Initiative for Climate Action Transparency - ICAT -

Debates and results of the seminar held with pilot-states to present the outcomes of the project

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Contents

1. Introduction

Centro Brasil no Clima (CBC) and Centro Clima (COPPE/UFRJ) organized on the 17th September 2021 the final seminar of the ICAT Brazil Project 2nd phase - Deploying Brazilian NDC implementation efforts at the state level. The objective of the seminar was to present the consolidated results of the project at state level and discuss pathways for the states to implement and monitor mitigation actions in their territories. The event was held online (via Zoom platform) and had interpretation to English.

The event was divided into four parts. The first part had the opening speeches from Guilherme Syrkis (executive director of CBC), Emilio La Rovere (coordinator of Centro Clima), Denis Desgain (UNEP DTU Partnership), and Henning Wuester (director of ICAT). Next, there was a section dedicated to the speeches of state representatives, which had the interventions of Eduardo Taveira (State Secretary of the Environment of Amazonas), Renato Brandão (President of the State Foundation for the Environment of Minas Gerais), and Telmo Borges (Superintendent of Climate Change at the State Secretariat for the Environment and Sustainability of Rio de Janeiro).

The third part of the seminar was focused on presentation of the results of the project, and was conducted by Carolina Dubeux, Bruna Guimarães and Erika Carvalho (reserachers at Centro Clima), and Guilherme Lima (coordinator of the project at CBC). Next to the presentation of the results, there was a section for discussion, which had the participation of Renata Grisoli, technical analyst of the National Inventory of GHG emission at the Ministry of Science, Technology and Innovation (MCTI). At the end of the seminar there was a section to answer questions from the participants and final considerations.

2. Opening

The seminar started at 9am with a speech by the executive director of Centro Brasil no Clima, Guilherme Syrkis. He thanked all the participants presented in the event and the team of CBC for the work developed so far, which enabled the conclusion of the project. Guilherme mentioned that on that very day, the 17th of September 2021, it has completed one year since the election of the new CBC council, and that the progress the institution has made the last 12 months is noticeable. When the ICAT Brazil Project started CBC had four projects in progress, and today this number increased to eleven projects. He also highlighted that in this process CBC was structured in four core areas: advocacy; capacity building and engagement; international affairs; and one area of technical studies, coordinated by William Wills and Guilherme Lima, which encompasses the ICAT Project.

Figure 1: Guilherme Syrkis, Centro Brasil no Clima.

Next, the floor was passed to Professor Emilio La Rovere, coordinator of Centro Clima. He started presenting his compliments to the participants, congratulating the technical team for the work developed and thanking for the partnership and support from CBC and ICAT. Emilio mentioned that in 2018 the ICAT Brazil Project started its first phase, when scenarios were developed for Brazil as a whole and the development of MRV indicators. The Professor highlighted that we are now on the eve of COP 26 and that it is expected that we will have mechanisms from the Paris Agreement operationalized, in particular Article 6, which will enable further climate projects.

He continued saying that for those projects to take place developing countries must be capable to do so, with a portfolio of projects and capacity to quantify avoided emissions. He also highlighted the importance of working with the subnational level, embedding the climate agenda in state secretariats.

Emilio concluded saying that it was pleasant to work with the states of Amazonas, Minas Gerais and Rio de Janeiro, and that the ICAT Brazil Project contributes to the efforts to provide technical subsides to state secretariats and help them to take advantage of existing opportunities with climate actions.

Figure 2: Emilio La Rovere, Centro Clima.

Next, Denis Desgain, from UNEP DTU Partnership made his speech thanking, on behalf of UDP, to CBC and Centro Clima for the opportunity to participate in the Seminar and for the partnership among the institutions. He mentioned that Brazil is member of ICAT since four years through CBC and that the first phases, concluded in 2019, focused on the development of ambitious scenarios for monitoring GHG emissions in different sectors. For him, a logical continuation of that first phase was to focus on the implementation of mitigation efforts at subnational level. He thanked the three states for the commitment with the project and expressed his expectative that the results can inspire other states and even other countries to replicate this work.

Figure 3: Denis Desgain, UNEP DTU Partnership.

Closing the opening section, there was a presentation by Henning Wuester, Director of ICAT. He complimented CBC for the new leadership mentioned by Guilherme Syrkis and highlighted that the project would not have been possible without the involvement of Alfredo Syrkis, who was a very important personality in the climate agenda and stated that the best way to honor him is by continuing the project he started. He mentioned that it was very special to work with Emilio La Rovere and congratulated Guilherme Lima for the coordination of the project.

Henning made a presentation with the objective of providing a brief introduction about ICAT. He said that the initiative is present in 40 countries, such as Brazil, China, and other countries in Africa, Asia and Latin America. He spoke about the need of climate transparency for national NDCs and stated that countries need to implement public policies to achieve the target of liming global warming to 1.5ºC or 2ºC.

Henning stressed that the objective of ICAT is to put into practice the Paris Agreement and the NDC's of each country signatory to the agreement. He pointed that the initiative works by providing support, especially to developing countries, in order to enable the implementation of effective action actions climate, report data with transparency and provide tools to integrate sub-national levels in mitigation actions. Henning concluded by emphasizing the importance of sharing experiences, as it is the best way to encourage other countries to implement targets to reduce GHG emissions in their territories.

Figure 4: Henning Wuester, ICAT.

3. Partner states

After the opening section, the representatives of the three pilot states were invited to provide their perceptions about the development of the project and how the results could contribute to the development of public policies and implementation of mitigation actions in the states. The speeches were made by:

- Eduardo Taveira – State Secretary of the Environment of Amazonas
- Renato Brandão – President of the State Foundation for the Environment of Minas Gerais
- Telmo Borges – Superintendent of Climate Change at the State Secretariat for the Environment and Sustainability of Rio de Janeiro

Eduardo Taveira (Amazonas)

The secretary was not able to join the event due to his agenda, but he recorded a video and was represented by a person from the secretariat. He thanked the participation in the event, especially CBC for mediating the integration with state governments in efforts to reduce GHG emissions. He

commented that the support of CBC, through the ICAT Project, has been crucial for the construction of trajectories of GHG emissions reduction in the state of Amazonas. Eduardo also pointed out that we are facing difficult times with the intensification of environmental pressures, due to the increase in deforestation and fires, which makes it necessary to institute increasingly adequate public policies to reduce emissions.

Then, he highlighted that the partnership with the CBC enabled the development of a study on the profile of emissions in the state, with the simulation of scenarios and mitigation measures for these emissions until 2030. The secretary stated that through this partnership it was possible to develop a system of MRV indicators with a participatory process, engaging multiple sectors, in addition to holding several workshops to present and discuss the preliminary results obtained in the study.

He mentioned that the project also contributed to the strengthening of the State Forum on Climate Change of Amazonas, which is an important space for discussion and social control of the commitments assumed by the state government. This allowed the creation of a working group to discuss issues related to bioeconomy, basic sanitation and new opportunities for the state's green economy. The secretary stressed that Amazonas has a state climate change law that needs to be effectively implemented, and that the ICAT Project helped in this process of implementing the law. Finally, he spoke about the importance of the partnership with the CBC, which was fundamental for the development of increasingly active state public policies, in order to minimize the climate change scenario we are facing.

Figure 5: Eduardo Taveira, State Secretary of the Environment of Amazonas.

Renato Brandão (Minas Gerais)

Renato thanked CBC and the FEAM team for the partnership in the development of the project. The president of FEAM commented that the state of Minas Gerais has been working hard on climate change issues since 2005, and is currently working on the implementation of its 2015 Energy and Climate Change Plan. He pointed out that the ICAT Project has added to the state through the establishment of MRV indicators, since Minas Gerais has recently taken on the Race to Zero commitment.

Renato said that the project will help update the climate change and adaptation plan, being a guide through the MRV indicators and scenarios of emission trajectories for 2030. He believes that the project has brought significant results to the state, in the sense of meeting the challenges posed to Brazil and the states, seeking to reduce the actions of climate change in the country and in the world.

He pointed out that the project has already contributed in all spheres to the state, aiming at reducing GHG emissions and helping to adapt to climate change.

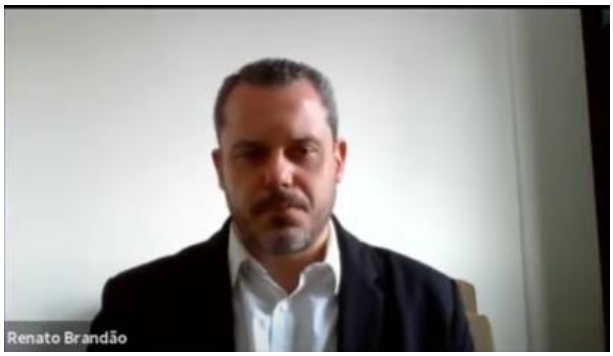

Figure 6: Renato Brandão, FEAM – Minas Gerais.

Telmo Borges (Rio de Janeiro)

Telmo thanked CBC and Centro Clima for the partnership and for the support of the ICAT Initiative. He stressed that the state of Rio de Janeiro has been at the forefront of climate change policies in Brazil and, at the time, the governor of Rio de Janeiro instituted an inter-secretariat working group, integrating the climate change agenda to the development sphere of the state, through the discussion of targets for reducing GHG losses in Rio de Janeiro. He pointed out that the ICAT Project will be a baseline for decision recalls and that the state is developing the Fourth Emissions Inventory, which allow them to understand what types of special attention are needed, in order to carry out an action to reduce the emissions of GHG.

Telmo said that the work groups created have already allowed for dialogue with the port, metallurgical and cement sectors, putting into practice the ongoing work of public policy. He highlighted several advances that the state has had, such as the development of the Second Cycle of the Forest Inventory, which shows the potential for absorption of 101 million tons of carbon by the forests of the state of Rio de Janeiro. In addition, they will develop a study to analyze the potential for generating bioenergy through forestry, if there be an advance of 100,000 hectares of forest by 2030 in Rio de Janeiro.

Figure 7: Telmo Borges, State Secretariat for the Environment of Rio de Janeiro.

4. Presentation of results

After the speeches from the state representatives, there was a section dedicated to present the results of the project. This section had the participation of the researchers of Centro Clima (Carolina

Dubeux, Bruna Guimarães and Erika Carvalho) and the coordinator of the project at CBC Guilherme Lima.

Carolina Dubeux (Researcher at Centro Clima)

Carolina presented the context of the ICAT Project, detailing the applied calculation methodology. She explained that the study of the ICAT Brazil Project phase 2 was based on previous studies, mainly on the first phase, which was a project that established and applied the methodology for calculating the effect of mitigation measures to allow the monitoring of the progress of the Brazilian NDC, in addition to building more ambitious scenarios for national NDC. She said that in the first phase the objective was to establish and apply a methodology for assessing the impact of mitigation policies and measures, providing indicators of progress. These indicators were adapted to the three states analyzed: Amazonas, Minas Gerais and Rio de Janeiro. She recalled the three scenarios developed in the first phase:

- Scenario A: included current emission trends and the quantified and measured targets defined by the Brazilian NDC.
- Scenario B: included several mitigation actions proposed by the Brazilian Forum on Climate Change, with an emphasis on the AFOLU sector.
- Scenario C: included another set of actions, this time no longer focused on AFOLU, but with emphasis on other sectors. This scenario was used to build the states' mitigation scenarios.

Carolina presented the net GHG emissions in Brazil between 2005 and 2015, and the goals for 2025 and 2030. She pointed out that in 2015 Brazil presented an NDC still in the intention phase, which had 2005 as the base year, and used the values of the Second Inventory of GHG Emissions in Brazil. The ambition of the Brazilian NDC would allow the country to reach 2030 with 1.2 Gt of CO_2e. Carolina commented that the country already has the Fourth National Communication, which again revised the 2005 emission values, changing the ambition for 2030. In the ICAT 2 Project, the calculations used the new First Brazilian NDC, whose base year value is 2 ,8 Gt of CO_2e.

According to here, the objective of the phase 2 was to develop strategies for Brazilian states to help the country achieve NDC targets, structure indicators to monitor emissions trajectories, estimate and assess the potential of states in NDC's contribution, and involve everyone stakeholders, from the preparation of a pilot project for the three analyzed states. She explained that the second phase started with the reference scenario of the ICAT 1 Project, which was updated based on the new project being implemented in Brazil, the DDPBICS. This project is developed with a research institute based in France and a study was drawn up in it that establishes values for a reference scenario until 2050, as well as a mitigation scenario that would reach zero net emissions in 2050.

Carolina explained that DDPBICS was used only in the reference scenario, as Brazil went through serious economic crises due to the COVID-19 pandemic in 2020. The project team had the opportunity to update the reference scenario for the new ambition of the Brazilian GDP in the DDPBICS, which considers this period of economic crisis. She pointed out that an update of ICAT's Scenario A was made using the DDPBICS values and the mitigation measures that were embodied in Scenario C to trace the trajectories to the states.

Carolina spoke about the second phase being based on the reference DDPBICS scenario until 2030 and used the mitigation ambitions of ICAT 1 Scenario C. Carolina recalled that there were several

events during the project preparation, such as the event with the Technical Chamber of Energy and Cliamte Change of Minas Gerais and the first and second engagement workshops.

Carolina highlighted the use of the methodology based on historical data from the states' GHG emission inventories. In the case of Minas Gerais and Rio de Janeiro, inventories prepared by the states themselves were used. As for Amazonas, the database provided by SEEG was used, which is a non-profit organization that prepares national and state data on GHG emission.

Carolina explained that the baseline scenario was built from a projection based on data from the last year in which inventories were available. In the case of Rio de Janeiro, the last year of available data was 2015; for Minas Gerais, 2014; and for Amazonas, SEEG provided data until 2018. Then, the growth rate of the DDPBICS project was applied to each state historical data, from the last year of available data to 2030.

Carolina said that the reference scenario up to 2025 and 2030 was calculated using the historical inventory data and the percentage of variation by sector of the reference scenario. The mitigation scenario adopts measures according to the assumptions of ICAT 1, applying percentages of emission variation from Scenario C of the first phase. The mitigation scenario was calculated applying the percentage of emission variation by sector to the emission level of the reference scenario. Thus, it was possible to build a reference and mitigation scenario for the states until 2030, and from these scenarios the indicators that were presented below were inferred.

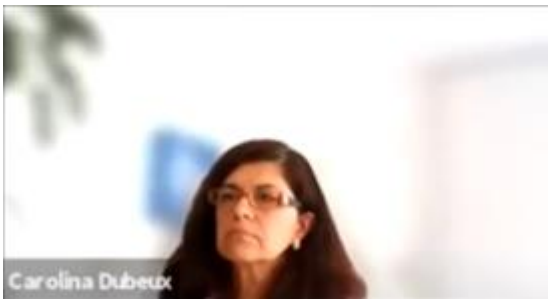

Figure 8: Carolina Dubeux, Centro Clima.

Erika Carvalho (Researcher at Centro Clima)

Erika continued the presentation of the results and explained that the tables present the variation between 2005-2025 and 2005-2030, since the Brazilian NDC has committed to reduce 37% GHG emissions in 2025 and 43% in 2030, both compared to 2005 level. She commented that the NDC targets apply to all sectors of the economy and that there is no specific target for the sub-national level, so individual states are not required to meet any GHG reduction targets.

State of Amazonas

Erika began presenting the results for the state of Amazonas, explaining that historical data from SEEG are available until 2018 and projections were made from that year onwards. She showed that the AFOLU sector, which represents agriculture, forestry and other land uses, is responsible for most removals in the state. Emissions and removals from the variation in the amount of carbon from biomass in vegetation areas are accounted for in the AFOLU sector.

Erika highlighted that the data for this sector represent net emissions, that is, the difference between emissions and removals, and that the final value is negative, since removals are greater in the state. Erika presented that in the period between 2005 and 2030 a 31% increase is expected in the

reference scenario due to the reduction in removals, which were 22 $MtCO_2e$ in 2005 and would reach only 15 $MtCO_2e$ in 2030. On the other hand, she showed an increase in removals in the mitigation scenario, which went down to 75 $MtCO_2e$ in 2030. Erika pointed out that the AFOLU sector has the greatest impact on reducing emissions due to mitigation measures, followed by the transport and energy consumption sectors.

Erika mentioned that, from 2005 to 2030, the AFOLU and industry would be the only sectors to reduce emissions, in the case of AFOLU due to the increase in removals. In the reference scenario, the total net emissions were negative and in the mitigation scenario, due to all the additional policies to promote the reduction of emissions in the state, it was possible to obtain a removal value four times greater than in the reference scenario.

Erika concluded by mentioning the increase in emissions in the reference scenario, despite the 233% reduction in emissions in the mitigation scenario. Regarding the mitigation scenario, the AFOLU sector had the greatest impact of the measures, with 58 $MtCO_2e$ more removed in the mitigation scenario, followed by transport and energy supply. Finally, in the mitigation scenario, between 2005 and 2030, there was a percentage increase in emissions mainly due to other sectors of energy consumption, transport and energy supply. Only the industry and AFOLU sectors showed emission reductions.

State of Minas Gerais

Erika explained that historical data for Minas Gerais was available until 2014 and projections were made from that year onwards. She showed that the state's total emissions increase in both the baseline and the mitigation scenarios, between 2005 and 2030.

Erika pointed to the AFOLU sector as the most responsible for emissions in the period, followed by the industry and transport sectors. Between 2005 and 2030, all sectors showed an increase in emissions, except for the energy supply sector. In 2030, it was possible to achieve a 12% reduction in emissions in the mitigation scenario compared to the reference scenario.

Erika said that the transport sector had the greatest impact on reducing emissions in the mitigation scenario, followed by the AFOLU sector and industry. In the mitigation scenario, the waste sector had an increase in emissions of 142% between 2005 and 2030, due to the expansion of coverage of basic sanitation services, and was followed by a 17% increase in the transport sector, 13% in the AFOLU sector and 10% in the industry sector.

State of Rio de Janeiro

Erika explained that there was historical data available for Rio de Janeiro until 2015 and that projections were made from that year onwards. She commented that the state's emissions increased by 56% in the reference scenario and 33% in the mitigation scenario, between 2005 and 2030. She highlighted that, unlike other states, the energy supply sector is responsible for most of the state emissions, which comprises oil and gas exploration, fuel production and electricity generation.

Erika explained that the greatest variation in emissions between 2005 and 2030 occurred in the energy supply sector, followed by the other sectors of energy consumption and industry. The AFOLU sector was the only one that reduced its emissions in both scenarios during this period. Furthermore, the impact of mitigation measures totaled a 15% difference in emission reductions from the mitigation scenario compared to the reference scenario.

Erika added that the industry sector had the greatest emission reduction impact in the mitigation scenario, followed by the transport and energy supply sector. For the waste sector, although the mitigation measures have shown a considerable reduction in emissions, due to the increased coverage of the service, there was an increase in emissions in the mitigation scenario. She concluded by emphasizing that more efforts will be needed to direct the state towards the fulfillment of the Paris Agreement goals, even considering the mitigation scenario between 2005 and 2030.

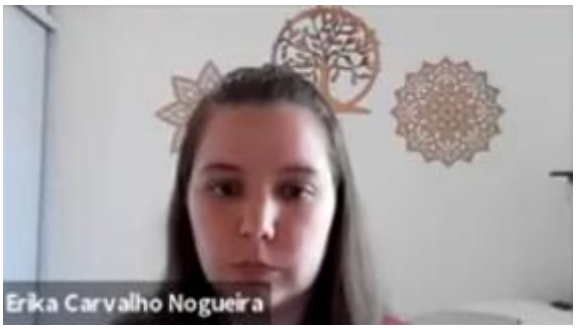

Figure 9: Erika Nogueira, Centro Clima.

Bruna Guimarães (Researcher at Centro Clima)

Bruna continued the presentation talking about the MRV indicators developed by the project team for the pilot states. She explained that MRV stands for monitoring, reporting and verification, and that these indicators involve procedures and guidelines that allow the monitoring of emissions through accounting, quantification and disclosure of information. The MRV indicators make it possible to identify the sectors that emit the most GHG and how these sectors behave in relation to their emission reduction targets. She pointed out that these indicators are a valuable tool for choosing the best alternatives, as well as helping to better understand the emission profile of states and in structuring public policies.

Bruna highlighted two main types of indicators: i) absolute emissions, which show the number of emissions associated with a sector or activity; and ii) emission intensity, which relate emissions to socioeconomic aspects, such as GDP, added value of the industry and the number of inhabitants, for example. She informed that indicators were created for all the analyzed sectors, and for each of them they created at least one absolute indicator, which shows the evolution of emissions and an intensity indicator.

Bruna presented the general indicators that were created and highlighted some important aspects. For the broad economy indicator, total emissions and GDP data were considered, which allowed to create a GDP carbon intensity indicator. The data of population allowed the development of a per capita emissions indicator. The waste indicator included solid waste emissions, considering per capita emissions, and the indicator for agriculture was related to GDP and the aggregated value of agriculture. Indicators from other energy consumption sectors, which include the public, residential and commercial sectors, related GHG emissions to GDP and energy emissions from agriculture. The AFOLU indicators were associated with the added value of agriculture, as were the LULUCF indicators. The energy supply, transport and industry sectors were related to GDP.

<u>MRV indicators for the state of Amazonas</u>

Bruna presented the table containing the indicators for the state, separated by main groups and showing the evolution over the years for the two scenarios considered. The state's total emissions

increased by 31% in the baseline scenario during the period analyzed, while they decreased by 233% in the mitigation scenario. Total emissions without LULUCF also increases, which shows that this sector has great potential for removal. She stated that the GDP carbon intensity indicator showed an increase in emissions of 62% in the baseline scenario, as opposed to the mitigation scenario, which reduced emissions by 85%.

Among the sectors that stood out in the state of Amazonas, she highlighted that the AFOLU sector is responsible for most of the emissions, despite being the sector with the greatest potential for absolute mitigation, as it reduced emissions from 98% to 45%, in against the baseline and the mitigation scenario in 2030, respectively. The transport sector also stands out, as it is the second sector with the highest percentage of emissions in the period, increasing emissions by 59% in the mitigation scenario. However, the transport sector is also the second sector with the greatest potential for mitigating absolute emissions, decreasing from 3.4 $MtCO_2e$ in the reference scenario to 2.5 $MtCO_2e$ in the mitigation scenario, considering the adoption of mitigation measures.

MRV indicators for the state of Minas Gerais

Bruna highlighted that the state's total emissions had an increase of 34% in the reference scenario and 18% in the mitigation scenario, between 2005 and 2030. Bruna showed that there was a reduction in the carbon intensity of the GDP of 33% and 41% in the baseline and mitigation scenarios, respectively. Among the sectors that stood out in the state, she commented on the transport sector, which ranks second in the ranking of sectors that most increase their emissions in percentage between 2005 and 2030. Despite this, the transport sector has the greatest potential for absolute mitigation, falling from 28 $MtCO_2e$ to 19 $MtCO_2e$ in 2030, with the adoption of mitigation measures.

She also highlighted the AFOLU sector, which is the largest responsible for emissions in the state, reaching 71.6 $MtCO_2e$ in 2030, being the third sector that most increases the percentage of emissions. However, the AFOLU sector has a high mitigation potential, as it reduces emissions from 77.7 $MtCO_2e$ in the reference scenario to 71.6 $MtCO_2e$ in the mitigation scenario, in 2030.

MRV indicators for the state of Rio de Janeiro

Bruna pointed out that the state's total emissions increased 56% in the reference scenario and 33% in the mitigation scenario, during the period analyzed. Per capita emissions increased by 34% in the reference scenario and 14% in the mitigation scenario. Bruna explained that the energy supply sector is responsible for the greatest number of emissions, unlike the other two states, in which the AFOLU sector was the main responsible for emissions.

The energy supply sector reached 38 $MtCO_2e$ in the 2030 mitigation scenario and showed an increase of 102% in the period. However, when comparing both scenarios, it is possible to observe the mitigation potential of this sector, as emissions fall from 41 $MtCO_2e$ to 38 $MtCO_2e$ in 2030. She highlighted the industry sector, which occupies the fourth position in the ranking of sectors that increased its emissions, with a 38% increase in the mitigation scenario, despite being the sector with the greatest potential for mitigating absolute emissions in the state.

Bruna concluded her speech by presenting the next steps, which include the definition of an action program to enable mitigation scenarios, which may be the adoption of policy instruments or the detailing of projects. It is important to have a careful monitoring of the MRV indicators, based on the collection of information and annual updating, aiming at measuring the progress made towards

the goals of the Brazilian NDC. She cited the need to extend the exercise to 2050 as an element to define a long-term strategy for achieving carbon neutrality, as well as exploring synergies with other initiatives that are also being launched at the subnational level.

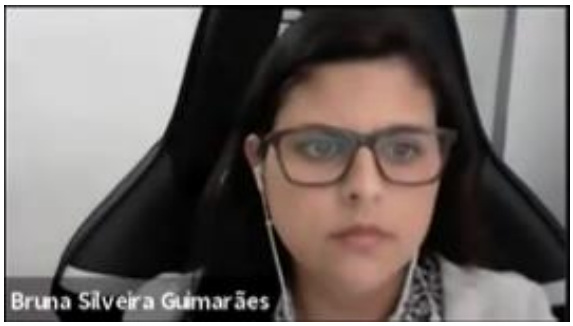

Figure 10: Bruna Guimarães, Centro Clima.

Guilherme Lima (Coordinator of the Project at CBC)

He complemented the presentation of the results emphasizing that the project was developed in a participatory way with the states, through the holding of eight workshops, aiming at the development of the study. He recalled that there was an initial workshop to launch the ICAT Project, from which the three pilot states were selected. Then, studies began by drawing up the emissions profile for the states, reference and mitigation scenarios and MRV indicators.

Guilherme highlighted the effort to maintain close contact with teams from the three states, through the State Secretariat for the Environment of Amazonas, the State Foundation for the Environment of Minas Gerais and the State Secretariat for the Environment and Sustainability of Rio de Janeiro. The project team participated in the meeting at the State Forum on Climate Change in Amazonas and in the meetings of the Technical Chamber for Energy and Climate Change in Minas Gerais, in addition to organizing several meetings in an attempt to articulate the initiative.

Guilherme commented on the training workshop prepared for the three states participating in the studies, which also included the presence of other states, so that everyone could acquire important knowledge about the climate agenda. Next, two rounds of workshops were organized: the first, in which the preliminary results of the reference scenario were presented, and the second, when the results of the mitigation scenario were presented and discussed. These workshops made it possible to discuss the results and receive suggestions to improve the studies, so that the project could be faithful to the reality of each of the pilot states.

He highlighted that the states will receive a summary report of the project in Portuguese, containing information referring to the three states. Thus, it will be possible to share it with the teams from the states that participated in the project and with other actors from the states who may be interested in using this information and contributing with suggestions. Guilherme concluded by thanking Centro Clima team for presenting the results.

Figure 11: Guilherme Lima, Centro Brasil no Clima.

5. Discussion of results

Following the presentation of the results, there was a section dedicated to discuss it with the participation of a representative of the Ministry of Science, Technology and Innovation (MCTI), Renata Grisoli, who is technical analyst of the national inventory of GHG emission.

Renata Grisoli (MCTI)

Renata thanked the invitation to participate in the seminar on behalf of the General Coordination of Climate, Science, and Sustainability of MCTI. She commented on the performance of this coordination of the ministry, responsible for drawing up the national emissions inventory, data collection, parameters and emission factors. She highlighted the participation of Rede Clima and its networks, which work directly in this initiative.

Renata spoke about the non-existence of a clear definition of a strategy for NDC at the national level, but the articulation of subnational entities in this regard is observed. She explained about the exercise of disaggregating sector information by states that was carried out by the MCTI team, based on the disclosure of the submission of the Fourth National Inventory of Emissions. After the end of the disclosure of these results, they will be available on the SIRENE website, starting in October.

Renata recalled that not all state secretariats have the resources to develop an emissions inventory, and that the idea of this exercise is to provide this information to subnational entities. She highlighted the discussion of this topic with the private sector, as many companies in Brazil already report their emissions data on a voluntary basis and explained that a platform is being developed on which companies will be able to enter their emission data, facilitating access to reports by the states. Renata explained that SIRENE is the official national MRV for disseminating information from the national inventory and also from voluntary organizational inventories.

Figure 12: Renata Grisoli, MCTI.

After her speech, **Guilherme Lima** questioned how Renata believes that the results of the ICAT Project can contribute to a national strategy of MRV, given that a complex job of defining the responsibilities of the actors involved was developed.

Renata answered by talking about the urgency of structuring these initiatives. She believes that this discussion will become more evident due to the obligation to issue Biennial Transparency Reports (BTRs) from 2024 onwards. She spoke about the need for dialogue between the Federal Government and the various sectors of the economy. It is in this sense that the importance of the ICAT Project is inserted, providing the necessary subnational vision for the development of public policies.

Emilio La Rovere seized the opportunity and asked Renata about the annual estimates of GHG emissions. He commented that socioeconomic indicators are published annually, and that this is why it would be important to also make available the emissions data. Emilio recalled that it is more feasible for some sectors to issue GHG data every year, such as industry, energy and transport.

Renata said that the creation of a National Emission Inventory System was a fundamental step forward for the country. She highlighted the difficulty for Brazil to issue the data provided biennially. However, in some sectors it would be appropriate to identify annually. She concluded by saying that the MCTI will organize itself to reduce the time interval between the release of these data.

Henning Wuester cited that the next step would be to use the results obtained from the ICAT Project and analyze opportunities to reduce additional emissions. He gave the example of Colombia, which carried out an exercise similar to the ICAT Project, which made it possible to see the potential of applying urban mobility measures. The results obtained in this country showed that 80% of emissions in the transport sector could be reduced if mitigation measures were applied at the urban level.

Guilherme Lima asked the Centro Clima team about what could be done to reduce emissions in the states of Minas Gerais and Rio de Janeiro, since there is an expectation of an increase in emissions even in the mitigation scenario. Guilherme asked about how the data obtained from the ICAT Project would be used in other states of the country.

Emilio answered by pointing out the different realities of the Brazilian states, as in some of them, transport, industry and livestock activities are so important that emissions continue to increase until 2030. Therefore, Brazil established its NDCs considering the offsets in relation to the different realities of states. For example, the study illustrated that the state of Amazonas has significant

removals due to biological carbon sequestration. He mentioned the possibility of applying the monitoring indicators elaborated in the project in other states in Brazil, although the relevance of the indicators will be different for each of the states. However, one important aspect is the methodological approach, monitoring the evolution of emissions and verifying whether the targets are being achieved within a desirable pace.

Fernando Rosenthal (Trevo Soluções em Comunicação, from the audience) asked if the COVID-19 pandemic boosted the recorded increases in GHG emissions and what parallels can be drawn in this respect.

Carolina Dubeux highlighted the reduction in demand for meat during the pandemic, which resulted in a decrease in slaughter. This increased the permanence of cattle of advanced age in Brazilian pastures, culminating in an increase in emissions. She mentioned that it is necessary to analyze the sectors separately to understand whether or not there was an impact of the pandemic on Brazilian emission indicators. Carolina stated that, if there was an increase in emissions, the trend is for this impact to be mitigated with the return of economic activities.

Emilio recalled the existence of an economic recession in Brazil, which has lasted since 2014. Lately, there has been a deterioration in the perspective of economic growth, due to the demographic factor, and public policies are incapable of promoting an economic recovery. Therefore, all indicators of industrial activity, transport and energy demand are already being impacted by this issue, and the pandemic is only an aggravating factor in the situation. Emilio commented on the reduction of emissions in other countries, unlike Brazil, which increased emissions due to the increase in annual deforestation rates and the permanence of cattle on pastures.

Henning added a global perspective, noting that global CO_2 emissions have reduced by around 6%. However, some of these reductions were merely temporary, and with the economic recovery emissions are expected to increase again.

Guilherme Oliveira (Federation of Agriculture and Livestock of the State of Minas Gerais, from the audience) questioned whether the recovery of degraded pastures was considered in the estimates of emissions from the livestock sector.

Guilherme Lima reported that the recovery of degraded pastures was considered in the estimates of emissions from the livestock sector. This is one of the mitigation measures considered for the sector, in addition to being part of the ABC Plan. He said the Centro Clima team could provide more details on where this measure is included in the scenarios.

Carolina mentioned that pasture recovery was dealt with within the global context of increasing the productivity of cattle raising in Brazil, as this activity tends to increase production levels to meet the demand for meat, emitting less GHG. One of the factors that can contribute to this reduction in emissions is the increased recovery of the pasture area to increase the capacity of pasture regions in the medium and long term. In the reference scenario, the recovery of pastures and other variables that influence the increase in the sector's efficiency in relation to the step of implementing the national policy were considered. In the mitigation scenario, the expansion of this ambition was taken into account.

Denis Desgain asked how it would be possible to disaggregate the indicators developed at the national level into specific indicators for different states, and whether a next stage of the project

would be necessary to carry out such an exercise. Furthermore, it was asked about the creation of instruments necessary to quantify emissions and the different impacts in Brazil.

Emilio emphasized that the ICAT Project provided results that could help state managers to understand the emission profile at the subnational level, highlighting which sectors are responsible for GHG emissions. When there is a specific mitigation action, it is possible to intervene in the reduction of emissions, and this is the situation with the MDL projects, in which Brazil has had extensive experience. He mentioned that the consulting engineering sector is qualified to prepare projects, monitoring protocols, carry out audits and measure the results, for subsequent accreditation of projects with the Climate Convention, aiming at issuing carbon credits. In this sense, it is important that state managers have the knowledge and training of this methodology to contract data collection work with the most adequate contract terms.

Guilherme Lima added that the ideal would be to have a mix of federal, state and municipal governments to assess mitigation measures, with the Ministry leading the preparation of inventories. He stressed the excellent communication at the federal level and the organization of some states of the federation, while others still needed more progress. There is still a need to develop efforts at the national level, in terms of transparency, MRV mechanism, establishment of well-defined responsibilities and which institutions would be responsible for providing data.

Renata highlighted the need for well-defined indicators to measure which events at the national, state and municipal levels are influencing the increase or decrease in emissions. To this end, discussions should be fostered at the national, subnational and private levels, in order to capture this information and effectively report it.

6. Final considerations

Henning reiterated his thanks to CBC team, Centro Clima and the three pilot states that participated in the project. He expressed the wish that the results be useful and that they continue to support the work of governments. He concluded by saying that this discussion has a lot of potential and that the ICAT Initiative is open to dialogue.

Denis thanked all the seminar participants, said that he greatly appreciated the work developed and hopes that they can continue to work together with the project teams.

Renata congratulated everyone for the project, thanked the invitation to participate in the seminar and said that the MCTI is available for discussions.

Telmo thanked CBC and Centro Clima for the invitation and partnership, noting that the project prepared will be important for the advances of mitigation discussions in the state of Rio de Janeiro. He said that this product will allow the implementation of the MRV indicator system, which will enable the application of public policies and the effective monitoring of emissions.

Emilio congratulated all the national and international partners, stressing that it is always possible to learn a lot from them. He thanked CBC and the MCTI and mentioned that it is essential to join efforts at various levels, as there is no single solution to global climate change.

Carolina thanked all the collaborators, wished that the work was useful and that it could inspire future projects.

Erika thanked everyone for their collaboration, especially the states, who were very active in building the data used in the project.

Bruna thanked the states for their support, which were in frequent contact with the project and provided important feedback.

Guilherme Lima thanked the efforts of the teams from the three states, CBC, Centro Clima, the ICAT Initiative and the UNEP DTU Partnership. He made a perspective brief of the project, commenting that just one month after the project had started, the society entered a pandemic context. The team had to adjust to the new work model and new ways of interacting. Unfortunately, the pandemic made it impossible to hold face-to-face meetings in Rio de Janeiro, Minas Gerais, Amazonas and Brasília, preventing closer contact with the population of those states. Despite this, the team did not lessen its efforts in carrying out the project, just as the states were also engaged to move forward with the actions of the climate agenda.

7. Results of the project in the media

The results of the project and the final seminar were widely repercussed in the media in Brazil, highlighting that the study was aimed at supporting the country in the achievement of the NDC targets. At least 20 communication vehicles published articles about the project. The links for the articles are provided below.

1) https://agenciabrasil.ebc.com.br/geral/noticia/2021-09/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris
2) https://www.bol.uol.com.br/noticias/2021/09/28/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris.htm
3) https://epocanegocios.globo.com/Um-So-Planeta/noticia/2021/09/minas-gerais-e-rio-de-janeiro-tendem-ter-um-aumento-nas-emissoes-de-gases-de-efeito-estufa-nos-proximos-anos.html
4) http://www.tribunadonorte.com.br/noticia/estudo-quer-auxiliar-paa-s-a-alcana-ar-metas-do-acordo-de-paris/521794
5) https://costanorte.com.br/geral/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris-1.344105
6) https://www.folhape.com.br/noticias/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/199583/
7) https://www.newsrondonia.com.br/noticia/184643-estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris
8) https://portalmatogrosso.com.br/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/
9) https://www.istoedinheiro.com.br/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/
10) https://www.gazetanews.com/noticias/brasil/2021/09/438088-estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris.html
11) https://diariodocomercio.com.br/economia/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/

12) https://br.financas.yahoo.com/noticias/estudo-quer-auxiliar-pa%C3%ADs-alcan%C3%A7ar-205900140.html

13) https://revistacenarium.com.br/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/

14) https://www.odemocrata.com.br/geral/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris-2/

15) https://brasilamazoniaagora.com.br/estudo-quer-auxiliar-pais-a-alcancar-metas-acordo-de-paris/

16) https://www.matogrossomaisnoticias.com.br/geral/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/

17) https://www.gazetadoestado.com.br/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/

18) https://istoe.com.br/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/

19) https://www.dinheirorural.com.br/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/

20) http://capitaldeminas.com.br/noticias/estudo-quer-auxiliar-pais-a-alcancar-metas-do-acordo-de-paris/

Table 2. Attendees

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