Initiative for Climate Action Transparency - ICAT -

Report about the workshop(s) with states to deepen strategies in engaged states and possibly include states not still committed to climate actions

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Deliverable #7

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Sumário

1. Introduction

Centro Brasil no Clima (CBC) coordinates the ICAT Brazil Project phase 2, which is funded by the Initiative for Transparency in Climate Action (ICAT) and implemented by UNEP-DTU Partnership and focuses on identifying opportunities for mitigation of GHG emissions in Brazilian states, evaluating their contribution to the achievement of the NDC, and developing Monitoring, Reporting and Verification (MRV) indicators to track mitigation actions. The project is executed in partnership with Centro Clima (COPPE/UFRJ), which is responsible for the elaboration of technical reports about the emissions profile of the states, emissions estimates for 2030 in different scenarios and for the identification and evaluation of mitigation actions.

This second phase of the project, *Deploying Brazilian NDC implementation efforts at the state level,* started in February 2020, and intends to engage subnational governments in NDC commitments, prioritizing the development of their actions and capabilities at the state level. The main objective is to develop a strategy to advise and encourage the Brazilian states to contribute so that Brazil can achieve its NDC goals. The project is carried out with three "pilot states" (Amazonas, Minas Gerais and Rio de Janeiro) so that, together with its technical staff and through a participatory process, it can submit proposals and prepare technical reports to help the states in estimating their potential contribution to the NDC and in developing a MRV system to monitor their emission trajectories.

As part of the project, the team of Centro Clima has been developing technical studies that analyze the sectorial emissions, elaborate trend and mitigation scenarios and propose MRV indicators to monitor the mitigation actions in the states, with the production of reports as listed below:

- Evaluation of historical emissions of the state and their trends;
- Evaluation of the current trend of emissions until 2030;
- Evaluation of mitigation actions that can be implemented in the state and development of a scenario for 2030;
- Elaboration of a MRV system to follow the proposed mitigation actions.

In addition to this technical work, the project has also an axis focused on raising awareness and promoting the engagement of states in the climate agenda. As part of this axis, CBC organized a series of workshops with the objectives of training partner states, presenting concepts and instruments related to the climate agenda, and promoting the participation of stakeholders at the subnational level in the elaboration of the studies, both for gathering inputs for the identification of mitigation opportunities, and for the validation of the scenarios elaborated.

This series of workshops is a fundamental step in the development of the project, as it strengthens the participatory process in the evaluation of current actions and policies and the mitigation options that can be adopted in the states. The participation of actors throughout the project contributes to better policy design and evaluation, integrates different knowledge and perspectives, and provides

greater transparency and legitimacy in decisions. According to the ICAT Guide for Stakeholder Participation, this participatory process has among its objectives:

- Give understanding and support to the policies;
- Improving policy development and implementation;
- Strengthening the assessment of the impacts of policies to mitigate GHG emissions;
- Strengthening the identification and assessment of sustainable development impacts;
- Strengthening the technical review of GHG emissions.

The structure of this series included two types of workshops:

i) An initial workshop that had the objective of training state stakeholders, addressing theoretical and practical aspects around the climate agenda;

ii) Two rounds of workshops whose objective was to promote the engagement of states in the elaboration of products, obtaining inputs for the analyses and validating them together with the state actors.

Figure 1 below brings some information about the series of workshops that will be further explained in this report.

Training workshop	Engagement workshop (1st round)	Engagement workshop (2nd round)
• August 2020 (2 days) • To provide fundamental knowledge about climate change • 8 states participating from 5 regions	• October/November 2020 - 3 workshops, one for each pilot-state • To present results of GHG emission profile and reference scenario to validate and receive inputs • For each state there was the participation of representatives from diferent sectors	• April/May 2021 - 3 workshops, one for each pilot-state • To present results of the mitigation scenario scenario to validate and receive comments to refine the analyses • For each state there was the participation of representatives from diferent sectors

Figure 1 – Information about the series of workshops

2. Training workshop

The training workshop was held on August 24th and 25th, 2020 and was conducted jointly by the teams of Centro Brasil no Clima and the Centro Clima (COPPE/UFRJ). The purpose of this workshop was to provide state stakeholders fundamental knowledge about climate change so that they could better contribute with the identification of mitigation actions in their states and the elaboration of the scenarios of GHG emission.

The workshop had the joint participation of both, the three pilot states (Amazonas, Minas Gerais and Rio de Janeiro, and other partner states that showed interest in following the development of the project (Rio Grande do Sul, Alagoas, Mato Grosso, Santa Catarina e Rondônia). The audience was composed mostly from technical staff from state secretariats with whom CBC has been articulating.

In the first part, held on August 24th, the following topics were presented:

- The basic science of climate change, its causes and effects;
- International climate negotiations and international agreements;
- The national policy on climate change and its instruments (laws, decrees and plans);
- Methods of adaptation; and
- Schemes of climate finance and mechanisms of carbon pricing.

It started with a brief introduction by Guilherme Lima (project coordinator at CBC), who explained the objectives of the activity in addition to the partnerships involved. He passed the floor to Guilherme Syrkis (executive director of CBC), who reinforced the commitment to each state involved in the project, making himself available to any demand during the workshop.

Ana Cardoso (UNEP DTU Partnership) contextualized the ICAT project and explaining some specificities of the support that is provided by the initiative and its multiple parts, such as fund managers (among them UNOPS), partnership implementers and partners. Ana explained the tools for political decisions, such as assessing the impacts of climate policies and actions, the development of effective and ambitious climate policies, and the necessary investment mobilization. She presented the types of support that ICAT provides for the construction and improvement of climate transparency systems:

- Development of methods to monitor the progress of the goal;
- Assessment of the impacts of climate policies (GHG emissions, socioeconomic parameters and contribution to sustainable development objectives);
- Integration of transparency systems at the subnational level;
- Identification of national benefits resulting from improved transparency, for example, the mobilization of financing;

- Specific ICAT methodologies for various sectors, including renewable energy, building efficiency, transport pricing, agriculture and forestry;
- Methodologies for assessing broader impacts on sustainable development, transformational change and non-state action.

Ana Cardoso also mentioned some countries that receive support from ICAT and have been using those methodologies to assess climate policies developed as part of their NDCs, such as Costa Rica, Ghana, Sri Lanka, Mozambique and India.

Finally, there was a presentation by Professor Emilio La Rovere (coordinator of Centro Clima) about the topics presented above. After each of the topics there was a break when the participants could make comments and questions. The presentation used by Professor Emilio is available here and the full video of the first day of the workshop is available here.

The second part, held on August 25th, 2020, focused on Greenhouse Gas Emissions Inventories and available methodologies, with a presentation Carolina Dubeux (senior researcher at Centro Clima). Her presentation was divided into two parts, being the first part dedicated to the IPCC 2006 Guidelines for National GHG Inventory, where she addressed some concepts (such as anthropogenic emissions and removals, base year and also the gases and sectors included in the inventories), estimate methods, the structure of the guidelines, quality of the inventory (transparency, consistency, comparability, completeness, and accuracy), and step-by-step procedures, including identification of key categories, identification of the most appropriate estimation methods (appropriate tiers), data collection, estimates of emissions and removals, uncertainty analysis and Inventory preparation. The second part was focused on time series consistency, where she presented key elements necessary to guarantee the consistency of a historical series and methods to overcome data gaps. The presentation used by Carolina Dubeux is available here and the full video of the second day of the workshop is available here.

The workshop was attended by 45 participants in the first day and 40 participants in the second day, with eight states represented from all the five regions of Brazil (North, Northeast, Central-West, Southeast and South). Besides the three pilot-states (Amazonas, Minas Gerais and Rio de Janeiro), five additional states manifested interest in participating in the workshop to learn more about the climate agenda and GHG inventories (Rio Grande do Sul, Alagoas, Mato Grosso, Santa Catarina e Rondônia). Participants were mostly technical staff from state secretariats with which CBC is engaged.

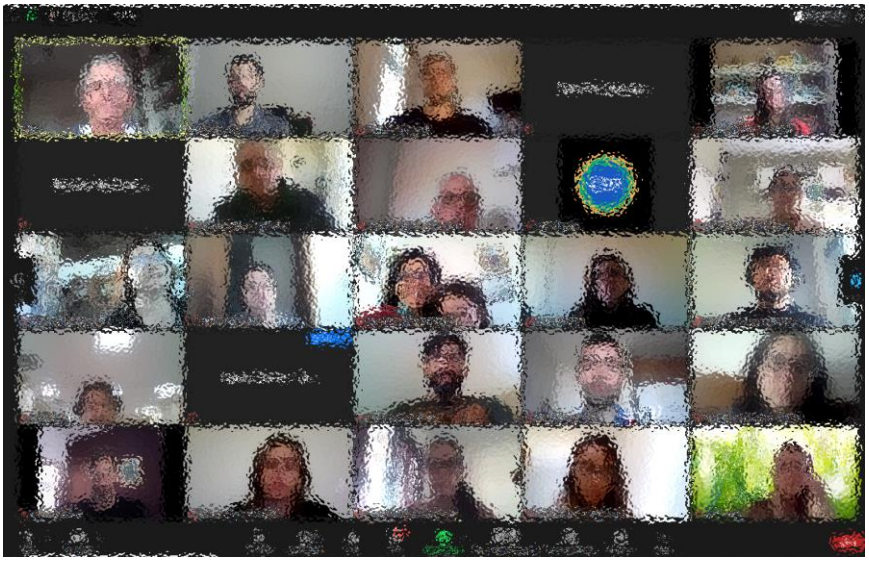

Figure 2 – Participants in the Training Workshop

3. Engagement workshops

The engagement workshops were organized to take place in two rounds, both containing three workshops, one for each pilot state. The first round of workshops (conducted in October and November 2020) had the objective of engaging state stakeholders to be part and contribute with the assessments that are conducted as part of the project. To this end, the results of the report on the state emissions profile and preliminary results on the reference scenario for the 2030 horizon were presented in each of the three workshops of this first round. It was also intended to have a space for discussion with the participants about the mitigation options that would be later included in the mitigation scenario.

The second round of workshops (conducted in April and May 2021) aimed to engage state stakeholders in the evaluation of GHG mitigation actions that would be included in the report with the mitigation scenario. Preliminary results of the mitigation scenario developed for each state were presented so that suggestions could be made for its improvement.

- 1st round of workshops - had a double objective: to present and validate the results of the baseline scenario prepared for each state based on previously existing policies and actions; and to gather inputs from state actors on the actions to be included in the mitigation scenario;
- 2nd round of workshops - had the objective of presenting preliminary results of the mitigation scenarios and validate them with the state actors.

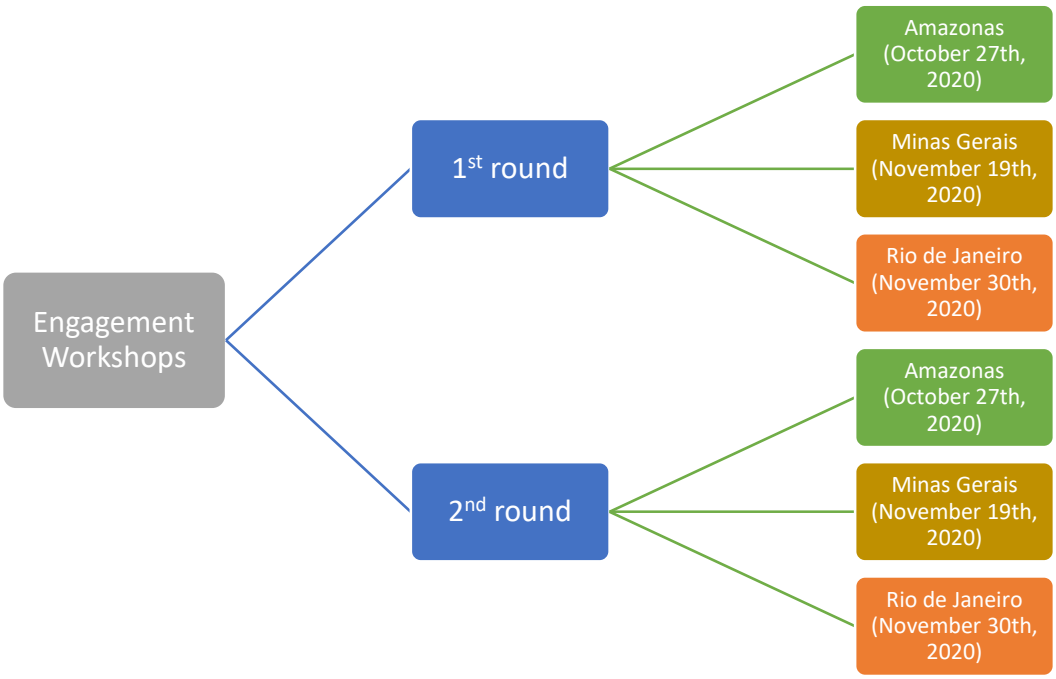

Figure 3 – Structure of the engagement workshops

3.1 First round of engagement workshops

3.1.1 First engagement workshop for the state of Amazonas

On October 27th, 2020, the first engagement workshop for the state of Amazonas was held in two parts (morning and afternoon). The event happened via the Zoom platform, with the participation of the technical team of the State Secretariat of Environment of Amazonas (SEMA-AM), which has been a partner in the implementation of the project in the state. The workshop was conducted jointly by Guilherme Lima, coordinator of ICAT Brazil Project at CBC, and the team of Centro Clima (COPPE/UFRJ) and was attended by Francisco Itamar, head of Environmental and Territorial Management department at SEMA-AM and other guests and representatives from different institutions of the state, including government, private sector, and civil society.

Guilherme Lima (CBC)

Guilherme Lima started the workshop talking about the partnerships that are part of ICAT Brazil project, highlighting the involvement of the SEMA-AM, and thanked Secretary Eduardo Taveira and the head of the Department of Environmental and Territorial Management, Francisco Itamar, for their support. After explaining the objectives of the project and its status, Guilherme explained the proposal of the workshop and its two parts.

Emilio La Rovere (Centro Clima)

Professor Emilio La Rovere highlighted that even though the NDC commitment has been signed by the federal government, states can also develop actions in the same direction. Emilio discussed about the emission scenarios and explained that the preliminary results of the reference scenario reflect the measures and actions already implemented in the state that can contribute to the reduction of greenhouse gases.

Bruna Guimarães (Centro Clima)

Bruna presented the results of the report on the emission profile of the states (Deliverable 4) and explained that for the state of Amazonas data were collected from the Greenhouse Gas Emission and Removal Estimating System (SEEG), given that the state does not have GHG inventories. From the results she highlighted the increasing use of natural gas as source for power generation, followed by diesel oil. In the transport sector, an increase of 80% in total emissions was observed, with an emphasis on the air and road sector. Similar analyzes could also be seen in the industrial sector.

Erika Nogueira (Centro Clima)

Erika presented preliminary results from the reference scenario and highlighted that the analyses show a trajectory of growing GHG emissions in the state, with an expected increase of 52.5% by 2030. Regarding the projections in the Agriculture, Forestry and other Land Use (AFOLU) sector, the data show a greater emphasis on agriculture in relation to emissions. In protected areas (indigenous lands and conservation units) data remained stable in the state of Amazonas. Although LULUCF is responsible for most the state emissions, the agricultural sector will present the sharpest increase in this decade.

In terms of energy emissions (MtCO2), what was observed was that the largest emissions were concentrated over the years in the public service sector and transportation. As for energy use in industry, Erika presented the total emissions data, observing a downward trend over the years, so that in 2030 industrial emissions may be less than in 2005. The same was observed in industrial processes and use of products (IPPU), considering the cement emission data which, according to the projection, may have a lower number than that obtained in 2005.

Finally, the survey concluded that between 2005 and 2030 there might be a 52.5% increase in gross state emissions. In the state, LULUCF is expected to be responsible for 77.1% of emissions in 2030. It is noteworthy that agriculture will have a 103% increase in gross emissions, followed by liquid effluents with an increase of 94.9 %, and energy with an increase of 63.6%. The only sector that is expected to reduce emissions is being the industrial sector (IPPU and Energy).

Carolina Dubeux (Senior researcher at Centro Clima – Coppe/UFRJ)

In the second part of the workshop, the researcher Carolina presented the mitigation measures in order to receive feedback from the participants. The first sector presented was AFOLU due to its greater relevance in the state, with measures such as reducing the annual rate of deforestation, the increase of protected areas (Conservation Units and Indigenous Lands) and the restoration of Native

Forest. Other mitigation measures that were presented include: commercial forests; expansion of the use of integrated crop-livestock-forestry systems; recovery of degraded pasture areas; and the expansion of use of the No-Till System; expansion of the use of Biological Nitrogen Fixation (FBN); management of animal waste; and improvement of agricultural practices.

Regarding the expansion of public transport, active mobility and the rationalization of individual motorized transport, the proposals adopted are those developed by the FBMC (NDC), such as the capture of users and the effective participation of the travel and vehicle sharing segment. Francisco Itamar (SEMA-AM) commented on the transportation restriction that occurs in Amazonas, so that the forum's proposals do not adapt to the entire state, occurring only in the city of Manaus due to its viability.

About the mitigation actions for the industry, possibilities are found according to Carolina in energy efficiency, in the substitution of fuels, among them increase of additives, improvement in the control of processes, in the reduction of leakage of fluorinated gases and in the replacement fluorinated gases. In the matter of energy supply, the alternatives discussed were related to the expansion of generation from renewable sources and the increase in the efficiency of thermoelectric power plants and reduction of losses in general. Francisco Itamar contributed by stating that in the state of Amazona the bet has been on solar energy as a renewable source as an alternative to wind energy, that has the greatest development in the south of the country.

The presentation used by the team of Centro Clima is available here, the video of the first part of the workshop is available here, and the second part is available here.

Figure 4 – First engagement workshop for the state of Amazonas

3.1.2 First engagement workshop for the state of Minas Gerais

On November 19th, the first engagement workshop for the state of Minas Gerais was held in two parts (morning and afternoon). The event happened via the Zoom platform, with the participation of the technical team of the State Environmental Foundation of Minas Gerais (FEAM-MG), which has been a partner in the implementation of the project in the state. The workshop was conducted was conducted jointly by Guilherme Lima, coordinator of ICAT Brazil Project at CBC, and the team of Centro Clima (COPPE/UFRJ) and was attended by Larissa Oliveira, head of the Sustainability, Energy and Climate Change Center of FEAM and other guests and representatives from other states.

Guilherme Lima (CBC)

Guilherme Lima started the workshop talking about the partnerships that are part of ICAT Brazil project, highlighting the involvement of FEAM, and thanked Larissa Oliveira for their support to the project. After explaining the objectives of the project and its status, Guilherme explained the proposal of the workshop and its two parts.

Emilio La Rovere (Centro Clima)

Professor Emilio La Rovere explained the technical work developed at Centro Clima, highlighting the importance of the contributions of each state to the fulfillment of the goals of the Paris Agreement. In addition, he presented the entire construction of the methodology for the contributions of national emissions that are adapted so that each state can reduce emissions.

Bruna Guimarães (Centro Clima)

Bruna spoke about the historical emissions of Minas Gerais, which over the years has adopted measures to reduce emissions. The first initiative took place in 2005 with the creation of the Minas Gerais Forum on Global Changes and later, followed by the State Inventory of Greenhouse Gas Emissions in 2018. Another inventory was carried out by Centro Clima for alternatives for the reduction of Greenhouse Gases in Minas Gerais.

Another milestone in the development of mitigation policies in the state was Decree 45,229 of 2009 that regulates measures by the Public Power of the State of Minas Gerais regarding the fight against climate change and the management of greenhouse gas emissions. In 2014 an Inventory of Greenhouse Gas Emissions was carried out which helped in the construction of the Energy and Climate Change Plan of Minas Gerais (PEMC) developed in 2015.

Regarding the total state emissions, Bruna highlighted that the lack of data on Land Use Change and Forests (LULUCF) from 2005 to 2009 impacted the total result, not being a totally exact figure due to this lack of data. In the energy sector, the researcher also observed an increase in total emissions, as well as in the industrial sector. In the transport sector, emissions were concentrated in the railway sector with an increase of 75%.

With the conclusion of the data analysis, she noted that in the period analyzed there was a 49.9% increase in state emissions and only four sectors were responsible for 88.0% of emissions in 2014:

agriculture (35.5%), industry (20.3%), transportation (17.7%) and LULUCF (17.5%). Finally, the only sector that had its emissions reduced was the residential sector (26.3%).

The presentation used by Bruna is available here.

Erika Nogueira (Centro Clima)

Erika presented the preliminary results of the reference scenario for the state, which an increase of 59% in emissions until 2030, being concentrated in AFOLU, with this sector representing 48.5% of the state emissions in that year. Within AFOLU, LULUCF would increase emissions by 60%, whereas agriculture would increase 13%. Regarding the other sectors, projections from the reference scenario would increase 157% by 2030, followed by energy supply, with a 43% increase, and IPPU, with 22%.

Emilio La Rovere added that these data are not provisions, but to think about alternatives for the reduction. He also argued that there is currently a study to develop carbon pricing with a focus on reducing greenhouse gases. With that, at the state level, the first step is to build this reference scenario with the most detailed information possible with the support of everyone.

The presentation used by Erika is available here.

Carolina Dubeux (Centro Clima)

In the second shift of the workshop, Carolina presented a set of the main mitigation measures for the state according to each sector. Initially, the hypotheses for AFOLU were discussed, including the reduction of the annual deforestation rate, the increase in protected areas and the restoration of native forest. Other possibilities in terms of planting commercial forests and recovering degraded pasture areas were presented as a solution. The management of animal waste and the improvement of agricultural practices were also mentioned as options to reduce emissions in the agricultural sector.

Carolina followed the presentation with possible mitigation measures for industry with a focus on energy efficiency, fuel substitution, improvement in process control, among other measures. Finally, mitigation measures as renewable sources in the electricity sector and the increase in flare efficiency and reduction of losses in general were identified as the most appropriate measures for the state of Minas Gerais.

The treatment of solid waste was also studied with recycling and composting alternatives for final disposal as alternatives for the scenario. The same logic was used for the treatment of sewage and effluents, opting for efficient measures. She concluded by stating that she was waiting for a revised plan so that meetings with working groups can be scheduled.

The presentation used by Carolina is available here, the video of the first part of the workshop is available here, and the second part is available here.

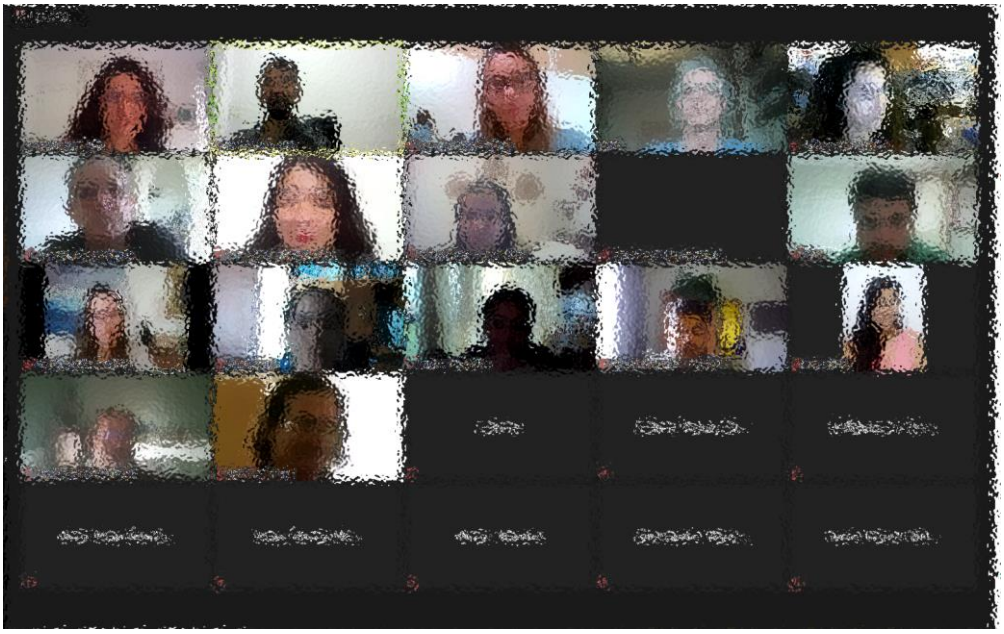

Figure 5 – First engagement workshop for the state of Minas Gerais

3.1.3 First engagement workshop for the state of Rio de Janeiro

On November 30th, 2020, the first engagement workshop for the state of Rio de Janeiro was held in two parts (morning and afternoon). The event happened via the Zoom platform, with the participation of the technical team of the State Secretariat for Environment and Sustainability of Rio de Janeiro (SEAS-RJ), which has been a partner in the implementation of the project in the state. The workshop was conducted was conducted jointly by Guilherme Lima, coordinator of ICAT Brazil Project at CBC, and the team of Centro Clima (COPPE/UFRJ) and was attended by Telmo Borges, superintendent of Climate Change at SEAS, other members of the SEAS team, besides representatives from the State Environment Institute (INEA-RJ), and other guests.

Guilherme Lima (CBC)

Guilherme presented the ICAT Brazil project and the partners, explained the purpose and the structure of the workshop to the participants, and then passed the word to Telmo Borges, superintendent of Climate Change at SEAS.

Telmo Borges (SEAS-RJ)

Telmo Borges thanked the partnership and stated that the state is evaluating all instruments and working to launch a climate change information website and the register of emissions in an online platform. He stated that the state government is committed to a green agenda and to any institution concerned with the progress of this project.

Emilio La Rovere (Centro Clima)

Professor La Rovere thanked all the participants and the continued development of state policies, especially in the state of Rio de Janeiro, which has a pioneering case in the development of policies for climate change. He continued saying that climate change needs to be assessed quantitatively, as this could have a positive impact on society by seeking to thoroughly research emissions and activity levels. The effort would be to verify past emissions, analyze their causes and build hypothesis sets, projecting a reference scenario according to past trends.

Carolina Dubeux (Centro Clima)

Carolina began by addressing the study previously carried out at the national level, focusing on the application of the methodology for assessing the impacts of mitigation policies which in the process of the current seeks to develop strategies to commit the Brazilian states to help the country achieve the goals of the NDC. In this regard, the researcher presented the evolution of the policy from 2010 to 2017 in the state of Rio de Janeiro, which has currently several ongoing projects that are part of the evolution of this project.

The inventory of estimates evaluated the emission of energy in the different sectors (transport, waste, AFOLU) with which the indicators are constructed, evaluating the data on the economy and energy supply and other indicators. As a result, in the analyzed period there was an increase of 40.2% in state emissions, and only three sectors were responsible for 80.5% of emissions in 2015: energy supply, industrial and transport. In addition, the period 2005-2014 observed an increase of 277% in the emissions of the commercial sector, 138% in the public sector and 112% in an increase in energy supply, so that the only sector that had its emissions reduced was AFOLU (-59.30%).

In the second part of the workshop, measures to elaborate the mitigation scenario in the state were discussed. Carolina started by giving an overview of the total emissions of each sector, highlighting a growth of 49.19% in total emissions, taking into account that she only had historical data for the year 2005, 2010 and 2015. In this sense, the estimates were for a scenario that follows the current greenhouse gas emission trends for Rio de Janeiro until 2030 (reference scenario).

As a result, it was verified that in the period from 2005 to 2030 there would be a 49% increase in the total emissions. With the energy sector being responsible for 71.9% of GHG emissions in 2030. In fact, the ranking of the variation in the period was consolidated with an increase of 82% in the energy sector, 65% increase in IPPU, and lower growth rates in the waste sector (14%) and agriculture (1%).

Emilio La Rovere (Centro Clima)

Professor Emilio explained that several options can be tested within a mitigation scenario, but that a collective effort is needed for the policies to be ambitious and promote this construction effectively. He stated that it would be interesting to call the agents that work in the different sectors to better discuss the scenarios.

The presentation used Centro Clima is available here, the video of the first part of the workshop is available here, and the second part is available here.

Figure 6 – First engagement workshop for the state of Rio de Janeiro

3.2 Second round of engagement workshops

3.2.1 Second engagement workshop for the state of Amazonas

On April 28th, 2021, the second engagement workshop for the state of Amazonas was held via the Zoom platform, with the participation of the technical team of the State Secretariat of Environment of Amazonas (SEMA-AM), which has been a partner in the implementation of the project in the state. The workshop was conducted jointly by Guilherme Lima, coordinator of ICAT Brazil Project at CBC, and the team of Centro Clima (COPPE/UFRJ) and was attended by Francisco Itamar, head of Environmental and Territorial Management department at SEMA-AM and other guests and representatives from different institutions of the state, including government, private sector and civil society.

Guilherme Lima (CBC)

Guilherme thanked the presence of all the participants in the workshop and explained that the ICAT Project is executed in partnership with Centro Clima and receives support from the ICAT initiative and UNEP DTU Partnership. He also thanked for the partnership with the State Secretariat for the Environment of Amazonas (SEMA-AM), represented by Francisco Itamar.

Guilherme reminded that this is the second workshop conducted for the state of Amazonas in the ICAT project, being the first realized in 2020 to present the results about the emission profile of the state and preliminary results of the reference scenario, whereas this second workshops is intend to present and discuss results of the mitigation scenario.

Francisco Itamar (SEMA-AM)

Francisco thanked for the organization of the workshop and highlighted the relevance of this work to the objective of analyzing GHG emissions in the state. He mentioned that the state has some projects that contribute to the identification of mitigation actions and to stablish mitigation targets, and that they are willing to contribute to the ICAT project providing information from those projects.

Emilio La Rovere (Centro Clima)

Emilio explained about the scenarios elaborated by Centro Clima, highlighting that those are projections that aim to provide pathways for decarbonization in the different sectors using premises about the economic activity and about how emissions might evolve. He claimed that it is important to refine this preliminary version of the mitigation scenario with mitigation actions identified by other projects implemented in the state such as those informed by Francisco.

Bruna Guimarães (Centro Clima)

Bruna started reminding about the methodology used in the ICAT Brazil phase 1 project and about how it was used to elaborate the scenarios in the current phase. Next, she spoke about the studies already conducted in the project, such as the analysis of the emission profile in the states and the reference case scenario, explaining about the data sources, the hypothesis and the mitigation actions and policies included in the analysis.

Bruna detailed the parameters used to project the GHG emission trajectories in each sector and subsector based on the results of the first phase of ICAT. She also presented the results found for the mitigation of the emissions in each sector in the first phase to illustrate how the mitigation scenario was built in this second phase.

Erika Nogueira (Centro Clima)

Erika started with a brief explanation about how the methodology of the first phase was used to elaborate the scenarios for the states, using historical emission data from the states and the parameters of GHG emissions from the first phase. She detailed the methodology of the calculus, including the percentual variations in the emissions in each sector both for the reference and mitigation scenarios.

Next, Erika presented the results obtained for each sector, comparing the reference and mitigation scenarios. The projections indicated that total emissions in the state would increase by 31% in the period 2005-2030 according to the reference scenario, whereas in mitigation scenario indicate a reduction of 233% in the total GHG emissions in the state. This difference occurs mostly because of the AFOLU sector, which is responsible for most of state emissions. The sector of energy supply, the second in GHG emissions in the state, has a moderate mitigation potential, with 56% of increase in the reference scenario against 46% in the mitigation scenario.

Guilherme Lima (CBC)

Guilherme explained that those presentations by Bruna and Erika are a first result for the state emission trajectory, used as a basis so that we could discuss and receive comments to refine the results. Next, he questioned to the experts of Centro Clima about why they did not use for the state

of Amazonas the scenario B of the first phase, given that this scenario had an emphasis on the AFOLU sector, which is precisely the main sector in the state emissions.

Emilio La Rovere (Centro Clima)

Emilio replied to the question reminding that in recent years there was a significative increase in deforestation rates, and therefore the results from the scenario B are not anymore feasible. In this case, scenario C becomes more realistic to the projections in this second phase. He highlighted that even in this scenario, which is more balanced and does not have so much emphasis on AFOLU, the results of the mitigation scenario for the state are expressive.

The presentation used by the team of Centro Clima is available here, and the full video of the workshop is available here.

3.2.2 Second engagement workshop for the state of Minas Gerais

On May 11th, 2021, the second engagement workshop for the state of Minas Gerais was held via the Zoom platform, with the participation of the technical team of the State Environmental Foundation of Minas Gerais (FEAM-MG), which has been a partner in the implementation of the project in the state. The workshop was conducted was conducted jointly by Guilherme Lima, coordinator of ICAT Brazil Project at CBC, and the team of Centro Clima (COPPE/UFRJ) and was attended by Larissa Oliveira, head of the Sustainability, Energy and Climate Change Center of FEAM and other guests and representatives from other states.

Guilherme Lima (CBC)

Guilherme started reminding that this is the second workshop conducted with the state as part of the ICAT project and explained the project goals and phases and the studies concluded so far, such as the analysis of the state emission profile, the reference case scenario, and the mitigation scenario that is being concluded. He stated that the objective of the workshop is precisely to present the preliminary results of the mitigation scenario so that it is possible to discuss and refine it, aiming to contribute to design of public policies in the state.

Larissa Oliveira (FEAM-MG)

Larissa started saying that she has great expectations about the ICAT Project, reminding that the results will contribute to identify the pathway that the state must follow to decarbonize its economy. She commented about the previous results, stating that the reference scenario already presented brings many relevant information, and that it can be compared with the scenario elaborated for the state plan of climate change in the past. She reminded also that this scenario was presented in working groups for different sectors in the state.

Emilio La Rovere (Centro Clima)

Emilio started highlighting the objective of the workshop, which is to present the preliminary results of the mitigation scenario for the state and receive feedbacks to refine it. He commented that the targets presented by countries are usually economy-wide, and that there are different pathways for its achievement. He said that in face of the lack of climate action by the federal government, states are gaining leadership, similarly to what happened in the United States. Emilio also commented about

the trend of an inflow of investments for mitigation and emission trade certificates, with a greater importance of methods to verify the results, for which the MRV indicators play an important role. Finally, he highlighted the importance of the feedback of the participants with suggestion of policies and actions that can be included in the analyses to refine the results, so that they can contribute to the design of public policies in the state.

Bruna Guimarães (Centro Clima)

Bruna started reminding the historic of the two phases of the ICAT project, presenting the scenarios elaborated and the methodology of analysis. She detailed the data used for the analyses of the state of Minas Gerais and next she presented the hypothesis and parameters used to elaborate the mitigation scenario.

Erika Nogueira (Centro Clima)

Erika complemented the previous presentation by Bruna providing more details about the methodology of scenarios and its application to the case of Minas Gerais. She explained how percentual variations of emissions in each sector were calculated based on the scenarios elaborated in the first phase of the project. The results presented indicated a trajectory of 34% of increase in state emissions between 2005 and 2030 in the reference scenario, whereas in the mitigation scenario it would increase 18%.

The bigger percentual growth is expected in the waste sector, although this is only the fourth sector in GHG emissions in the state. The AFOLU sector, which is the greater source of emissions, will increase its emissions by 22% in the reference scenario, whereas in the mitigation scenario it is expected 13% of growth. In industry, the second main source of emissions, the increase will be of 28% and 10%, respectively. The transport sector has the biggest mitigation potential in the state, with projections of 67% of increase in the reference scenarios, whereas in the mitigation scenario this would be 17%. The energy supply is the only sector that will have a decrease in GHG emissions in the period, both in reference and mitigation scenarios.

The presentation used by the team of Centro Clima is available here, and the full video of the workshop is available here. After the presentations by Centro Clima, Guilherme Lima invited the audience to participate and bring contributions to the analyses.

Tainan de Farias Nogueira (UK Ambassy)

Tainan commented about the recent declaration by president Bolsonaro with the intention of achieving zero deforestation in Brazil by 2030 and asked if it would not be reasonable to include this target in the scenario for the state.

Emilio La Rovere (Centro Clima)

Emilio replied that the target presented by the president refers to the illegal deforestation, and commented that this is a complex issue, given that the fact that it is an illegal deforestation makes it difficult to have precise data. In addition, he considers that the statement by the president with an intention to halt illegal deforestation does not mean that the goal will be achieved and mentioned the example of the policy for solid waste, which has not been fully implemented.

Igor Braga (CREA-MG)

Igor questioned about what the reduction of emissions could be provided by the change of old lamps in street lighting by new LED lamps, given that the energy efficiency could be relevant for the emission reduction.

Emilio La Rovere (Centro Clima)

Emilio replied saying that indeed the energy efficiency in street lighting is relevant, as well as in the residential sector. However, he explained that the study does not have an emphasis on the reduction of electric power consumption, given that the electric matrix in Brazil is mostly renewable. On the other hand, he did not discard the importance of gains of efficiency in power consumption to avoid other impacts.

Eleonora Sad (UFMG)

Eleonora commented about the low level of systematization and organization of data in Brazil, particularly at local level, and expressed her preoccupation with the lack of monitoring, what can lead to distortion of the results. She also stated that the methodology of scenarios in general has a sectorial approach and asked about the possibility to have a special approach.

Emilio La Rovere

Emilio replied saying that regarding GHG the procedure to monitor the results is not through measuring emissions in monitoring stations, but calculating it based on methodologies provided by the IPCC, which include, for instance, activity levels and emission factors. And this is exactely the purpose of the ICAT project. In addition, he highlighted that to have information about the activity levels it is necessary to have reliable data sources.

Viviane Vieira (SEINFRA-MG)

Viviane addressed the transport sector saying that the state has been providing public concessions of highways and created a regulatory agency for this sector and asked how mitigation actions in this sector were assessed.

Emilio La Rovere (Centro Clima)

Emilio explained that They used hypotheses elaborated by specialists in other studies at national level but reinforced the importance to receive contributions specific for Minas Gerais. He mentioned that there are federal programs being implemented, such as Rota 2030 and RenovaBio. In the mitigation scenario, besides those initiatives in place, there were additional hypotheses such as expansion of railways, increasing use of biofuels (ethanol and biodiesel) and electrification of vehicles.

Larissa Oliveira (FEAM-MG)

Larissa stated that the presentation showed the importance of having a special attention to the sector of LULUCF and said that she would search with representatives from this sector for data necessary for the mitigation scenario. She mentioned that they are concluding the elaboration of a state strategy for energy transition, which projects the expansion of renewable energy and increase in energy efficiency. The document of this strategy has estimations of GHG emission reduction and could be

useful for the analyses of the ICAT project. She also mentioned about a Project of sustainable steel industry which is intended to reduce emissions in this sector. Larissa also mentioned a memorandum of understanding of the state with the UK and that they are thinking about actions to implement, including the areas of aviation biokerosene and the use of biomethane from wastewater treatment stations.

3.2.3 Second engagement workshop for the state of Rio de Janeiro

On April 27th, 2021, the second engagement workshop for the state of Rio de Janeiro was held via the Zoom platform, with the participation of the technical team of the State Secretariat for Environment and Sustainability of Rio de Janeiro (SEAS-RJ), which has been a partner in the implementation of the project in the state. The workshop was conducted was conducted jointly by Guilherme Lima, coordinator of ICAT Brazil Project at CBC, and the team of Centro Clima (COPPE/UFRJ) and was attended by Telmo Borges, superintendent of Climate Change at SEAS, other members of the SEAS team, and representatives from other institutions of the state.

Guilherme Lima (CBC)

Guilherme welcomed and thanked the presence of the participants in the workshop, explaining that the project is executed in partnership with Centro Clima and has support from the ICAT initiative and UNEP DTU Partnership. He explained that the project is currently in the second phase and has the goal of developing a system of MRV indicators to monitor mitigation actions implemented to achieve the commitments of the Brazilian NDC.

Guilherme mentioned the studies already conducted as part of the project, including the analysis of the emission profile of the state and the reference case scenario, and explained that the mitigation scenario is being elaborated. Thus, the objective of the workshop is to present and discuss preliminary results of the mitigation scenario so that they can be refined with the participation of state stakeholders.

Telmo Borges (SEAS-RJ)

Telmo thanked for the opportunity to have the state of Rio de Janeiro as part of the project, reminding the political difficulties that prevent the state from advance the climate agenda in the state. He stated that this partnership as part of the project is crucial for the state to make progress in this agenda. Next, Telmo mentioned some recent progresses in the state, such as the application of projects to the State Fund of Climate Change, studies for the establishment of a state carbon market, the state plan of forest recovery, among other initiatives. He also mentioned the intention of revising the state emission targets and the contribution that the results of the ICAT project can provide in this process.

Emilio La Rovere (Centro Clima)

Emilio started saying that the studies of the ICAT project can provide a contribution to the initiatives mentioned by Telmo. He said that the purpose of the workshop is to present the projections of the GHG emissions in the state until 2030, both in the reference and the mitigation scenarios. He explained that the studies seek to assess what each sector can achieve in terms of GHG emission reductions, based on the national case, and then apply that to the state context making the necessary adjustments and including or excluding actions that are relevant for the state.

Bruna Guimarães (Centro Clima)

Bruna starter reminding the methodology used in the ICAT phase 1 project and the scenarios developed, as well as the studies already concluded in this second phase. She explained the process to elaborate the scenarios in the second phase, including the data used, the hypotheses and the mitigation action included. Bruna detailed the mitigation actions considered in the mitigation scenario for the state and presented projections for the emission factors in each sector based on the results of scenario C from the first phase of the project.

Erika Nogueira (Centro Clima)

Erika complemented the explanation about the methodology to elaborate the mitigation scenario for the state, explaining the calculus of the percentages of emission reductions in this scenario compared to the reference scenario, using the parameters of the ICAT phase 1 project. Next, Erika presented the results for each sector.

The results show that in the reference scenario the total emissions of the state in 2030 would be 56% higher than in 2005, whereas in the mitigation scenario this increase would be of 33%. The sector of energy supply is the main source of emission in the state and the one that will present the biggest increase, of 121% in the reference scenario and 102% in the mitigation scenario. Industry also stands out as second major emitting sector, but with a great mitigation potential, with projections indicating an increase of emissions of 79% and 38% in the reference and mitigation scenarios, respectively. Similar situation occurs in the transport sector, which in the reference scenario is expected to increase by 44%, whereas in the mitigation scenario there would be 8% of increase. The only sector that presents reduction in GHG emissions is AFOLU, with a 2% reduction in the reference scenario and 18% in the mitigation scenario.

The presentation used by the team of Centro Clima is available here, and the full video of the workshop is available here. After the presentations by Centro Clima, Guilherme Lima invited the audience to participate and bring contributions to the analyses.

Maria Silvia Muylaert (CEHAB-RJ)

Maria Silvia mentioned that the National Inventory of GHG recently published in the Fourth National Communication did not take into account state and municipal protected areas in the AFOLU sector. She asked if in this case those protected areas do not contribute to the targets of the Brazilian NDC and if they would be included in a possible carbon market after the Article 6 of the Paris Agreement is implemented.

Carolina Dubeux (Centro Clima)

Carolina replied that she would have to analyze better this question, given that state and municipal protected areas are supposed to be included in the Nationa Inventory of GHG. Later in the workshop Carolina informed that the state inventory of GHG includes state protected areas, but the national inventory has its own methodology and it is not simply the sum of state inventories.

Helga Restum (SEAPPA/SUPSDR)

Helga asked about the AFOLU sector and the use of federal policies to project the state emissions, and if the scenario included state policies.

Bruna Guimarães (Centro Clima)

Bruna replied that the preliminary projections were based on the results of the ICAT project first phase, which was implemented at national level. Then Erika complemented that it is important to has estimates of state policies and programs to be included in the mitigation scenario for the state of Rio de Janeiro.

Telmo Borges (SEAS-RJ)

Telmo commented that this partnership constructed as parte of the ICAT project is the beginning of a dialogue to elaborate a strategy for mitigation of GHG emissions in the state. He mentioned a project to strengthen the instruments of the climate policy in the state and that one of its components is aimed to have an analysis of each sector, its emissions and mitigation actions. Next, he asked if it was possible to analyze what are the main activities in which the state can make investments to reduce GHG emissions, so that it is possible to better direct the policies.

Nelson Teixeira (SEAPA-RJ)

Nelson complemented the speeches of Telmo and Helga, suggesting toestimate the potential of carbon sequestration in the agriculture, so that it is possible to elaborate a strategy with goals and targets. He also asked about how results can be monitored, mentioning the current economic situation on the state of Rio de Janeiro, which paralyzes many activities of monitoring. He highlighted the need to have a regular monitoring of the implementation of state policies.

Emilio La Rovere (Centro Clima)

Emilio replied first the question made by Nelson, explaining that the objective of the ICAT project is exactly to enhance transparency, and the MRV indicators elaborated in the project contribute for that. In the past, indicators were widely used at Project level, and now the objective if to formulate indicators pro policies and programs and provide an annual monitoring. Commented about the types of indicators that can be used for monitoring, such as absolute emission indicators and emission driver indicators, which will be presented in the last report of the project.

Emilio said that in the transport sector most of the policies are federal, on which the state cannot interfere, but the state can review its model for public transport after the current crisis and invest in electromobility both the public and private transport. Regarding the sector of energy supply he mentioned that it is necessary to make changes in the environmental licensing, in the terms of compromise and in the programs do depollute refineries.

He concluded reminding that the state of Rio de Janeiro has mitigation targets that are not being achieved, and that we have the opportunity to review them to stablish new targets that are feasible. The results of the ICAT Project show that many targets are far from being achieved and that it is necessary to discuss and update them

Guilherme Lima (CBC)

Guilherme concluded the workshop thanking the presence of the participants and reinforcing the importance of this space to discuss the mitigation actions in the state and provide the e-mail of the team to receive contributions.

4. Final remarks

Centro Brasil no Clima and Centro Clima have jointly organized 7 workshops as part of the ICAT Brazil Project. The first workshop was held in August 2020 and was aimed to provide a capacity building to state stakeholder about the climate agenda, so that they could better engage in the discussions of the project. The other six workshops were divided into two rounds of three workshops each, being one for each pilot-state. The first round was held in October-November 2020, whereas the second round happened in April-May 2021.

It is noteworthy that this number of workshops is far beyond the initial proposal of the project, given that the work plan had stablished the need of at least one workshop aimed at presenting fundamental topics of the climate agenda. The organization of the two rounds of workshops to discuss the results of the analyses with state stakeholders shows the attempt to construct a participative process in the project.

The training workshop held in August 2020 had the participation of eight states that showed interest in receiving the capacity building. Those were states with which CBC has been engaging to advance with the climate agenda at subnational level and that showed interest in engaging in the ICAT project, either following the studies and the results at this phase or as a pilot state in a possible third phase. The meetings to present the ICAT project to states other than the three pilot states helped the project to become known among the state technical staffs. The outcome of the workshop was very positive, with many compliments from the audience about the quality of the presentation, and many of the participants asked if there would be another course. The presentations used in the workshop and the record were made available to participants.

The first round of engagement workshops had three workshops, one for each pilot state. As explained above, each workshop was divided into two parts, being the morning dedicated to present the results of the emission profile and the reference scenario for the states, and the afternoon with the goal of presenting and discussing possible mitigation actions to be included in the mitigation scenario. A first barrier identifies at this stage was related to the large number of stakeholders that were necessary to reach. In order to have relevant discussions and contributions, it was important to have representatives from all the sectors analyzed in the project (AFOLU, energy, industry, transport and waste), as well as from different perspectives (government, private sector, academia and civil society). The institutions with which CBC engaged to execute the project were highly important to overcome this barrier, both bringing possible names to be invited and providing contacts, and also helping to articulate local actors to participate in the workshops.

A second barrier that we had to deal with was related to the knowledge of state stakeholders about the climate agenda, and in particular about mitigation actions and policies. On the one hand, the

training workshop helped to fill in this gap and prepare them to the discussions. On the other, some participants had a very straight and technical knowledge about their sector and could not provide relevant information about mitigation actions. Many times, their interventions were to solve doubts about the topic or to express some opinion, and then did not contribute significantly to refine the results or to provide state mitigation actions that could be included in the analysis. To overcome this barrier, we tried to explain as much as possible about the kind of information that was necessary to the analyses and provided our contacts to receive further contributions after the workshops. In some cases, participants made contact to send additional information about existing policies and actions that could be relevant.

One particular case happened for the state of Minas Gerais, where the participants in the first workshop asked for more moments like that to discuss. To meet this request, CBC and FEAM-MG jointly organized in March 2021 five working groups (one for each sector), where we could deeply discuss mitigation actions for the state. The team of FEAM-MG was highly engaged in the project and was interested in using the results to update their state climate plan. In those workshops we discussed the previous state plan and the proposed actions, as well as mitigation actions proposed by the Brazilian Forum of Climate Change (FBMC) that would be included in the mitigation scenario.

Finally, the second round of workshops, also with one workshop for each pilot state, was used to discuss preliminary results of the mitigation scenario. At this time, with concrete actions and results to show to the participants, their interventions were more pertinent, either suggesting to exclude some mitigation option that was not relevant for the state (or some policy/action that was not active anymore), or bringing some important program that should be included. One barrier was that sometimes policies suggested by the participants were not quantifiable, ie., did not have targets or expected results in terms of absolute GHG emissions or for emission drivers.

Therefore, the organization of the workshops was a very important step of the project. It contributed in many ways: to make the project known among state stakeholders; to engage states that were not committed with the climate agenda; to provide capacity building to state stakeholders; to contribute to a network of partnerships both within the states and among different states; to make state stakeholders fell part of the process of developing a policy, such as in Minas Gerais and Rio de Janeiro, that intend of update their climate plans; and, maybe most important, to receive feedbacks and validate the results of the project with local actors that have an indispensable knowledge about the state context. The barriers related to the large number of stakeholders to reach, and the lack of knowledge are somehow inevitable at subnational level, but the workshops contributed to fill this gap and help next steps the state institutions may take in this agenda.