition in order to achieve the objectives of the Climate Plan. She also mentioned that the decision to incorporate the topic of Just Transition, along with other cross-cutting components, into the Climate Plan was agreed upon by the Interministerial Committee on Climate Change (CIM). However, she noted that the concept remains broad and is still widely debated within societies, with challenges in distinguishing between "Just Transition" and "Climate Justice." Therefore, establishing clear terminology on Just Transition and its relationship with specific sectors is essential for advancing the agenda. Finally, she recalled that no agreement was reached on the topic of Just Transition at COP29, so she believes that this process, through sectoral discussions, can help guide a positive outcome at COP30, drawing inspiration from the national debate. This process thus represents a unique opportunity to make concrete progress towards the national plan, which will serve as input for international policy.

Aloisio Melo, Director of Climate Policy at MMA, expressed his gratitude to CBC for its collaboration and support in this dialogue agenda aimed at building a shared vision of what Just Transition means for Brazil and for a strategy to transform the country towards the goal of GHG emissions neutrality. Aloisio provided a brief contextualisation of the efforts to structure a Brazilian action strategy to address the challenge of climate change, in a scenario where the entire world is reassessing its level of commitment (NDCs). He highlighted that the policies already implemented or planned still keep global emissions at a very high level – far above the 1.5 to 2ºC warming limit – when, in fact, we should be undergoing a much faster transformation in technology, economy, production, and society towards a world with significantly lower emissions. Regarding the national climate context, he presented data from the Digital Atlas of Disasters in Brazil[2], which shows that over a ten-year period, from 2014 to 2023, 83% of municipalities were affected. Material damages and financial losses totalled more than 421 billion reais, 1.57 million homes were damaged, and over 177 million people were affected. In other words, this is undeniably a climate emergency.

[2] Available at: https://atlasdigital.mdr.gov.br/paginas/mapa-interativo.xhtml

Aloisio explained that the Climate Plan stems from a legal obligation of the Brazilian government as well as a mandate from CIM, which is composed of 22 bodies. CIM determined that the Climate Plan should be updated in both its mitigation and adaptation dimensions. To achieve this, CIM established two temporary technical working groups (GTTs) for the development of the Climate Plan – GTT Mitigation and GTT Adaptation. He highlighted that the Adaptation pillar is already well advanced, with a revised National Adaptation Strategy and sixteen sectoral plans developed and made available for public consultation. The current challenge, he noted, is to formulate a Mitigation strategy and present it to CIM. Additionally, as part of the Climate Plan's scope, there are cross-cutting themes and strategies that must be addressed to develop a national strategy that effectively engages with the challenges of this transformation, resilience, and emissions neutrality. There are five cross-cutting pillars: Just Transition; Socioeconomic and Environmental Impacts of the Transition; Means of Implementation; Education, Training, Research, Development, and Innovation; and Monitoring, Management, Evaluation, and Transparency.

Reflecting on the relationship between national mitigation ambition and the Climate Plan, Aloisio remarked that the Climate Plan will establish sectoral emission targets in an integrated manner, taking into account the intersectoral impacts while aiming for the lowest possible cost to society. He presented a curve illustrating emission levels in 2005 – 2.56 billion tonnes (Gt) of CO2e – and the commitments for 2025 (1.32 Gt CO2e, a 48.4% reduction from 2005), 2030 (1.2 Gt CO2e, a 53.1% reduction), and 2035 (0.85 to 1.05 Gt CO2e, a reduction of 59% to 67%), ultimately reaching net-zero emissions by 2050. He further stressed that, unlike the context of other countries, Brazil has significant emissions related to land-use change and agriculture, in addition to the energy sector. Therefore, when discussing Just Transition in Brazil, it is essential to adopt a multisectoral and multidimensional approach, considering aspects such as gender, race, ethnicity, and productive activities, among others.

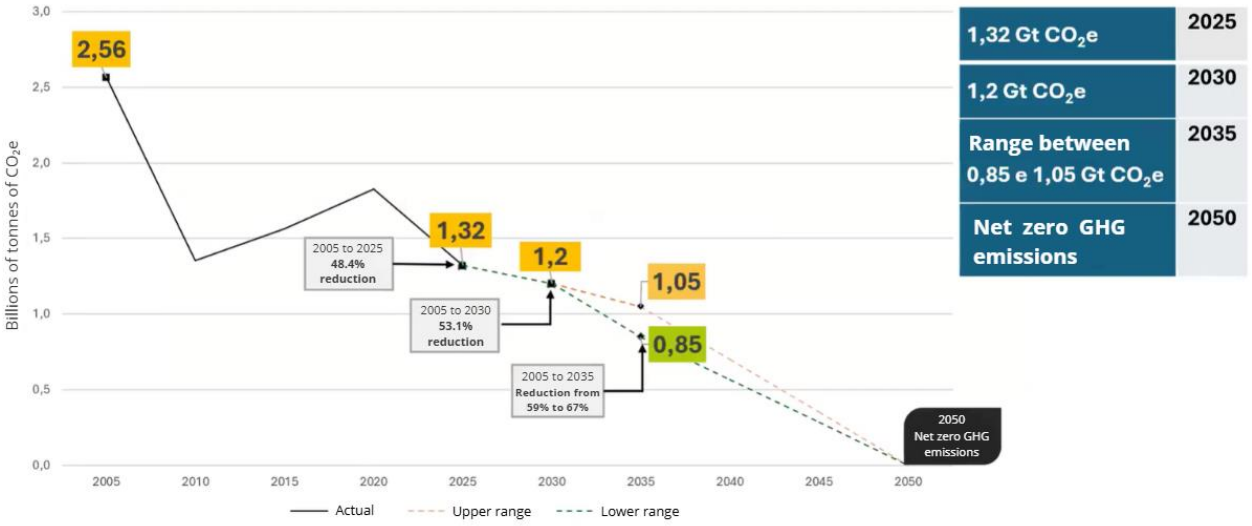

Figure 2 - Relationship between national mitigation ambition and the Climate Plan
Source: MMA.

Finally, Aloisio clarified that the National Mitigation Strategy, the guiding document for the country's mitigation priorities, is in the final stages of development. It will soon undergo an initial period of public consultation, followed by a final round of consultation alongside the sectoral plans. The document sets out ten guidelines, including that of a just and inclusive transition with a systemic and long-term perspective, taking into account the impacts on and response capacities of different social groups in the adoption and implementation of greenhouse gas emission reduction measures. In addition to the guidelines, the strategy is structured around a set of twelve national objectives, highlighting the goal of generating employment, income, and productive inclusion in economic activities related to the decarbonisation of the economy and sustainable development, thereby promoting a just, inclusive, and sustainable socio-economic transition.

Raiana, Technical Coordinator of the ICAT project, gave a brief presentation on the history of projects between CBC and ICAT, which led to the current action strategy supporting the Climate Plan in the Just Transition pillar. She highlighted an early opportunity for the current project: the workshop "Dialogues for a Just Transition in Brazil", held in September 2023 as part of the previous project. Regarding the workshop, she noted that the stakeholders mapped at that time were predominantly from the energy sector, as this was the primary focus. However, the event also provided an opportunity to broaden the debate and explore perspectives beyond the energy sector, with the aim of understanding how other sectors were approaching the topic of Just Transition. Among the most significant outcomes of that workshop, while most of the themes identified as principles of a Just Energy Transition align with those found in international literature, some stand out. These include energy decolonisation, public participation in decision-making and energy policy planning, an energy transition designed with inclusivity in mind, and transitions tailored to the country's regional characteristics. This suggests an existing motivation to develop an approach rooted in national and local needs, one that is attentive to Brazil's specificities and capable of addressing them effectively.

Providing context on previous initiatives was important because the objective of this first Just Transition workshop under the Climate Plan was precisely to facilitate sectoral discussion rooms. These discussions aimed to support the identification of aspects that may not yet have been mapped and to define a Just Transition approach that responds to national specificities while meeting Brazil's commitments, considering the challenges involved in advancing the mitigation agenda.

Raiana highlighted the project's main objectives: to assess the potential socio-economic and environmental impacts of sectoral measures within the Climate Plan Mitigation sectors and to develop elements of the roadmap for monitoring Just Transition within the Climate Plan Mitigation. She also outlined the methodologies used in the development of the work, designed by ICAT – namely, the Sustainable Development methodology and the Just Transitions Monitoring Guide. She emphasised that both methodologies are designed to be built through a participatory approach, which was the rationale

for proposing the workshop. In broad terms, the work begins with the development of a sectoral vision of Just Transition, understanding the specific ways in which this topic unfolds in each sector. This is followed by an analysis of the environmental, social, and economic impacts of the proposed sectoral measures, enabling the selection of indicators that support a well-structured plan for a Just Transition monitoring framework.

Regarding the methodology, Raiana explained the four fundamental pillars of Just Transition adopted in the study and incorporated into the sectoral discussions: recognition of ongoing injustices, inequalities, and political vulnerabilities, ensuring that "no one is left behind" (recognition); fair distribution of the costs and benefits of transitions (distributive justice); guaranteeing social perspectives in decision-making processes and the participation of affected and interested groups (procedural justice); and addressing historical injustices (restorative justice).

Finally, Raiana explained that once the activity of developing a sectoral vision of Just Transition has been completed, the final deliverable will culminate in the development of the Just Transition monitoring plan for the Climate Plan Mitigation. This plan will be informed by the recognised challenges and will apply a Just Transition perspective to the potential impacts of the measures, always striving for a participatory approach.

2.2 Profile of the participants

Stakeholder mapping was conducted through two complementary approaches: sectoral and intersectoral. The CBC team was responsible for identifying sectoral participants, focusing on groups directly impacted by the plan, as well as organisations and individuals with recognised engagement in the field. Representatives from academia, international cooperation, traditional communities, civil society, the financial sector, the private sector, and the public sector were selected. Intersectoral participants were nominated by the Ministry of Environment and Climate Change, as they are professionals directly involved in the development of Plano Clima. The full list of participants is available in the appendix section of this report (Appendix 1).

To understand the participants profiles, a short questionnaire was administered at the beginning of the workshop. The four questions aimed to gather information related to place of birth, age group, racial/ethnic identity, and gender identity. Figure 1 illustrates the distribution of participants by state[3], with approximately half of them originating from the Southeast region (46%), followed by the Central-West (24%) and the South (16%). The Northeast represented 12% of respondents, while the North had the lowest participation, with only 2%. Among international participants, 2% indicated an origin in the Global South, and there were no representatives from the Global North.

[3] The point shown outside the map area corresponds to the international participant.

Figure 3 – Participants' place of origin
Source: Mentimeter (responses to the exercise prepared by the authors).

The age range of participants was predominantly composed of individuals aged between 30 and 59, covering two age groups that together accounted for 78% of the total — the specific age group breakdowns can be seen in Figure 2. Younger participants were also present, with 13% aged between 18 and 29, and a small share under the age of 18 (2%). Participants aged 60 and above represented 7% of the total.

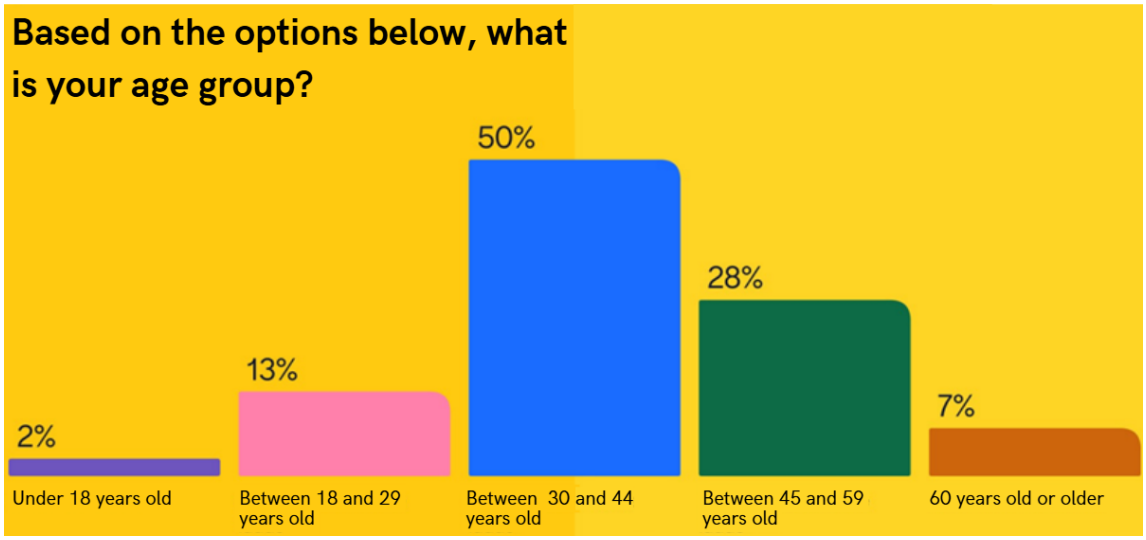

Figure 4 – Age range of participants
Source: Adapted from Mentimeter (responses to the exercise prepared by the authors).

As for racial/ethnic identity, 65% of participants self-identified as white, 17% as pardo (mixed-race), and 10% as black. Indigenous people and those of East Asian descent accounted for 1% and 5%

of participants, respectively, while 2% chose not to respond. With regard to gender identity, due to the sensitive nature of the topic, the question was presented in the form of a word cloud, allowing participants to freely describe how they identify. The results indicated a predominance of the categories “cisgender woman” and “cisgender man”, also expressed through terms such as “feminine” and “masculine”. In addition, some responses included references to sexual orientation, such as “heterosexual”, “bisexual”, and “gay”.

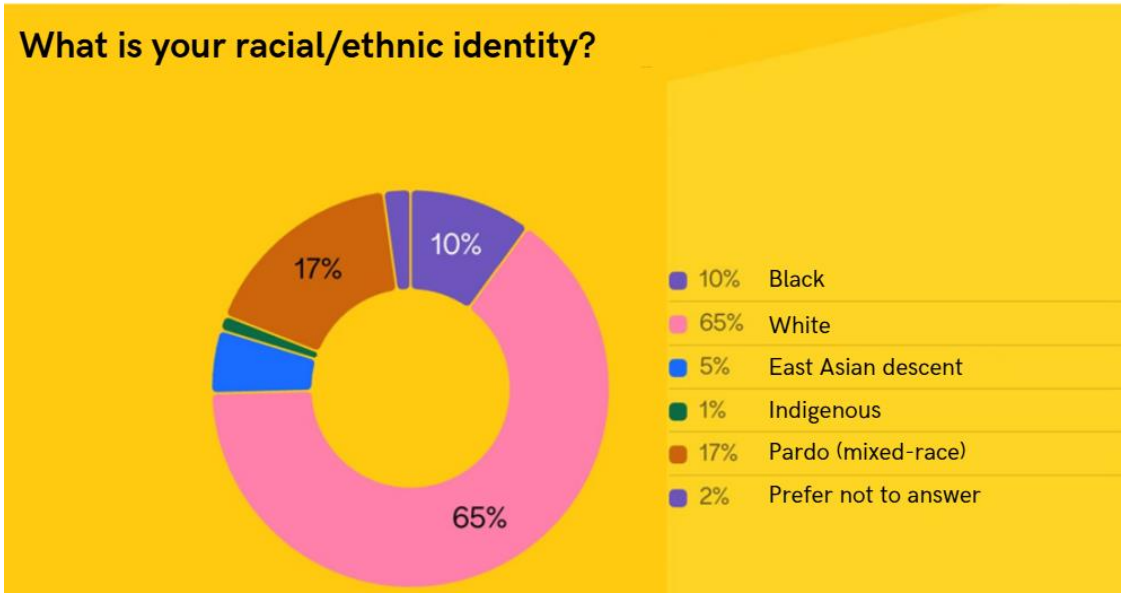

Figure 5 – Racial/ethnic identity of participants
Source: Adapted from Mentimeter (responses to the exercise prepared by the authors).

Figure 6 – Gender identity of participants
Source: Adapted from Mentimeter (responses to the exercise prepared by the authors).

2.3 Sectoral rooms/exercises

Still, during the main plenary session – the initial stage of the workshop, which included opening speeches and the administration of the participant profile questionnaires – an exercise was also conducted to conceptualise the idea of a just transition, with the aim of inspiring participants to reflect on key aspects of the theme. The activity proposed collective reflections on the impacts of climate change, the possibilities for addressing socio-environmental injustices, and the distribution of the benefits of mitigation.

To answer the first question, participants were invited to write, in a single word, a form of injustice, loss, or burden that may be caused by climate change. Among the most frequently mentioned terms were unemployment, vulnerability, food insecurity, environmental racism, and poverty (See Appendix 2 for the complete list of responses). Next, participants were encouraged to reflect on the possibility of redressing these injustices and the paths to achieve it. Most participants agreed that reparative processes are possible, although complex, emphasising the importance of involving affected groups in the construction of solutions.

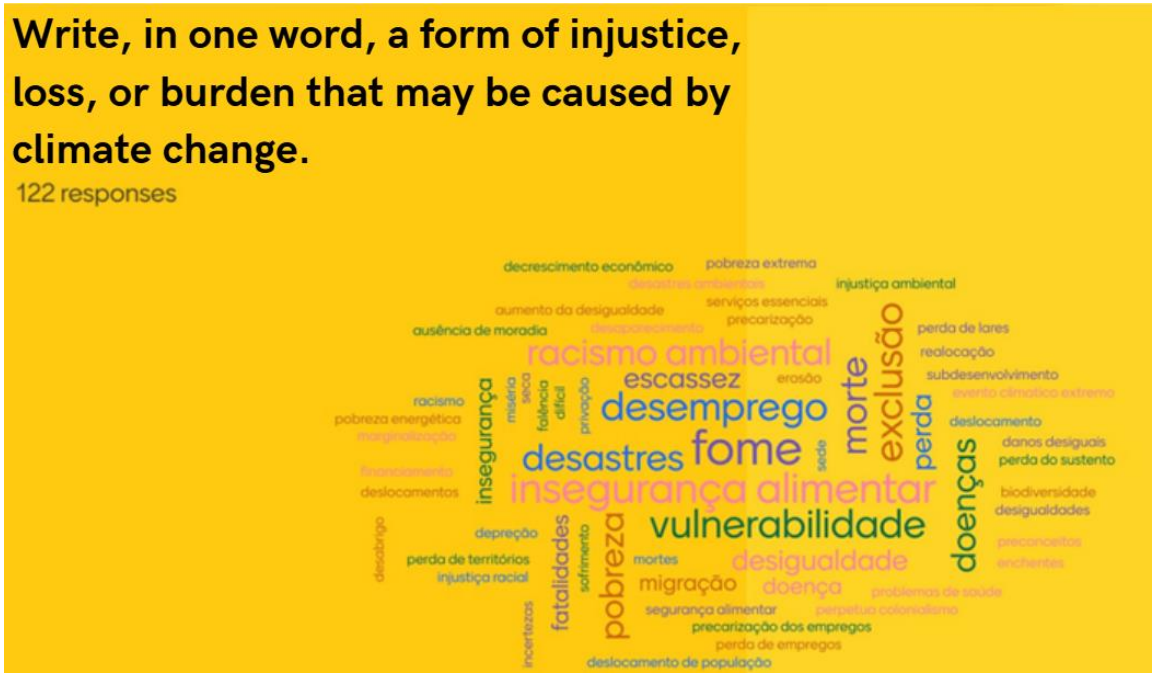

Figure 7 – Word cloud on injustices, losses, and burdens caused by climate change
Source: Adapted from Mentimeter (responses to the exercise prepared by the authors).

Similarly to the first question, a new word cloud was created by participants, who were this time invited to identify the benefits or opportunities associated with climate change mitigation. Among the responses, prominent terms included green jobs, public health, environmental conservation, sustainability, and social justice. When asked about the possibility of a fair distribution of these benefits, the responses revealed differing perceptions: 33% of respondents considered such distribution entirely

possible, while the majority (67%) viewed it as complex or unlikely to be effectively achieved in practice.

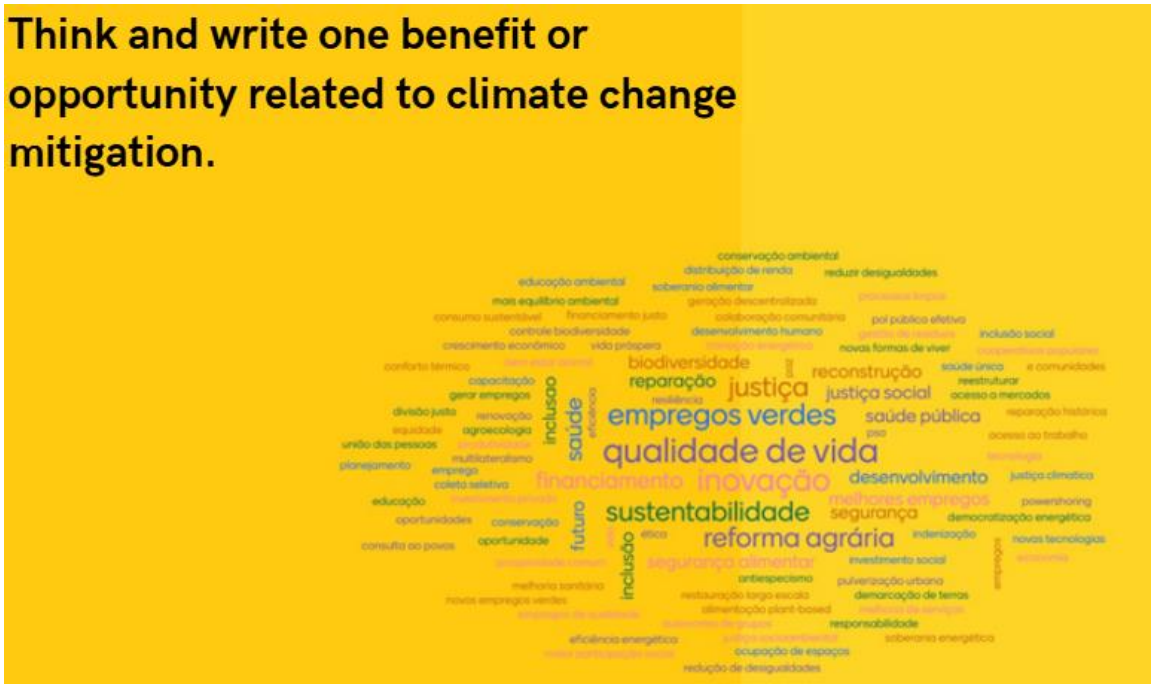

Figure 8 – Word cloud on benefits and opportunities associated with climate change mitigation
Source: Adapted from Mentimeter (responses to the exercise prepared by the authors).

The second stage of the workshop took place in sectoral breakout rooms, organised with the aim of deepening discussions on just transition, considering the perspectives and specificities of the assessed sectors – LULUCF, Agriculture, Energy, Industry, and Waste. The sessions were held simultaneously, and in each room, CBC's sectoral specialists delivered an introductory presentation covering two key aspects: an overview of the challenges of mitigation for a just transition in Brazil, and the main challenges and objectives related to a just transition in the sector. These presentations offered a sectoral overview to guide critical exercises, which served as the main method adopted for collecting results.

Starting from the current context, the first exercise invited participants to reflect on existing injustices in the sector, understood as challenges that must be overcome for the transition to be truly just. Guided by the question *"What are the challenges of a just transition in this sector?",* participants recorded the main challenges identified in their realities and areas of work on post-it notes on Zoom's whiteboard. As illustrated in Figure 7, the colours of the post-its were used to represent thematic axes, previously defined by the CBC team based on the most recurrent themes identified in the literature review. The proposed themes included: ethno-racial, gender, generational, political, cultural, and territorial aspects; human rights, ecosystem rights, governance, poverty, health and well-being, and decent work. It is worth noting that these axes were provided as a reference only, and participants were free to include other categories if they felt none of the predefined ones captured the challenge they identified.

After writing down the challenges, each participant had the opportunity to present their contributions to the group, briefly explaining the points they had raised. During this presentation, participants could also highlight one of the challenges as an "enlightened" one, meaning the challenge they considered most relevant, and were given additional time to present it in more depth. Finally, a collective prioritisation stage was conducted, during which participants voted on the challenges presented, indicating those they believed should be addressed with greater urgency.

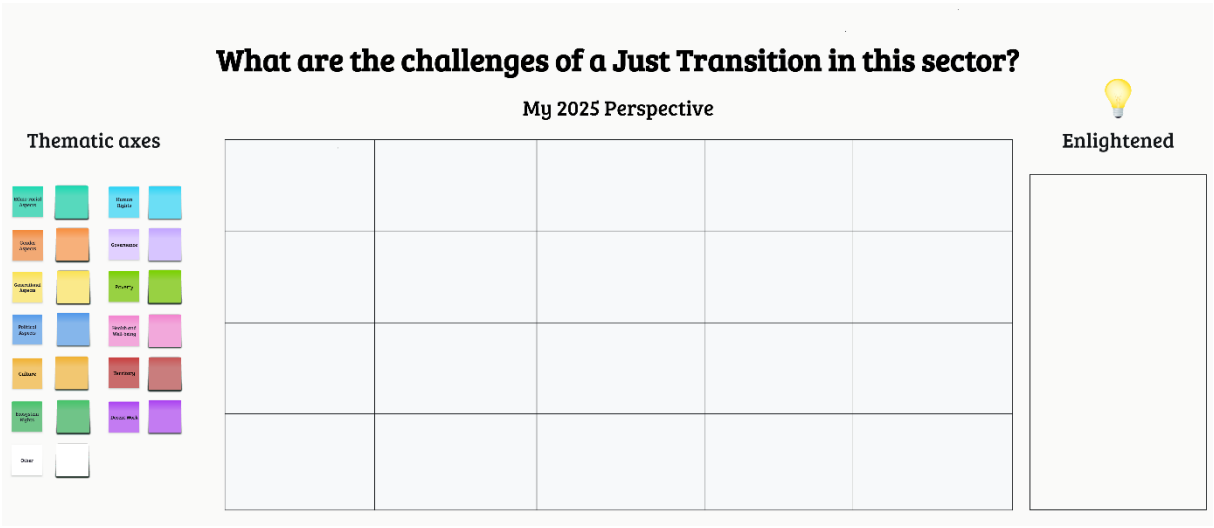

Figure 9 – Exercise 1 structure
Source: elaborated by the authors.

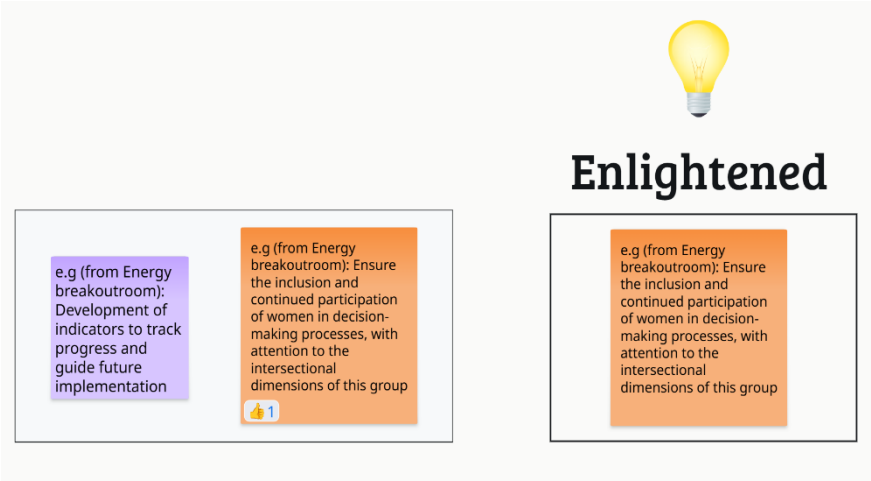

Figure 10 - Illustrative example from Exercise 1
Source: elaborated by the authors.

The second exercise focused on building a future vision for the sector, based on the question: *"What are the most important transformations in this sector for a just transition by 2035?"*. The activity encouraged participants to reflect on concrete changes that need to occur by that time horizon, with the understanding that, without such transformations, a just transition in the sector will not be achievable. The challenges prioritised in the previous exercise were provided as a reference to help guide the

discussion, but participants were free to propose other transformations they considered relevant. The round of presentations, as well as the "enlightenment" and prioritisation stages, followed the same format used in the first exercise.

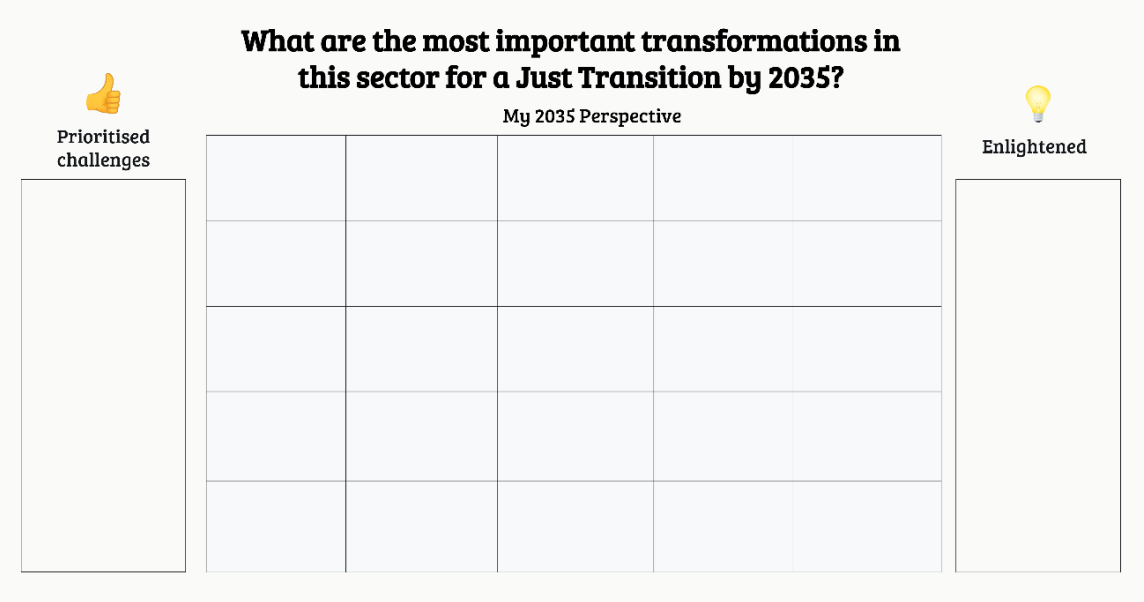

Figure 11 – Exercise 2 structure
Source: elaborated by the authors.

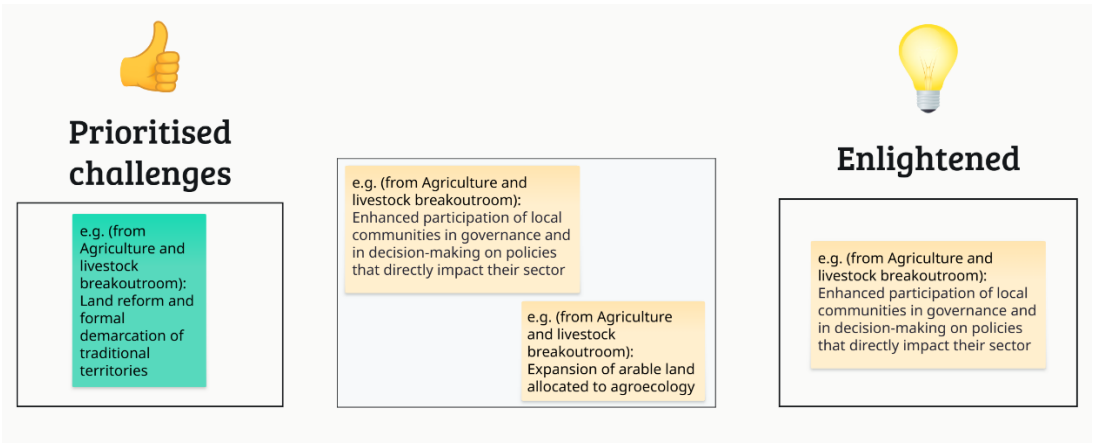

Figure 12 - Illustrative example from Exercise 2
Source: elaborated by the authors.

The third and final exercise aimed to encourage participants to construct possible paths for a just transition in the sector, considering three pillars that guide the development of a vision of a just transition: the equitable distribution of costs and benefits (distributive justice), the effective participation of interested and impacted groups in decision-making processes (procedural justice) and the reparation of historical injustices (restorative justice). In this sense, the activity was guided by four questions aimed at exploring these pillars, seeking to understand: what burdens and losses, benefits and opportunities should be distributed fairly, how to guarantee social participation and what rights should be restored

throughout the process. The results of this exercise will provide the basis for building the objectives of the just transition in each sector.

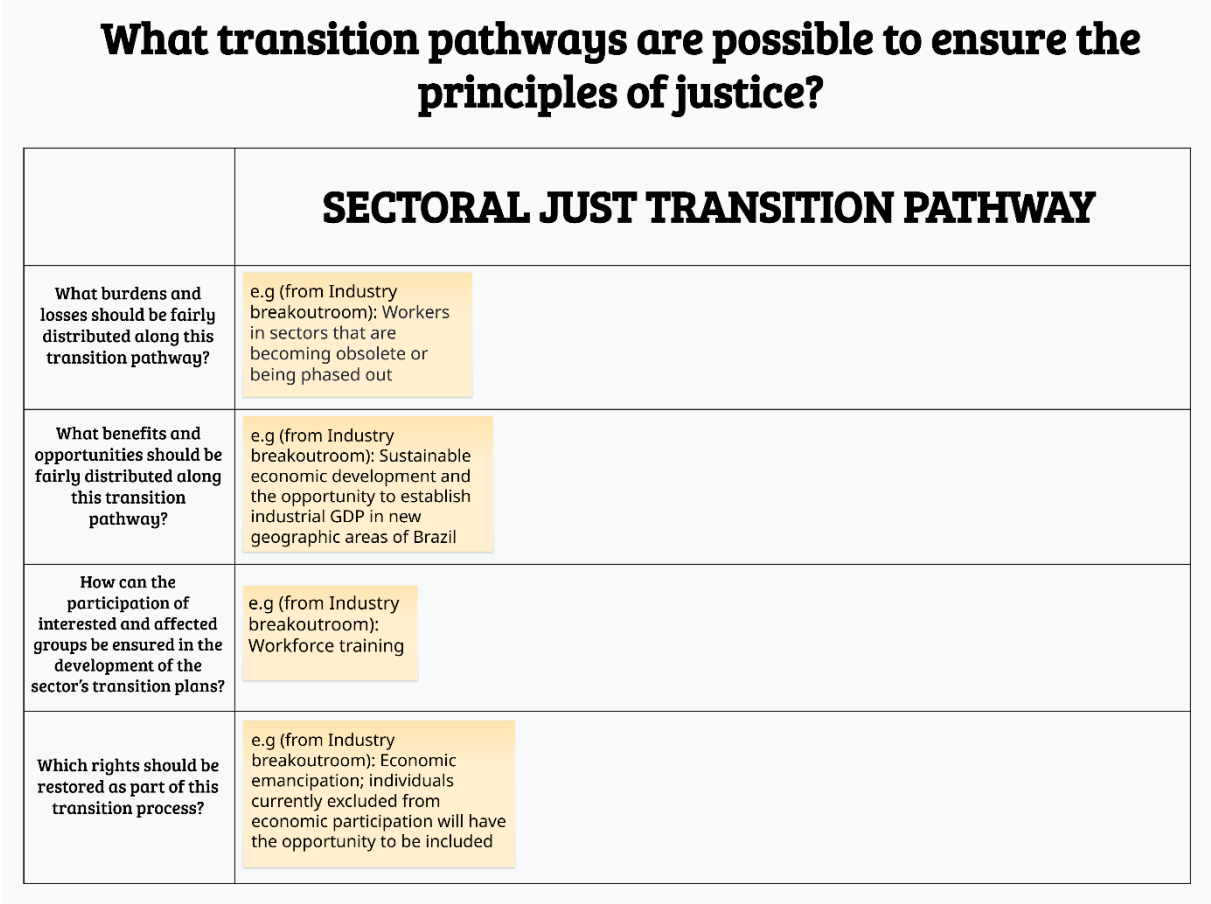

Figure 13 – Exercise 3 structure with an illustrative example
Source: elaborated by the authors.

3. Contributions from the audience

This section will present a summary of the contributions brought to the workshop and the discussion with the participants.

2.4 Land use, land-use change and forestry (LULUCF)

The land use, land use change and forestry (LULUCF) sector is the main source of GHG emissions in Brazil, primarily due to carbon dioxide (CO_2) released as a result of native forest deforestation. Thus, mitigation measures in this sector are mainly intended to eliminate illegal deforestation and forest degradation. However, they may also include other actions such as forest restoration, promotion of bioeconomy, land-use planning and land tenure regularisation, among others.

Workshop participants identified several challenges in this sector, including land concentration, environmental degradation, the precariousness of rural labour and the lack of incentives for production

chains related to sociobioeconomy[4]. Territorial recognition was highlighted as essential to ensuring a just transition, with particular emphasis on land tenure regularisation, access to water, and the promotion of agroecology. The importance of technical assistance and rural extension services (ATER) was also emphasised as a key instrument to empower producers to adopt sustainable practices and ensure climate adaptation.

Looking ahead, the most urgent challenges include the need to restore degraded land, the lack of clear incentives for an agroecological transition, the vulnerability of communities to climate change and the need to improve working conditions for family farmers. By 2035, the expected transformations include the elimination of illegal deforestation, the expansion of payments for environmental services targeting family farming, the implementation of the Native Vegetation Protection Law, land tenure regularisation of Indigenous and Quilombola territories, and the consolidation of a new model of environmental governance. Additional key measures include adapting credit lines to support sustainable practices and expanding both technical assistance and environmental monitoring as structural strategies to strengthen just and more resilient value chains. Among the main recommendations are the strengthening of family farming, via top-down national policy measures, e.g., the creation of economic incentives for forest restoration and the regulation of land governance to prevent further territorial conflicts.

2.5 Agriculture

As well as LULUCF, the agriculture sector plays a significant role in Brazil's total GHG emissions due to the scale of the sector. In this case, emissions mainly result from the cattle herd, in the form of methane (CH_4), and from the use of nitrogen-based fertilisers, in the form of nitrous oxide (N_2O). Possible mitigation measures for this sector include, for example, the expansion of integrated systems (ILPF and SAF), recovery of degraded pastures, no-till farming systems, intensive cattle finishing, the use of bio-inputs, among others.

The challenges to a just transition highlighted by the participants include low efficiency in food production and the sector's focus on commodity production (e.g., soya, sugar, coffee, cocoa, and others), high land concentration, and inequalities in access to funding and rural technical assistance (ATER). Consequently, the measures proposed to ensure a just transition in this sector included: the expansion of more efficient forms of food production through the promotion of productive diversification; the improvement and scaling up of land regularisation and agrarian reform processes; support for the

[4] Sociobioeconomy proposes an alternative economic model that values traditional knowledge, equity, and the sustainable use of sociobiodiversity — understood as the interconnection between biological diversity and the sociocultural systems — fostering harmonious relationships between people and their territories (Embrapa, 2024). Available at: https://www.embrapa.br/busca-de-noticias/-/noticia/90864515/falta-de-clareza-do-conceito-de-bioeconomia-pode-ser-prejudicial-a-amazonia?p_auth=mk0EyUSC

generation of new knowledge applicable to rural areas; a review of tax exemptions in the sector, particularly regarding the purchase of agrochemicals; and the encouragement of engagement and provision of economic incentives for the adoption of sustainable practices and new technologies. The need to recognise animal sentience and their right to well-being was also mentioned, calling for the establishment of ethical limits to animal exploitation and ensuring the economic viability of changes to existing production systems.

2.6 Energy

Although the energy sector in Brazil accounts for a smaller share of emissions compared to other countries, its contribution is still significant and may be affected by the worsening impacts of climate change (such as reduced hydropower generation), as highlighted in Output 6 of the ICAT Project (Phase III). Therefore, mitigation measures for this sector may include, for instance, the expansion of alternative energy sources to replace fossil fuels, the production of biofuels, the development of low-carbon hydrogen, and the promotion of energy efficiency.

A general aspect highlighted in the discussions regarding this sector is the need for a cross-cutting approach that links the energy transition to national industrialisation (not only for export), with the creation of skilled jobs and a more equitable distribution of wealth. Another important issue concerns the security of the electricity system and the conditions of energy access and pricing for consumers, particularly those in vulnerable situations. Also noted was the need for adequate public policies and financing to support the decarbonisation of urban mobility, especially through investment in public transport.

Participants reinforced concerns about the quality of jobs generated through the transition, underlining the need for greater involvement of the labour sector in discussions on a just transition and the creation of decent opportunities for young people and women. In this regard, the importance of strengthening women's participation in the energy sector was also highlighted – both in the workforce and in leadership and decision-making positions.

Overall, the debate in this sector emphasised that a just energy transition should not be limited to the expansion of renewable energy in the country but rather be viewed as a broader and more strategic process of decarbonisation and sustainable development, incorporating elements of governance, sectoral (and intersectoral) planning, and social justice.

2.7 Industry

Greenhouse gas emissions from Brazil's industrial sector derive mainly from the production of metals (particularly pig iron and steel), minerals (cement and lime) and the chemical industry (carbon black and ammonia). Possible mitigation measures for this sector include the substitution of mineral

coal with charcoal in steelmaking processes, the promotion of a circular economy through the reuse of materials across different segments, and the use of alternative materials in cement production to reduce the clinker content, among others.

The main obstacles mentioned by participants in this sector included the difficulty in generating quality jobs (e.g. inadequate working conditions in charcoal extraction), the relocation of workers whose roles will become obsolete, the health impacts on workers due to increased demand for minerals and critical materials essential to the energy transition, and pollution caused by the improper disposal of industrial waste, which can particularly affect populations already facing other forms of injustice, such as indigenous peoples. It was also noted that Brazil currently lacks a national industrial policy that systematically includes social dimensions in its agenda.

The actions deemed necessary to ensure a just transition, according to participants, include securing territorial rights for indigenous peoples and local populations, as well as promoting the economic empowerment of vulnerable groups through the regional redistribution of new jobs, considering social markers of inequality to foster economic development in the most disadvantaged regions of the country. Also mentioned for this sector were the need to establish an efficient carbon market, enabling the trading of carbon credits across different industrial sectors, and the provision of economic incentives to industries based on verified reductions in the environmental impact of their activities.

2.8 Waste

The waste sector has its GHG emissions primarily originating from the disposal of waste in landfills and garbage dumps, as well as from the treatment and discharge of domestic wastewater. Accordingly, mitigation measures for the sector include, on one hand, reducing the amount of waste sent for final disposal by promoting recycling, energy recovery and the installation of biodigesters, and, on the other hand, developing low-emission treatment systems for wastewater and sewage sludge, including the treatment and use of biogas.

The challenges identified by participants in this sector include the organised inclusion of waste pickers, with increased investment in the development of cooperatives and better remuneration for those involved, the promotion of women's leadership within these organisations, the extension of waste management services to populations in remote areas, commitment to cultural change aimed at zero waste, and the recognition of the fundamental role of biogas and biomethane in the transition. The main burdens perceived are related to the costs associated with the actions required to transform the waste management scenario, which involves the development of various industries, sectors, and affected communities.

With regard to the transformations proposed for the future, emphasis was placed on joint efforts with state governments to close open dumps, the expansion of selective waste collection to all

municipalities, aiming to further develop the recycling, composting, biogas, and biomethane industries, the mandatory implementation of Payment for Environmental Services for municipalities and packaging-producing business sectors, with a view to ensuring better remuneration for cooperatives, the promotion of the biogas and biomethane value chain from organic waste, development of the reverse logistics industry, diversified financing and support options and investment in education and culture to foster zero waste initiatives.

4. Recommendations

Achieving a just transition in Brazil demands a comprehensive and integrated approach that addresses longstanding structural inequalities, promotes environmental integrity, and ensures that the social dimensions of climate action are fully incorporated into policy and planning. It is essential to align climate and development strategies so that the benefits of the transition are equitably distributed, and the burdens are not disproportionately held by vulnerable populations/groups/biomes/etc.

Participants emphasized the need to prioritise territorial rights, equitable access to resources, and recognition of diverse ways of life and knowledge systems. Guaranteeing access to land, water, and basic infrastructure, as well as supporting sustainable production models, are central to building more resilient territories. Strengthening public services through technical assistance, environmental monitoring, and inclusive governance mechanisms were seen as crucial to ensure that local communities can meaningfully participate in and benefit from the transition process.

The transition should also contribute to transforming economic structures, generating decent work, reducing regional disparities, and encouraging productive diversification. This involves integrating social and environmental goals into sectoral policies, advancing inclusive innovation, and ensuring that fiscal and financial instruments support sustainability and justice. In terms of restorative justice, gender equality, youth inclusion, and the protection of historically marginalised groups must be embedded as cross-cutting priorities in all sectors.

Overall, the process must be guided by principles of redistribution, recognition, restauration and participation. This requires long-term commitment, intersectoral coordination, and the establishment of institutional frameworks that promote accountability and transparency. In other words, a just transition would not only be concerned in reducing emissions, but also, reshaping development trajectories to ensure that no one is left behind.

5. Final remarks

As previously mentioned, the 1st Just Transition Workshop of the Climate Plan aimed to engage stakeholders from various sectors and discuss challenges, objectives, and the necessary transformations for a just transition to a low-carbon economy in Brazil. This workshop is part of a broader series of

events organized by CBC on the topic of just transition in the ICAT project, including the "*Dialogues for a Just Transition in Brazil"* workshop, held in September 2023, and the ICAT project kick-off seminar, held in August 2024.

A key aspect to highlight across all these events is the federal government's involvement in the Just Transition agenda, which is evident from the participation of various ministries. In 2023, the Ministries of Environment and Climate Change (MMA), Mines and Energy (MME), and Foreign Affairs were involved. In 2024, additional ministries joined, including those focused on Racial Equality and Social Development. The latest workshop saw even broader ministerial participation, reinforcing the government's commitment to this agenda. This emphasis is also reflected in the speeches of Secretary Ana Toni and Director Aloísio Melo from MMA.

Another important takeaway is the growing interest of stakeholders from diverse sectors in this topic, with active participation during the workshop activities. Additionally, there is a clear increase in understanding of just transition issues, even in sectors where this topic has not been extensively explored, such as energy.

This trend is evident in the contributions shared by participants during the sectoral discussions. Participants highlighted challenges and necessary changes that relate to historical issues, potential problems arising from mitigation measures, and stakeholder participation and engagement processes. These inputs align with different types of justice frameworks identified in the academic literature. Furthermore, sectors beyond energy – where discussions on just transition may still be in their early stages – received significant contributions during the workshop.

Therefore, the workshop successfully provided a space for meaningful discussions among representatives with diverse perspectives, generated valuable contributions, and helped further spread awareness of the just transition concept within society. The insights gathered will be incorporated into the documents submitted to MMA, contributing to the Just Transition's cross-cutting strategy within the Climate Plan.

Appendix

Appendix 1 - List of participants

Sector	Group	Organization	Job title
Intersectoral	MMA nomination	General Secretariat of the Presidency	General Coordinator (Substitute)
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Senior Technical Coordinator
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Project Manager
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Climate Advisor
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Nature-based Solutions Advisor
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Sector Consultant for Plano Clima - Cities
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Sector Consultant for Plano Clima - MRV Cities
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Sector Consultant for Plano Clima - Energy
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Sector Consultant for Plano Clima - LULUCF
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Sector Consultant for Plano Clima - MRV LULUCF
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Sector Consultant for Plano Clima - M&E
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Sector Consultant for Plano Clima - Means of Implementation
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Sector Consultant for Plano Clima - Transport
Intersectoral	MMA nomination	United Nations Environment Programme (UNEP)	Sector Consultant for Plano Clima - Waste
Intersectoral	MMA nomination	Coalition Brazil Climate, Forests and Agriculture (CEBDS)	Executive Manager
Intersectoral	MMA nomination	Coalition Brazil Climate, Forests and Agriculture (CEBDS)	Advocacy Coordinator
Intersectoral	MMA nomination	Talanoa Institute	Senior Climate Policy Specialist
Intersectoral	MMA nomination	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ Brasil)	Technical Advisor
Intersectoral	MMA nomination	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ Brasil)	Technical Advisor
Intersectoral	MMA nomination	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ Brasil)	Technical Advisor
Intersectoral	MMA nomination	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ Brasil)	Coordinator
Intersectoral	MMA nomination	World Resources Institute Brasil (WRI Brasil)	Socioeconomics and Climate Finance Manager
Intersectoral	MMA nomination	Brazilian Research Network on Global Climate Change (Rede Clima)	Technical Working Group for Plano Clima
Intersectoral	MMA nomination	Brazilian Research Network on Global Climate Change (Rede Clima)	Technical Working Group for Plano Clima
Intersectoral	MMA nomination	Ministry of Cities	General Coordinator of Urban Mobility Regulation
Intersectoral	MMA nomination	Ministry of Cities	Climate Action Coordinator
Intersectoral	MMA nomination	Ministry of Indigenous Peoples	General Coordinator for Environmental and Climate Justice Promotion
Intersectoral	MMA nomination	National Secretariat for Climate Change - Ministry of Environment and Climate Change (MMA)	National Secretary for Climate Change

Intersectoral	MMA nomination	National Secretariat for Climate Change - Ministry of Environment and Climate Change (MMA)	Director of Mitigation Policies and Implementation Instruments
Intersectoral	MMA nomination	National Secretariat for Climate Change - Ministry of Environment and Climate Change (MMA)	General Coordinator for Mitigation and Protection of the Ozone Layer
Intersectoral	MMA nomination	Ministry of Environment and Climate Change (MMA)	Environmental Analyst
Intersectoral	MMA nomination	Ministry of Environment and Climate Change (MMA)	Environmental Analyst
Intersectoral	MMA nomination	Ministry of Environment and Climate Change (MMA)	Environmental Analyst
Intersectoral	MMA nomination	Ministry of Environment and Climate Change (MMA)	Environmental Analyst
Intersectoral	MMA nomination	Ministry of Environment and Climate Change (MMA)	Foreign Trade Analyst
Intersectoral	MMA nomination	Ministry of Environment and Climate Change (MMA)	Support
Intersectoral	MMA nomination	Institute for Climate and Society (iCS)	Climate Policy Specialist
Intersectoral	MMA nomination	Institute for Climate and Society (iCS)	Consultant
Intersectoral	MMA nomination	Federal University of Rio de Janeiro (UFRJ)	Assistant Professor
Energy	Civil Society	Brazilian Network of Women in Solar Energy (MESol)	Professor and Researcher
Energy	Civil Society	E+ Institute	Director
Energy	Civil Society	Frente por uma Nova Política Energética para o Brasil	Executive Coordinator
Energy	Civil Society	Institute for Climate and Society (iCS)	Fuels Specialist
Energy	Civil Society	Federação Única dos Petroleiros (FUP)	Director
Energy	Civil Society	Nordeste Potência and ClimaInfo	Project Coordinator
Energy	Civil Society	Energy and Communities Network (REC) and International Energy Initiative (IEI Brasil) International Energy Initiative (IEI Brasil)	Co-coordinator (REC) and Executive Director (IEI Brasil)
Energy	Civil Society	Brazilian Institute of Consumer Protection (IDEC)	Energy Specialist
Energy	Traditional Communities	National Council of Extractivist Populations (CNS)	General Secretary
Energy	Traditional Communities	Associação dos Remanescente de Quilombo Serra dos Rafaeis	Community Leadership
Energy	Private Sector	Brazilian Biogas and Biomethane Association (Abiogás)	Executive President
Energy	Private Sector	Electric Sector Environment Forum (FMASE)	Coordinator
Energy	Private Sector	Brazilian Association of Wind Energy and New Technologies (ABEEólica)	Executive President
Energy	Private Sector	Acende Brasil Institute	Sustainability Director
Energy	Academia	Study Group on the Electric Energy Sector (GESEL) - Institute of Economics, Federal University of Rio de Janeiro	Researcher
Energy	Academia	Bioenergy Research Group (GBbio) - Institute of Energy and Environment, University of São Paulo	Researcher
Energy	Traditional Communities	Coordenação Nacional de Articulação das Comunidades Negras Rurais Quilombolas (CONAQ)	Political Organizer
Energy	Public Sector	Brazilian Forum for Climate Change (FBMC)	Executive Director
Energy	Public Sector	Energy Research Office (EPE)	Energy research analyst
Energy	Public Sector	Ministry of Mines and Energy (MME)	Coordinator
Industry	Academia	Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering, Federal University of Rio de Janeiro (COPPE/UFRJ)	Researcher
Industry	Academia	Rio de Janeiro State University	Professor
Industry	Civil Society	Inter-Union Department of Statistics and Socio-Economic Studies (DIEESE)	Coordinator of Studies and Research on Labour and Environment
Industry	Civil Society	Inter-Union Department of Statistics and Socio-Economic Studies (DIEESE)	Technician and Researcher

Industry	Civil Society	Climate Observatory (OC)	Public Policy Advisor
Industry	Civil Society	Brazil Fund	Project Advisor
Industry	Private Sector	Brazilian Association of Green Hydrogen Industry (ABIHV)	Regulatory Analyst
Industry	Private Sector	Brazilian Association of Glass Industries (ABIVIDRO)	Executive President
Industry	Private Sector	Brazilian Association of Glass Industries (ABIVIDRO)	Sustainability Manager
Industry	Private Sector	Brazil Steel Institute	Sustainability Coordinator
Industry	Private Sector	E+ Energy Transition Institute	Energy Specialist
Industry	Private Sector	National Industry Confederation (CNI)	Policy and Industry Analyst
Industry	Private Sector	Aurora Lab	Director of Networks and Partnerships
Industry	Private Sector	Brazilian Aluminum Association (ABAL)	Government Relations Manager
Industry	Private Sector	Brazilian Aluminum Association (ABAL)	Project Analyst
Industry	Public Sector	Energy Research Office (EPE)	Analyst
Industry	Private Sector	Ministry of Development, Industry, Trade and Services (MDIC)	Analyst
Waste	International Cooperation	International Alliance of Waste Pickers (IAWP)	President
Waste	International Cooperation	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ Brasil)	Project Manager
Waste	Private Sector	Brazilian Waste Energy Association (ABREN)	President
Waste	Private Sector	National Association and Union of Private Concessionaires of Public Water and Sewage Services (ABCON-SINDCON)	Technical Coordinator
Waste	Public Sector	Deputado Estadual de Santa Catarina	State Representative
Waste	Public Sector	Legislative Assembly of Santa Catarina	Parliamentary Secretary
Waste	Public Sector	Public Ministry of Labour (MPT)	Deputy Attorney General for Labor
Waste	Public Sector	National Confederation of Municipalities (CNM)	Sanitation Consultant
Waste	Civil Society	Sustainable Paths Institute	Analyst
Waste	Civil Society	Recicleiros Institute	Business and Partnership Coordinator
Waste	Civil Society	Women in Informal Employment Globalizing & Organizing (WIEGO)	Researcher
Waste	Civil Society	National Association of Waste Pickers (ANCAT)	Reverse Logistics Director
Waste	Public Sector	Brazilian Forum for Climate Change (FBMC)	Assistant Manager
Waste	Finance Sector	Banco do Brasil Foundation	Advisor
Waste	Academia	Ibmec	Professor
Waste	Academia	Interdisciplinary Group for Socioenvironmental and Community Research and Studies, Pontifical Catholic University of Rio de Janeiro (PUC-Rio)	Professor
LULUCF	Civil Society	World Resources Institute Brasil (WRI Brasil)	Director of Forests and Land Use
LULUCF	Civil Society	Sustainable Connections Institute (Conexsus)	Coordinator of Community Business and Regional Ecosystems
LULUCF	Civil Society	International Institute for Sustainability (IIS)	Research Assistant
LULUCF	Academia	National Institute for Space Research (INPE)	Coordinator
LULUCF	Academia	Brazilian Agricultural Research Corporation (Embrapa)	Researcher
LULUCF	Academia	Center for Sustainable Development, University of Brasília (CDS/UNB)	Researcher
LULUCF	Financial Sector	Brazilian Development Bank (BNDES)	Manager
LULUCF	Private Sector	Mangará Innovation and Sustainability	Executive Director

LULUCF	Public Sector	Ministry of Agrarian Development and Family Agriculture	Information Management Coordinator
LULUCF	Public Sector	Ministry of Agrarian Development and Family Agriculture	General Coordinator
LULUCF	Public Sector	Brazilian Forum for Climate Change (FBMC)	Climate Change Leader
LULUCF	Public Sector	Ministry of Environment and Climate Change (MMA)	Environmental Analyst
LULUCF	Public Sector	Ministry of Environment and Climate Change (MMA)	Environmental Analyst
Agriculture and Livestock	Academia	Reference Center on Food and Nutrition Sovereingty and Security, Federal Rural University of Rio de Janeiro (CERESAN/UFRRJ)	Retired Professor
Agriculture and Livestock	Civil Society	Institute of Forestry and Agricultural. Management and Certification (Imaflora)	Climate Science Intern
Agriculture and Livestock	Civil Society	Mercy For Animals	Director of Government Relations and Public Policies
Agriculture and Livestock	Civil Society	Alianima	President and Technical Director
Agriculture and Livestock	Civil Society	Brazilian Forum for Climate Change (FBMC)	Researcher
Agriculture and Livestock	Traditional Communities	Brazilian Association of Agroecology (ABA)	Researcher
Agriculture and Livestock	Traditional Communities	National Union of Family Farming and Solidarity Economy Cooperatives (UNICAFES BRASIL)	Climate Advisor
Agriculture and Livestock	Traditional Communities	Peasant Women's Movement (MMC)	National Coordinator
Agriculture and Livestock	Traditional Communities	Coordenação Nacional de Articulação das Comunidades Negras Rurais Quilombolas (CONAQ)	National Coordinator
Agriculture and Livestock	Traditional Communities	Coordenação Nacional de Articulação das Comunidades Negras Rurais Quilombolas (CONAQ Amazonas)	Executive Coordinator
Agriculture and Livestock	Public Sector	Brazilian Institute of Environment and Renewable Natural Resources (IBAMA)	Environmental Analyst
Agriculture and Livestock	Public Sector	Ministry of Agriculture, Livestock and Food Supply (MAPA)	General Coordinator for Climate Change and Sustainable Development
Agriculture and Livestock	Public Sector	Ministry of Agriculture, Livestock and Food Supply (MAPA)	Coordinator for Cooperation in Sustainable Development
Agriculture and Livestock	Public Sector	Ministry of Fisheries and Aquaculture (MPA)	Head of Division for Good Aquaculture Practices
Agriculture and Livestock	Public Sector	Ministry of Fisheries and Aquaculture (MPA)	General Coordinator
Agriculture and Livestock	Public Sector	Ministry of Fisheries and Aquaculture (MPA)	Technical Analyst in Aquaculture Engineering

Appendix 2 – Responses from word cloud on injustices, losses, and burdens caused by climate change

Words with more than one occurrence	Words that appeared once
Hunger (12)	Bankruptcy
Food insecurity (7)	Biodiversity
Vulnerability (6)	Colonial loss
Death (6)	Deprivation
Disasters (5)	Depreciation
Environmental racism (5)	Difficult
Exclusion (5)	Drought

Unemployment (5) Illnesses (4) Loss (3) Poverty (3) Shortage (3) Disease (2) Fatalities (2) Insecurity (2) Migration (2)	Economic decline Energy poverty Environmental disasters Environmental inequalities Environmental injustice Essential services Exclusivity Extreme poverty Extreme weather event Floods Food security Funding Growing inequality Health problems Homelessness Inequality Job loss Lack of housing Loss of homes Loss of livelihood Loss of territories Marginalization Misery Population displacement Precarious employment Precariousness Prejudice Racism Racial injustice Relocation Relocations Suffering Thirst Underdevelopment Unequal damages Uncertainty

Appendix 3 – Responses from word cloud on benefits and opportunities associated with climate change mitigation

Words with more than one occurrence	Words that appeared once
Quality of life (8) Innovation (6) Green jobs (5) Justice (4) Inclusion (4) Land reform (4) Sustainability (4) Financing (3) Health (3) Better jobs (2) Biodiversity (2) Development (2) Food security (2) Future (2) Public health (2) Reconstruction (2) Reparation (2) Security (2) Social justice (2)	Access to markets Access to work Agroecology Animal welfare Antispeciesism Autonomy of groups Biodiversity conservation Citizen participation Clean processes Climate justice Collective rights Community collaboration Decentralized generation Democratization of energy Displacement Distribution of income Economic growth Economy Education

	Education for sustainability Efficient energy Efficiency Employment Energy transition Environmental conservation Environmental education Environmental justice Environmental sovereignty Equality Ethical responsibility Fair financing Fair occupation of spaces Fairness Future opportunities Green employment opportunities Group representation Historical reparation Income generation Indemnity Infrastructure planning Investment (private and social) Just transition Larger scale restoration Market access Multilateralism New technologies New ways of living Opportunity Participation in decision-making Peace Planning Political effectiveness Powershoring Productivity Prosperity for all Public policy Public services improvement Public services Renewable energy Responsibility Rights of nature Sanitation improvements Selective waste collection Social inclusion Sovereignty over food Sustainable consumption Technological development Union of peoples Universal health Urban dispersal Value of life Well-being Women's empowerment