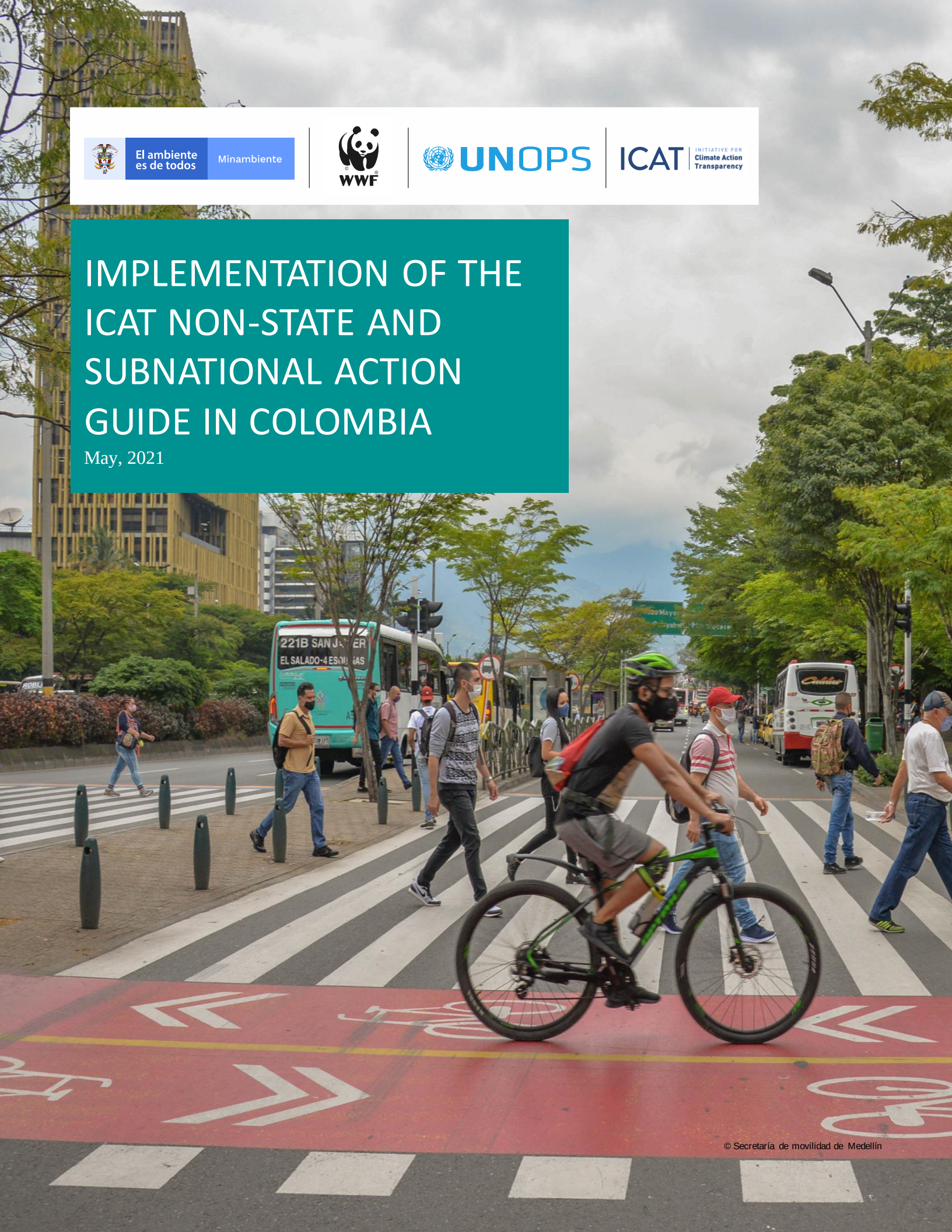
IMPLEMENTATION OF THE ICAT NON-STATE AND SUBNATIONAL ACTION GUIDE IN COLOMBIA

May, 2021



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EXECUTIVE SUMMARY

This report describes the process and results of implementing the ICAT Non-State and Subnational Action Guide in Colombia, executed by WWF-Colombia for the Ministry of Environment and Sustainable Development (MinAmbiente), with the support of the World Resources Institute (WRI) and with the accompaniment of the Ministry of Commerce, Industry and Tourism (MinCIT).

The document is divided into three sections: The first section presents the project context and the process followed to collect necessary information and data for the assessment. The second section provides the methodological details of the assessment, the necessary assumptions and information gaps. The third section presents the results of the different analyses carried out followed by a discussion and recommendations for recording and obtaining information on mitigation actions by non-state and sub-national actors in the country.

The project assessed the mitigation potential of 48 actions by private companies and transport projects implemented in cities, which is equivalent to a reduction of 3,550 $ktCO_2$ in 2030. This reduction corresponds to 0.8% of total national emissions projected for 2030 according to the reference scenario of the latest NDC update. The assessment underlines the need to define and strengthen communication strategies with identified actors for future quantification of their mitigation contributions. In the private sector, 60% of actions could be confirmed with primary information provided by the companies, which adds a degree of uncertainty to the actions that could not be confirmed. Similarly, in cities, 52% of the actions were confirmed with the local entities in charge of implementing the actions.

The project also assessed the potential for hypothetical actions on a larger scale. In a hypothetical scenario, if Bogota's plan to replace 10% of its diesel buses with electric buses is replicated in 14 other cities in the country, an additional 298 $ktCO_2$ of emissions could be avoided on top of actions already planned. This is equivalent to 7% of the national reduction goal of 4,200 $ktCO_2$ for 2030 established in the updated NDC. The results thus suggest that fleet electrification actions by cities should be significantly more ambitious to meet the national goal. It is also necessary to accelerate the implementation of the measures designed by the National Government to comply with these goals, such as the electric mobility NAMA (NAMA MovE).

Another hypothetical scenario evaluated the potential for non-motorized transport through the construction of cycling infrastructure. It assumed an expansion of the cycling infrastructure network in the 100 largest cities in the country by a total of 1,580 km. The analysis shows that such an expansion would yield an emissions reduction of about 240 additional $ktCO_2$, or about 0.5% of the emissions of all land transport nationwide.

The assessment identified several cities and private companies with emission reduction goals and quantified their mitigation potential towards realizing the enhanced ambition in Colombia's revised NDC. It also identified the need for building capacity so that the identified actions can be comprehensively reported through RENARE in a consistent and transparent manner. It is recommended that a process be established to identify needed support in this area and a capacity building plan be developed and executed as part of the NDC implementation. This will help integrate the subnational and private sector efforts in addressing the climate crisis.


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GLOSSARY

AFOLU	Agriculture, Forestry and Other Land Use
ANDI	National Business Association of Colombia
BEIS	Department for Business, Energy & Industrial Strategy (UK)
CAAT	Climate Action Aggregation Tool
ENME	National Electric Mobility Strategy
FECOC	Colombian Fuel Emission Factors
GEF	Global Environment Facility
GEI	Greenhouse Gases
GRI	Global Reporting Initiative
ICAT	Initiative for Climate Action Transparency
LEAP	Low Emissions Analysis Platform
MinAmbiente	Ministry of Environment and Sustainable Development
MinCIT	Ministry of Commerce, Industry and Tourism
MinEnergía	Ministry of Mines and Energy
MinTransporte	Ministry of Transport
MRV	Monitoring, Report and Verification
NAMA	Nationally Appropriate Mitigation Action
NDC	National Determined Contributions
PIGTCC	Integral Plan for Climate Change Territorial Management
WRI	World Resources Institute
WWF	World Wildlife Fund
UPME	Mining and Energy Planning Unit
RENARE	National Registry for Emissions Reduction
RUNT	Unique National Transit Registry

CONTENTS TABLE

INTRODUCTION

This document describes the research approach, methodologies, results, and recommendations developed in the implementation of the Initiative for Climate Action Transparency (ICAT)[1] Non-State and Subnational Action (NSA) Guide and its accompanying Climate Action Aggregation Tool (CAAT)[2] in Colombia.

Below is the roadmap followed during the implementation of the ICAT NSA Guide in Colombia to quantify the reduction of greenhouse gas (GHG) emissions from non-state and sub-national actors. The process was carried out in parallel with and as a complement to the update of the Colombian NDC and is the first exercise of its kind to be carried out in the country.

The implemented roadmap follows the steps outlined in Figure 1.

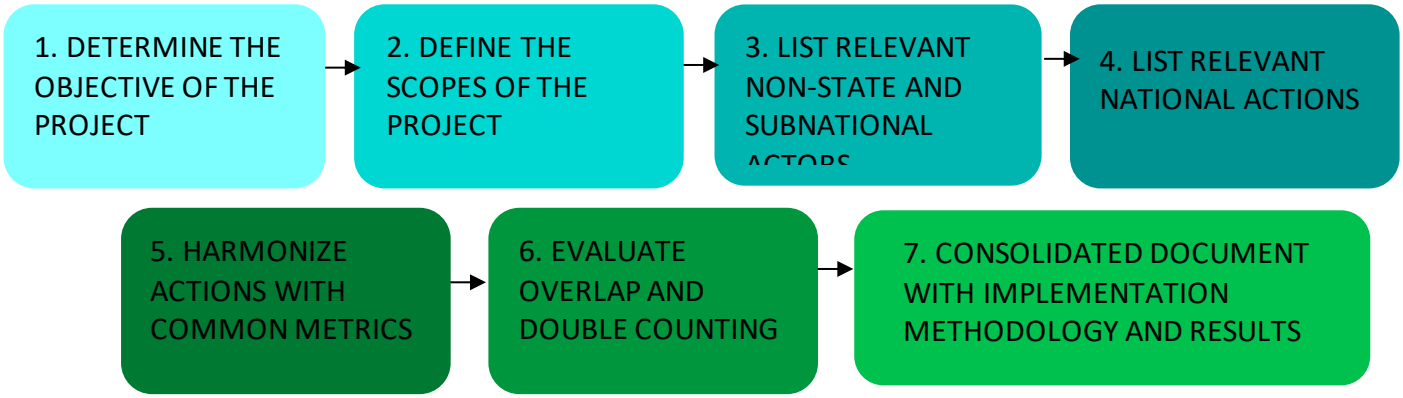


Figure 1. Scheme of the roadmap applied in the ICAT project (Own authorship based on the ICAT methodology)

This document is divided into three sections. The first section presents the context in which the project was developed and the process that was followed to collect all the information necessary for the evaluation and identification of national actions that have some overlap with the actions identified. The second section shows the methodological detail of the evaluation carried out, the necessary assumptions and information gaps. The third section presents the main results of the analyses carried out using the ICAT CAAT through the construction of different scenarios, followed by discussion and recommendations for recording and obtaining information on actions from non-state and sub-national actors in the country.

[1] https://climateactiontransparency.org/icat-toolbox/non-state-subnational-action/
[2] https://climateactiontransparency.org/icat-toolbox/climate-action-aggregation-tool/

SECTION I: FIRST STEPS OF THE ICAT NSA GUIDE

In this first section, activities 1 to 5 are presented. These activities allowed the team to define the objectives and limits of the analysis of the project, as well as to list the key actors and their corresponding actions (Figure 2). Additionally, national policies with relevant relationships with the mitigation actions were identified and the possible overlap between mitigation actions and policies was analyzed.

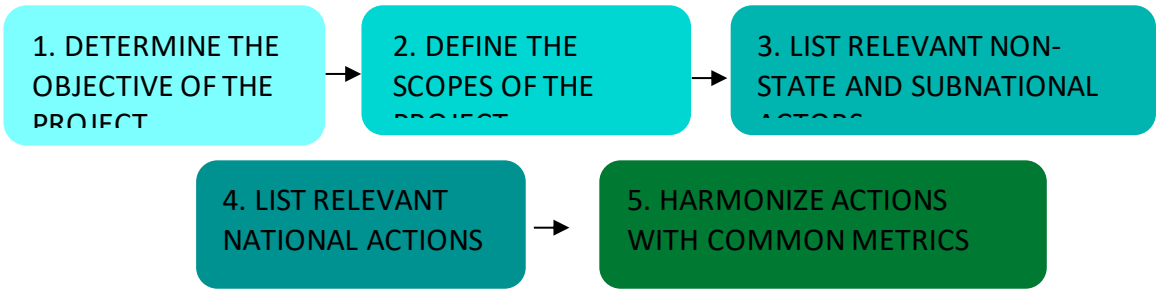


Figure 2. Steps of the roadmap addressed in section I of this document (own authorship based on the ICAT methodology)

1.1 Development of the objective for the ICAT project in Colombia

The main objective of the implementation of the ICAT Non-State and Subnational Action Guide is to quantify and make visible the mitigation measures currently carried out in Colombia by non-state actors (national and international companies with operations in Colombia) and sub-nationals (cities, regions and departments). Additionally, the aim was to support the MinAmbiente in identifying actions that could contribute to the NDC during the updating process that took place in the second half of 2020.

1.2 Defining the limits of the ICAT project

During the process of updating the NDC, different organizations and NGOs supported the MinAmbiente in identifying additional mitigation actions to those that had already been identified by the National Government. These newly identified actions were to then be included in the modeling that was being carried out during the update process. Through meetings with the MinAmbiente, it was established that the sectors and segments that still required support in its analysis were the transport sector at the urban level and actions developed by private sector companies.

The project boundaries were set in conjunction with the MinAmbiente according to the needs for the collection of information from territorial entities and the private sector. In accordance with this, the project focused on the transport sector of cities and on actions taken by the private sector (for companies belonging to any sector of the economy). The boundaries for these two groups of actors and actions analyzed are defined below.

1.2.1 Defining the limits for actions implemented by private sector companies

For private sector companies, it was agreed that climate change mitigation actions in all sectors of the economy would be considered. The project only taken into account actions that account for direct emissions in operational processes, reduction of transport emissions if the company has control over the operation of the fleet (Scope 1) and energy efficiency programs and actions to expand the use of renewable energies (Scope 2)[3]. It was also agreed that all greenhouse gases for which companies could provide an emissions inventory would be taken into account. This process is shown in Figure 3.

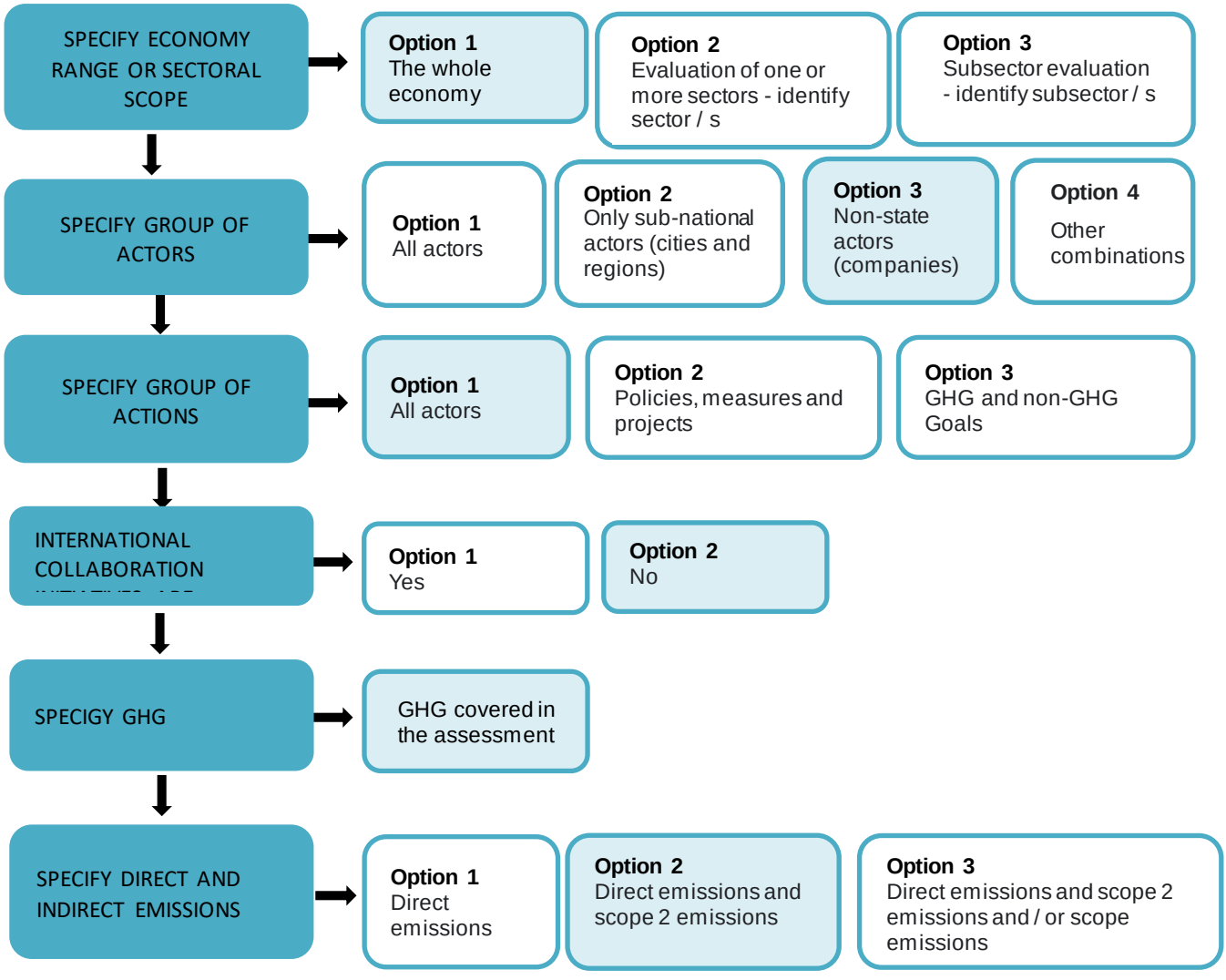


Figure 3. Defined boundaries for the ICAT assessment in the private sector (own authorship based on the ICAT methodology)

[3] Scope 1: Direct emissions occur from sources that are owned or controlled by the company. For example, emissions from combustion in boilers, furnaces, vehicles, etc.
Scope 2: Includes the emissions from the generation of electricity acquired and consumed by the company, these emissions physically occur in the plant where the energy is generated.

1.2.2. Defining the boundaries for actions implemented by transport sector in cities

In this case, actions and goals that have GHG mitigation potential in the transport sector being led by sub-national actors such as cities, metropolitan areas and regions, were taking into account. This was agreed with the MinAmbiente, taking into account the specific support requirements in areas and sectors that were not being analyzed by other organizations in the process of updating the NDC. Sectors other than transportation were analyzed in the cities by Fondo Acción through the IKI project. Figure 4 shows the different options defined in the ICAT methodology to focus the search for initiatives. It was determined that direct actions and those of scope 3 would be included if identified. No limit was set for the GHGs that would be included in the analysis. The options that defined the boundaries for the projects in the territories included in this project are highlighted in blue.

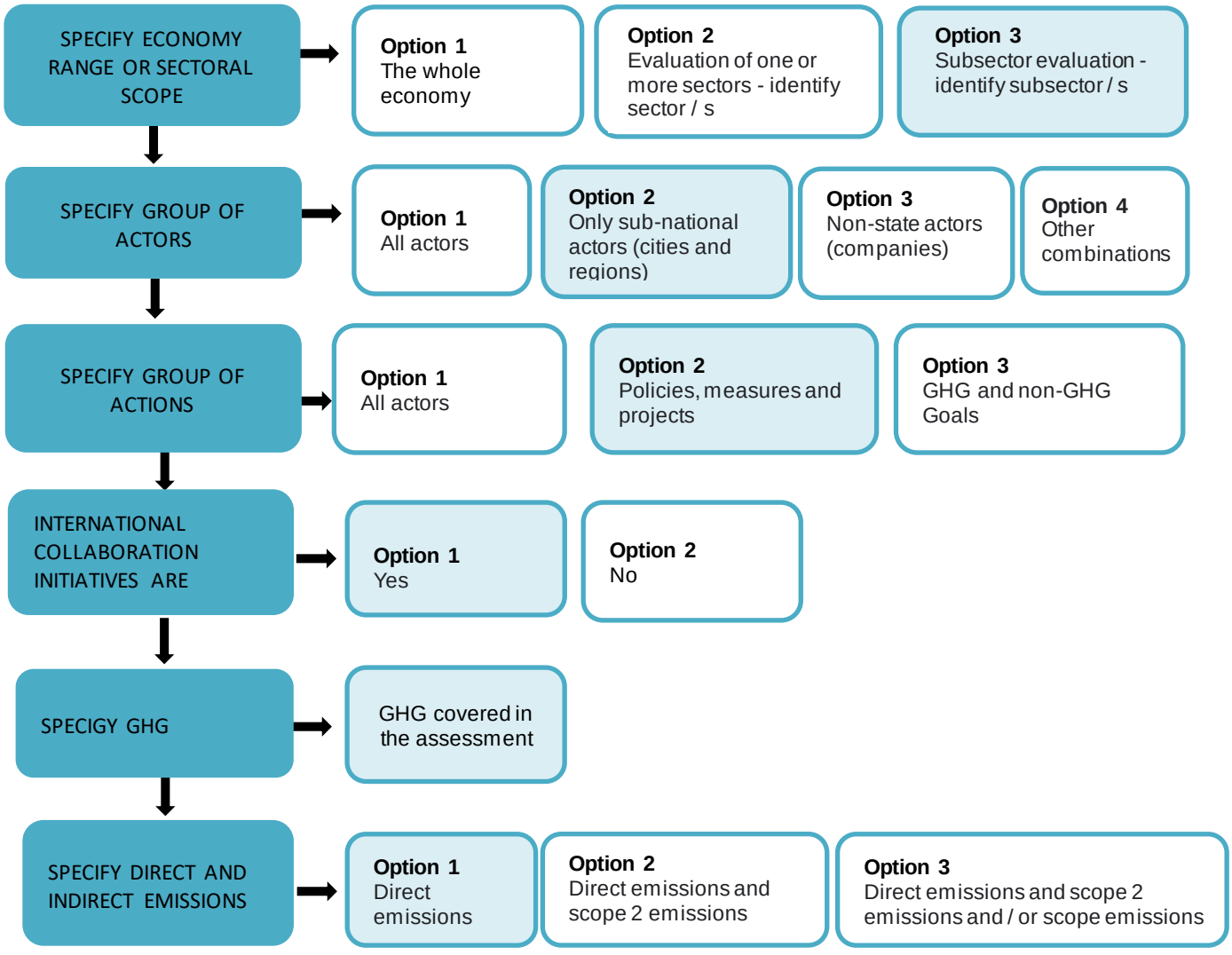


Figure 4. Defining the boundaries for the ICAT assessment in the transport sector in cities (own authorship based on the ICAT methodology)

1.3 Construction of the list of non-state and subnational actors and their respective actions considered for the analysis

Both for transport actions in cities and for actions implemented by the private sector, the data collection process was based on existing lists and databases built by ministries, unions, and other NGOs such as Fondo Acción[4]. In both cases the preliminary lists were subjected to validation processes, where actions were discarded responding to different criteria than are described in this section.

In the preliminary list for the transport sector, some actions had goals that were beyond the expected order of magnitude, for example they exceeded the emissions of the entire sector or were disproportionately high. In other cases, information regarding the year of goal compliance was not complete or these actions had begun their implementation before 2015, therefore disqualifying the action from contribution to the NDC. As a result of this process, some actions were discarded. In the case of the private sector, companies that had goals or actions to reduce emissions, energy efficiency or renewable energies were selected: **(Criterion 1: Consistency of the goals).**

Subsequently, a contact person was identified for each of the entities (in the case of cities) and companies (in the case of the private sector). This contact would ideally be responsible for the goals and could corroborate that the information in the data represents a real and quantified goal. It was not possible to carry out a virtual meeting to validate the information in all cases; thus, an initial classification of actions was performed: "with confirmed information" and "without confirmed information". Actions that had clear and consistent goals, but for which it was not possible to confirm the information in the databases through meetings with entities and companies, were included in the ICAT analyses under the classification of "no confirmed information". However, it is important to bear in mind that these actions have a higher level of uncertainty. In a potential second phase of the project, an attempt could be made to contact all the actors to reduce uncertainty and increase the confidence in the commitment. Regarding the actions "with confirmed information", some actions were discarded as a result of the information corroboration process with the responsible entities. In many cases actions were part of, for example, past mayoral goals (in the case of transport actions in cities) but there was no plan in place by the current administration to meet these goals. **(Criterion 2: Confirmation of the information with the entities in charge of the actions).**

Additionally, and as part of the NDC update process, MinAmbiente had identified some actions that were being monitored (and quantified) by the National Government. These actions are generally part of cooperative projects such as NAMAs (TOD, MovE for example), the Global Environment Fund (GEF),

[4] Fondo Acción made an exhaustive mapping of actions, this preliminary list was provided by Fondo Acción to WWF at the beginning of the project.

national macro-projects in the mining-energy sector and ongoing discussion groups with MinAmbiente. During the implementation of the ICAT NSA project, mitigation actions that were part of these and other projects were identified. Each case was discussed with MinAmbiente in order to avoid double reporting and accounting of these emission reductions. In order to identify which actions had risk of double counting, the actions were classified as "with overlap" or "without overlap." This process helped indicate which actions were already being monitored by the National Government and had total overlap with national measures. In the ICAT modeling, actions with and without overlap were included according to the specific analysis in each case as will be shown later in this report **(Criterion 3: Overlap with actions implemented by the National Government).**

The application of these criteria and classifications for the two groups of actions analyzed in the project is described below: private sector actions and transport actions in cities.

1.3.1 Construction of the preliminary list of private sector actors and actions and prioritization process

The development of the list of private sector actors began with a detailed review of existing databases provided by the MinAmbiente, MinCIT, information available online such as the CDP platform and corporate sustainability reports, among others. To complement this information, the WWF team held two workshops with companies affiliated to the National Business Association of Colombia (ANDI) in order to identify additional companies and actions to be analyzed in the ICAT project. These two processes are described below.

1.3.1.1 Review of existing databases

For the listing of private sector companies, the first inputs were provided by the MinAmbiente and MinCIT databases, corporate sustainability reports of companies, Global Reporting Initiative (GRI)[5] databases and the CDP[6] databases. In this first review, 78 companies were identified for analysis in greater detail. The process followed to reach these 78 companies is presented below.

a) In the first place, companies that reported emission reduction goals were identified in the database provided by MinCIT. 475 companies were initially identified, of which 47 had GHG emission reduction targets in their national operations and 9 had reduction targets for their global operations, adding up to a total of 56 companies that could potentially be included in the analysis.

[5] https://database.globalreporting.org/search/

[6] https://www.cdp.net/en/companies/companies-scores

b) The information provided by MinCIT was contrasted with the sustainability disclosure database, which features sustainability reports from companies worldwide. Although for some companies the same information was already reported in the database provided by MinCIT, in other cases updated information was found.

c) Additionally, to ensure that the most up-to-date information was available, the corporate sustainability reports were verified on the websites of the identified companies. Companies that did not comply with the minimum necessary information were then discarded. Thus, of the previous 56 companies, 42 remained.

d) A second source of information provided by MinCIT was used, which listed projects that have been registered with the National Environmental Licensing Agency (ANLA). The shared database had listed projects from 2017, 2018 and 2019, but only the 2019 information had enough data for the evaluation. From this database, 5 companies were identified in addition to the 42 above.

e) Similarly, a third source of information for identifying emission reduction actions was the CDP database. This database has a registry of 17 companies in Colombia that report emission reduction goals and actions, of which 10 have sufficient information for evaluation. However, 7 of these 10 were already within the 42 companies from the first MinCIT database, so only 3 more were added to the project list.

f) Additionally, taking CDP's recommendation, the WWF team carried out its own search on the multinational companies that report in the CDP database and are part of the 100 largest companies in Colombia. From this search, 9 additional companies were added, adding to a total of 59.

g) Finally, a second stage of identifying companies with actions in energy efficiency and conversion to renewable energy was carried out. In this second stage, the MinCIT databases were reviewed again. After an analysis of the sustainability database and reports of the sustainability disclosure database, a total of 19 additional companies with renewable energy goals were added.

1.3.1.2 Workshops with companies affiliated with the ANDI

To further identify companies and compile the final list of mitigation actions implemented by the private sector, two virtual workshops were held in collaboration with the ANDI and the MinAmbiente for the affiliates of the association[7]. A survey was designed to collect the information, which allowed for the identification of companies with existing goals or actions to reduce emissions, use more renewable energy or enhance energy efficiency.

[7] The workshops took place on October 5 and 6, 2020 with an approximate capacity of 50 companies in the 2 sessions, lasting an hour and a half.

During these sessions, MinAmbiente presented the process of updating the NDC and WWF presented the ICAT NSA project, together with the relevance of the private sector in both the NDC and in the first implementation of the ICAT NSA Guide. Likewise, during this space, the participants were surveyed and a round of questions and answers was developed. Finally, the steps to follow were presented for companies that wanted to provide information on their actions in order to be included in the project analysis.

Of the 50 companies that attended the workshops, 20 answered the information capture survey designed by WWF. The results of the responses received during the two workshops are presented below.

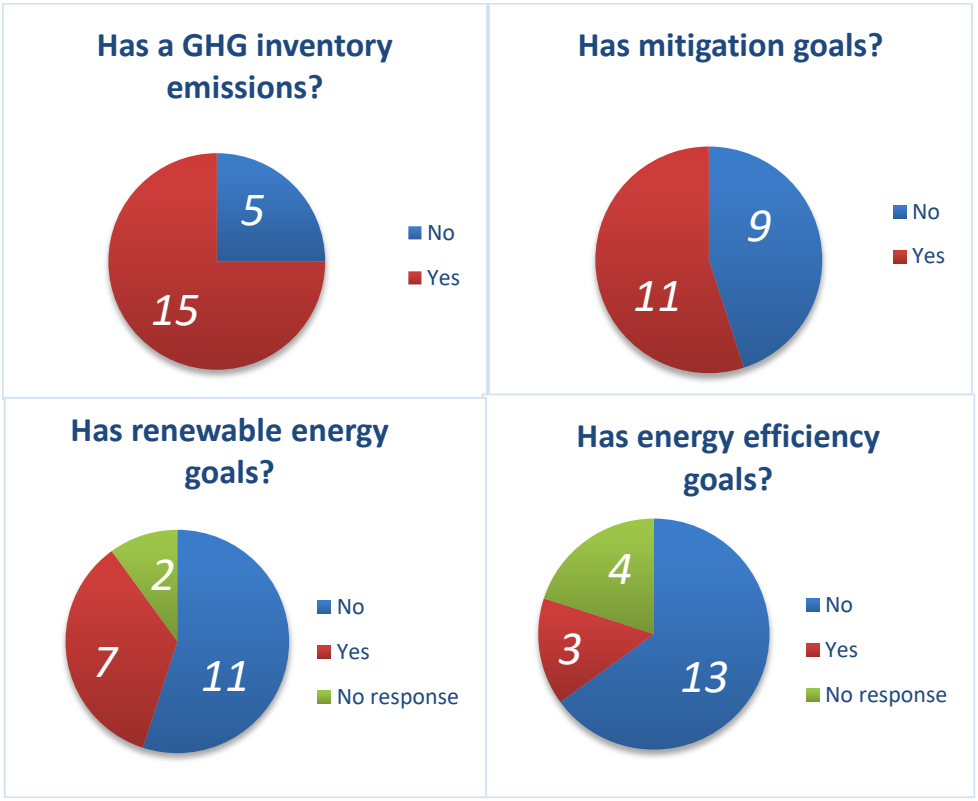


Figure 5. Number of companies that reported having a GHG emission inventory at the workshop

Figure 5 shows that 15 of the 20 companies have an emissions inventory, 11 have short, medium and / or long-term climate change mitigation goals, 3 consider energy efficiency goals and 7 have renewable energy goals.

Of the total of the 20 companies that participated in the survey, 6 were discarded because they do not present the minimum requirements to be considered in the ICAT analyses (actions or goals to reduce emissions, energy efficiency or renewable energy). Of the 14 remaining companies, 1 had already been contacted by WWF and had shared information for this project (Empresas Públicas de Medellín - EPM). Of the remaining 13 companies, 8 were new (they had not been identified in the initial databases) and 5 had been previously identified, but effective contact had not been achieved, so this opportunity was used to establish contact. All 13 companies were asked for specific information about their actions, however,

only 2 responded: **Ladrillera Meléndez** and **Cerro Matoso**. In conclusion, the 8 additional companies identified through the workshops were added to the final list, 6 with unconfirmed information and 2 with confirmed information, for a total of 86 actors.

Table 1. Details of the companies included in the database through the workshops with the ANDI

Companies added to the WWF list to be part of the ICAT analysis	1. *Cerro Matoso* 2. *Grupo Argos* 3. *Cenit* 4. *Acerías Paz del Río* 5. *Veolia* 6. *Ladrillera Meléndez* 7. *Promigas* 8. *Gaia Servicios Ambientales*
Companies that had been previously identified in the databases	9. *Odinsa* 10. *Celsia* 11. *Bimbo de Colombia* 12. *Air liquide* 13. *Cementos Argos*
Company that had already shared information with WWF by the date of the workshop	14. *Empresas Públicas de Medellín (EPM)*
Companies that fulfilled the minimum requirements[8] to be added into the analysis	15. *Monómeros S.A* 16. *Araujo Ibarra* 17. *Cerámica San Lorenzo* 18. *Mineros Aluvial S.A* 19. *Custodiar S.A.S* 20. *Ecoacciones*

1.3.1.3 Preliminary list of private sector actors

In the process of building the preliminary list, 86 companies with potential mitigation actions were identified, of which: i) 42 companies were identified from the first search phase in the MinCIT databases, ii) 5 companies by the ANLA database, iii) 3 companies by the CDP database, iv) 9 companies by the WWF team's own search, v) 19 companies from the second phase of search for energy efficiency goals and renewable energies in the MinCIT database, and vi) 8 additional companies in the workshops with ANDI.

[8] Goals for reducing GHG emissions, energy efficiency or renewable energies

Of the 86 companies, meetings were held with 20, in which they were asked to confirm the information. 11 companies sent the required information. Subsequently, a process of harmonization of information was done to calculate the inputs through the CAAT tool. Finally, 25 actions were included in the model for which the analyses of this report have been made. Table 2 describes this process.

Table 2. Summary of the applied methodology and prioritization criteria used for the identification and mapping of private sector actors and actions

ICAT OBJECTIVE	METHODOLOGY FOR IDENTIFYING AND SEARCHING FOR ACTORS AND ACTIONS	DATABASES	ANALYSIS / NUMBER OF ACTORS

Identify and prioritize actors and actions relevant to climate change mitigation.	Phase I: Search for private sector actors for all sectors of the economy with goals and measures to reduce GHG emissions.	• MinCIT database, and ECDBC (475 companies)
		• ANLA 2019 certification database
		• Sustainability disclosure database (Global Reporting Initiative)
		• CDP database
		• WWF search from the list of the 100 largest companies in Colombia, making a cross with previous databases.
			• MinCIT database -> 475 companies:
			  ○ 56 companies with GHG emission reduction goals in their national or global operations
			  ○ Of the 56, 42 had the minimum required information for the analysis
			• 5 additional from ANLA database
			• 3 additional from CDP
			• 9 additionally researched by WWF
			Total phase I: 59 companies

	Phase II: Search for private sector actors for all sectors of the economy with goals and actions in energy efficiency and renewable energies.	• MinCIT and ECDBC database • Corroborate initial information with the sustainability disclosure database (Global Reporting Initiative) • Corroborate information with the CDP database	• MinCIT database -> 475 companies: ○ 19 companies had the mimimum information required **Total phase II: 19 companies** **Total phase I and II: 78 companies**

	ANDI Workshop: Presentation and invitation to participate in the ICAT project in Colombia to the affiliated companies and the ANDI chambers.	• Workshop 1: Companies prioritized by Phase I and Phase II exercises
		• Workshop 2: Prioritization of companies affiliated to the Chamber of Mines and Energy.
			• 20 companies responded to the survey
			  ○ 14 fulfilled minimum requirements for the analysis
			  ○ 8 additional to phase I and II
			Total ANDI: 8 companies
			Total phase I, phase II, and ANDI: 86 companies

Harmonization of company information to ICAT CAAT.	From the total number of prioritized companies, the information confirmed by stakeholders and information in CDP and business sustainability reports is analyzed.	• Companies from various sectors that expressed their desire and willingness to participate and cooperate in the ICAT project by sharing their information
		• Companies that reported that they are currently updating inventories, processes and investments
			• Meetings were held with 20 of the 86 companies identified.
			  ○ 11 companies sent in information
			• 66 companies without direct contact with the WWF team but with information available online
			  ○ 8 companies with sufficient information for modeling
			Total ICAT: 19 companies

1.3.2 Building the list of the transport sector actions in cities

The construction of the list of actors in cities and territories was based on individual meetings with territorial actors identified in databases provided by MinAmbiente, Fondo Acción and other projects participating in the process of updating the NDC. Moreover, MinAmbiente and Fondo Acción held a series of workshops with territorial nodes. The NODES are regional bodies that act to achieve inter-institutional coordination at the central and territorial level in matters of climate change and are part of the SISCLIMA. The WWF team attended these workshops and thus identified the measures mentioned in the transport sector. Subsequently, a preliminary list was made that was supplemented with information available from MinAmbiente and other WWF projects. The details of this process are presented below.

1.3.2.1 Review of existing databases of transport actions implemented by cities

Having identified the boundaries for searching initiatives by subnational actors, the database of actions and measures of subnational actors compiled by Fondo Acción for MinAmbiente within the framework of the IKI Project was taken as a starting point. The WWF team actively participated in the Regional Node meetings to which it was invited by Fondo Acción and MinAmbiente. These meetings sought to provide relevant information for the process of updating the NDC from governments, mayors, and corporations, and to establish contact with the entities in charge of implementing the identified actions.

With the information provided by Fondo Acción, mostly obtained from the Comprehensive Territorial Climate Change Management Plans (PIGTCC), a preliminary list was built that groups a total of 92 transport actions for 16 departments and cities of the country. The database was then fed with contact information of an official of the entity in charge of the identified action or project.

Subsequently, meetings were held with the actors and entities responsible for the actions. The objective of the meetings was to confirm or clarify information on the goals of the 92 actions initially identified in the preliminary database. It was not possible to confirm the information through direct contact with local entities in all cases, as it was not clear which entity was responsible for the project. In some cases, the goals of the preliminary list corresponded to actions planned by the previous municipal governments (2016-2019) for which the incoming governments did not have any follow-up or implementation plans; these actions and goals were discarded. In other cases, we found goals that were not clear or consistent[9] with the level of emissions in the transportation sector reported by the

[9] Some of the goals of the preliminary list of 92 actions had orders of magnitude that exceeded the total emissions of the city and in some cases of the transport sector, these actions were discarded.

National Government, or the initiatives had no clear timeframe for the achievement of the identified goal.

Taking into account the above, 75 actions were discarded, leaving a total of 17 projects in the country's departments, metropolitan areas and cities on the list.

Additionally, during meetings with local entities, 15 additional projects were identified, for a grand total of 32 actions. Among the local entities that participated in such meetings are the District Secretaries of Environment and Mobility of Bogota, the Secretariat of Mobility of Medellin, the Metropolitan Area of Valle de Aburra, the Metro de Bogota Company, Transmilenio, Secretariat of Mobility of Villavicencio and the Empresa Férrea Regional de Cundinamarca.

Besides, WWF implemented a project[10] in 2020 through which the design of MRV systems for specific transport measures was carried out - funded by the UK Department of Business, Energy and Industrial Strategy (BEIS). Based on this information, meetings were scheduled to collect information on actions implemented in Monteria, Pereira, Medellin and Cali, with the links already established by WWF. From these meetings, 6 additional projects to those already mentioned were identified, bringing the total to 38. Additionally, WWF also has other projects in Villavicencio and Manizales, which facilitated contact with the Mobility Secretariats of those two cities.

Finally, in agreement with MinAmbiente and with the purpose of covering regions of the country that are not considered in the IKI Project database, an emphasis was placed on the search for projects implemented in the Amazon and Orinoquia regions through meetings with representatives of these nodes. Based on this search, 8 projects were added to those previously identified. In total, 46 actions for transport in cities were identified.

1.3.2.2 Preliminary list of actions by the transport sector in cities

In the construction of a preliminary list of transport sector actions implemented in cities, 46 actions with mitigation potential were identified: 17 were obtained from the Fondo Accion, 15 identified through meetings with local entities; 6 obtained from WWF's work in the BEIS project and 8 actions identified through meetings with the Nodes in Orinoquia and Amazonia.

[10] Catalyze the implementation of local action: unleash the potential of cities. Project implemented by WWF between 2019 - 2021, with support from MinAmbiente and IDEAM and funded by the UK Department for Business, Energy and Industrial Strategy.

Of these 46 actions, it was possible to establish contact and confirm the information with entities responsible for the implementation of 40 of them. For 12 actions, the entities in charge provided WWF with their estimate of mitigation potential. For 11 other actions, the entities in charge provided sufficient information for WWF to support them with the calculation of the mitigation potential and the corresponding projection until 2030. The description of this process is shown in Table 3.

Table 3. Summary of the applied methodology and the prioritization criteria used for the identification and mapping of transport sector actors and actions

ICAT OBJECTIVE	METHODOLOGY FOR IDENTIFYING AND SEARCHING FOR ACTORS AND ACTIONS	DATABASES	NUMBER OF ACTIONS
Identify and prioritize actors and actions relevant to climate change mitigation	Analysis of the Fondo Acción database: the database of actions and measures of sub-national actors compiled by the Fondo Acción for the MinAmbiente within the framework of the IKI Project was taken as a starting point.	Fondo Acción database	96 actions
		Fondo Accion database - filter by actions with available information with clear goals and reported years of execution.	17 actions
	Specific meetings with stakeholders: For cities, metropolitan areas and departments identified in the previous stage, meetings were held with the stakeholders responsible for the projects that have significant mitigation potential.	Compilation of actions obtained from specific actors (mobility and environment secretaries)	15 actions
	Projects characterized within the framework of the BEIS project implemented by WWF	Compilation of actions worked from the BEIS project of WWF Colombia	6 actions
	Specific meetings with Nodes Amazonia and Orinoquia.	Collection of actions identified by Nodes	8 actions
Prioritization of actions for ICAT CAAT	The information collected was analyzed and the stakeholders were contacted, starting with those who were in charge of actions that were considered of interest in terms of mitigation potential. Taking into account the availability and quality of the available information, the corresponding projected emission reduction was associated.	Transport actions for which it was possible to establish direct contact with entities in charge in the cities	40 actions
		Actions whose mitigation estimate was provided by the same actors (confirmed actions)	12 actions
		Actions whose mitigation estimate was made from secondary information by WWF (unconfirmed actions)	11 actions
		Actions modeled in the ICAT CAAT tool	23 actions

1.3.3 Identification of relevant national mitigation policies for ICAT analysis and overlap analysis

1.3.3.1 Identification of relevant national policies for the analysis

The first step was to prepare the list of relevant national mitigation policies and actions for the ICAT analysis in order to subsequently assess possible overlaps. This is because these national actions also have emission reduction accounting processes which could lead to double counting.

Through meetings and information exchange with the ministries (MinAmbiente, MinCIT, MinEnergía and MinTransporte), the following list of national measures to be taken into account in the analysis[11] was identified.

Ministry of Mines and Energy:

- Diversification of the energy matrix of the national interconnected system
  - Potential for reducing GHG emissions in 2030 is 4,740 $ktCO_2e$
- Management of fugitive emissions
  - Potential for reducing GHG emissions in 2030 is 3,240 $ktCO_2e$
- Development of active management of electricity demand
  - Potential for reducing GHG emissions in 2030 is 2,010 $ktCO_2e$
- Promotion of energy efficiency in the mining-energy industry
  - Potential for reducing GHG emissions in 2030 is 1,210 $ktCO_2e$

Ministry of Commerce, Industry and Tourism:

- Energy efficiency program in the manufacturing industry (phase II) - Incorporation of actions to improve logistics operations and product management in supply centers
  - Potential for reducing GHG emissions by 2030 is 1,670 $ktCO_2e$
- Sustainable production processes in the chemical sector
  - Projected to reduce N_2O emissions from companies in the chemical sector by 70%
    - Potential for reducing GHG emissions by 2030 is 600 $ktCO_2e$
- Sustainable production processes in the cement sector
  - Projected to reduce emissions in the sector by 2030 by up to 15% in accordance with the advances in the structuring and viability of projects in the industry
    - Potential for reducing GHG emissions by 2030 is 710 $ktCO_2e$

[11] Update of the Contribution Determined at the National Level of Colombia (NDC). Government of Colombia (2020). Available at: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Colombia%20First/NDC%20actualizada%20de%20Colombia.pdf

- Comprehensive brick development
    - Projected to reduce emissions from the sector by 2030 by around 190 $ktCO_2e$

Ministry of Transport

- National strategy for electric mobility (ENME)
    - 600,000 electric vehicles registered in the RUNT by 2030, which is equivalent to 4040 $ktCO_2e$ emissions reduction
- NAMA Tandem
    - Cities which increase the modal share of bicycle trips by 5.5% by 2030 compared to 2018. This goal has a potential to reduce GHG emissions by 130 $ktCO_2e$
- NAMA TOD
    - Adjust land use and encourage the necessary urban planning within the cities to reduce the use of private vehicles and, if possible, of public transport to reduce fossil fuel consumption in the sector and thus mitigate CO_2 emissions. This goal has a GHG emission reduction potential of 160 $ktCO_2e$

Ministry of Environment and Sustainable Development

- District heating
    - The measure estimates a reduction of 20 $ktCO_2e$ by 2030 through the incorporation of districts in 5 main cities of the country and 3 intermediate cities.

1.3.3.1 Analysis of possible overlap and double counting

The overlap and double counting assessment were developed independently without using the ICAT CAAT tool. The tool allows an evaluation of overlap and double counting between the actions of the evaluated actors, but not with the national trajectories. Because the overlap of the actions identified in this project are with respect to national mitigation measures and not between them, this section of the tool was left unchanged with its default values. It is worth noting that the ICAT CAAT tool uses geographic overlap as a proxy for the overlap of emissions. This implies that if there are departmental and city goals within the same area, ICAT CAAT assumes a total emission overlap and subtracts the city goals from the departmental goals. In the case of the actions identified here, there is no geographic overlap, therefore, there is no emissions overlap between actions.

The overlap assessment with national mitigation measures was carried out through a series of discussions with the MinAmbiente. Identified actions were discussed one by one to determine if there was a possible overlap with national policies. In all actions with overlap, a total overlap was assumed, that is, the action is completely contained in national policies and therefore does not provide additional reductions. Because the distinction of actions with and without overlap is key in the

analysis of the results of this project, it was decided to use the results of specific analyses 1 and 5 as the best indicator of possible overlap and double counting in this context, as explained later.

One of the objectives of the project was to identify additional actions to those that were already being included in the NDC update process. The actions that were part of the national policies described in section 1.3.3.1 were already part of the national accounting, so they were not reported as additional actions to the MinAmbiente. These actions were included in the ICAT NSA project under the label of "actions with overlap with national programs".

In the case of transport actions implemented in cities, all electromobility actions have total overlap with the national goal of electric mobility established in the ENME. Similarly, all actions of public bicycle systems and cycling infrastructure have total overlap with the goal of the NAMA TAnDem.

For the private sector, the actions implemented by companies, for example the electrification of the cargo fleet has overlap with the national goal for electric mobility established in the ENME. Additionally, energy efficiency actions such as fuel replacement or technological improvement overlap with MinCIT's efficiency programs in the manufacturing industry.

1.3.4 Final list of actions analyzed in the ICAT project

The final lists of actors and actions included in the ICAT project are presented below. The classification "with / without confirmed information" refers to whether the information on actions and goals obtained from different databases could be rectified by WWF through meetings with the entities in charge. This classification refers to the level of certainty in the information on the measure, those that are classified as "with confirmed information" have greater certainty of becoming part of the NDC as mitigation actions reported in RENARE than actions for which it was not possible to establish contact with the entities and corroborate their information.

The classification "with / without overlap" refers to the total overlap of the actions identified with national programs and policies. One of the objectives of the ICAT project in Colombia was to identify actions additional to those that were already being included in the NDC update process. Overlapping actions were not submitted to the MinAmbiente as additional actions, however, these were included in the modeling and analysis of the ICAT project. As part of the process with the MinAmbiente to identify actions that were part of the NDC, different mayors and private companies signed letters of consent[12] to include the actions identified in the Colombian NDC.

[12] Letters of voluntary commitment for the actions to be included in the modeling of the NDC update carried out in 2020. The private sector letters were sent by companies and the transport letters in cities by mayors and governors.

1.3.4.1 Final list of actors and actions in the private sector

Table 4. Measures modeled in the ICAT CAAT tool for the private sector

N°	COMPANY	ACTIONS OR MITIGATION PROJECTS	WAS THE INFORMATION CONFIRMED?	DOES IT OVERLAP WITH NATIONAL MITIGATION POLICIES?	WHICH?	IS THERE A LETTER OF CONSENT FROM THE COMPANY?
1	POSTOBÓN	Development of the solar farm in Yumbo that supplies 40% of the electricity demand of the beverage plant, which is equivalent to 6 MW of the 9.8 MW of its installed capacity. The surplus is delivered to the National Interconnected System.	No	Yes	Cogeneration by use of solar energy	No
2	CEMENTOS ARGOS	The net direct CO_2 emissions in the baseline as of 2006 is 735 kgCO_2 / ton of cement produced, and the reduction goal to be achieved at the emissions level is 544 kgCO_2 / ton of cement produced, which represents a reduction in the 25% by 2025 using 2006 as a baseline.	No	Yes	Participation measured in the cement sector MinCIT	No
3	SODIMAC COLOMBIA	Change of lighting technologies by 100%, change of roofs to translucent, transition from Diesel fuels to gas, implementation of first solar farms, energy redesigns.	Yes	No		No
4	GRUPO NUTRESA S.A.	Installation of 4 solar panels to supply outdoor lighting at the pasta production plant in Colombia. Development of new refrigeration technologies in the vending machines of the New Lighting Business in 70 points of the NewBrands plant of the Consumer Food Business in Colombia. Installation of high-tech packing machines and technological replacement of wrapping equipment in the Pasta Business, in Colombia. Sustainable Business Mobility Plan (MES)	No	Yes	Cogeneration by use of solar energy / Energy efficiency in operational processes / Sustainable mobility	No
5	GRUPO CORONA	Mitigation and adaptation to climate change; groups together all the initiatives that contribute to improving the energy performance of operations, seeking to improve competitiveness and reduce environmental impact by reducing greenhouse gas emissions and promoting a culture of energy efficiency in Grupo Corona.	Yes	No		No
6	COLOMBINA	Colombina decided to adopt the science-based target for 2030, to reduce Scope 1 and 2 emissions by 13%.	No	Yes	Energy efficiency in industrial processes	No
7	AUTECO	Implementation of LED lighting in the Itagüí building and Itagüí plant. Solar energy project at the Cartagena plant to supply 50% of the total electricity consumption.	Yes	Yes	Cogeneration by use of solar energy	Yes
8	TCC	Improve performance for the local haul fleet by 0.3 km / gallon per year. Improve performance for the haul fleet by 0.04 km / gallon per year	Yes	Yes	Electric vehicles	Yes

9	TCC	15% of the local fleet with zero emissions vehicles	Yes	No		Yes
10	BANCOLOMBIA	Reduce scope 1 + 2 by 10% compared to 2010 levels (achieved in 2017). Reduce scope 1 + 2 emissions by 25% compared to 2017 (in 2030)	No	No		No
11	CELSIA S.A E.S.P.	Reduce the intensity of its emissions associated with electricity generation by 25% by 2025. Increase the use of wind, solar and hydroelectric energy, in order to have a larger portfolio that responds to the different dynamics of the energy market.	No	Yes	PIGCC MinEnergía	No
12	GRUPO ÉXITO	Manage refrigerant gases known as hydrofluorocarbons (HFCs). Sustainable Mobility: Logistics, Collaborators and Clients: Management of emissions associated with energy consumption. Work to reduce energy intensity and adopt renewable energy. Promote the conversion to renewable energy sources.	Yes	Yes/No	Cogeneration by use of solar energy /ENME	Yes
13	AVIANCA HOLDINGS S.A.	Development of the AVIANCA fuel program, which seeks to implement fuel saving strategies and proportionally reduce CO_2 emissions. Invest every year in the renewal of the fleet, buy airplanes with the highest technology in fuel savings and therefore in the reduction of emissions. Through this program, it was possible to reduce the consumption of 12.8 million gallons of fuel	No	No		No
14	DAVIVIENDA	Increase the amount of solar energy generation in the bank's facilities (240 kWp, which will be installed in the first half of 2020). Davivienda solar panel installation in different cities of the country.	No	Yes	Cogeneration by use of solar energy	No
15	GRUPO SURAMERICANA	Air conditioning renovation project implemented in some of the buildings of Suramericana Colombia, which has an estimated reduction of emissions of 351.6 tons CO_2 for the year 2020. Solar energy in some branches in Colombia: It is estimated that, in 2020 0.8% of the energy consumed in 2017 was generated from photovoltaic energy panels (225,453 kWh). LED lighting	No	Yes	Cogeneration by use of solar energy	No
16	FRONTERA ENERGY	Establish a photovoltaic park that generates electricity for self-sufficiency. Replacement of current use of generators in the field that nowadays use diesel and gasoline, replacing them with new gas generators, and will be powered by the gas production itself.	No	NA	Cogeneration by use of solar energy	No
17	BAVARIA	Use of Biogas in boilers (Medellin / Barranquilla). Boiler fuel change (coal to natural gas) (Boyaca)	Yes	Yes	Efficiency measures in manufacturing sector/ENME/ Cogeneration by use of solar energy	Yes
18	BAVARIA	Proposed goal for 2025, to identify projects "off-site" or outside the brewery to supply 100% of electrical energy that comes from non-conventional renewable sources.	Yes	Yes	Efficiency measures in manufacturing sector /ENME/ Cogeneration by use of solar energy	Yes

19	BAVARIA	Sustainable mobility strategy. To reach the goal of reducing tons of CO_2 by 2025, an annual roadmap for technology change or electrification of the fleet in 5 logistics and transportation categories of the Bavaria operation. They are mostly hybrid Renault Kangoos between gas (70%) and gasoline (30%), and distribution centers (approximately 40 distribution centers throughout the country).	Yes	Yes	Efficiency measures in manufacturing sector /ENME/ Cogeneration by use of solar energy	Yes
20	PEPSICO	The goal of reducing greenhouse gas emissions will be achieved through the following actions: Implementation of telemetry measurement systems to control consumption per line (Manufacturing). 100% renewable electricity by 2030, with purchase from the market and the implementation of photovoltaic generation systems. Implementation of energy efficiency projects in our operations, both for fuels and electricity	Yes	Yes	Cogeneration by use of solar energy / Energy efficiency in operational processes	No
21	CERROMATOSO	Replace 86% of the diesel buses for the transportation of employees on the Montelíbano - Cerro Matoso route with electric buses. This represents the replacement of 12 of the 14 buses in the fleet.	Yes	Yes	ENME	Yes
22	LADRILLERA MELÉNDEZ	Generate 25% of the energy used in the plant with photovoltaic panels	Yes	Yes	Cogeneration by use of solar energy	Yes
23	LADRILLERA MELÉNDEZ	Replacement of coal feed system with Stocker system to traveling charcoal boiler grill system	Yes	Yes	Energy efficiency in operational processes	Yes
24	LADRILLERA MELÉNDEZ	Implementation of a new Rapid dryer to replace the chamber drying system, the Rapid dryer has a heat recovery system from the tunnel oven 1 to the rapid dryer of the Normandian line to reduce the consumption of coal in the dryer	Yes	Yes	Energy efficiency in operational processes	Yes
25	LADRILLERA MELÉNDEZ	Replacement of the burner system and carbon injection in the national brands carbojet ovens, with the best technology Italian carbojet system and in-line feeding system to the two-way ovens from the factory.	Yes	Yes	Energy efficiency in operational processes	Yes

1.3.4.2 Final list of actors and actions in the transport sector in cities

Table 5. Measures modelled in the ICAT CAAT tool for the transport sector in cities

N°	CITY OR DEPARTMENT	ACTIONS OR MITIGATION PROJECTS	ENTITY IN CHARGE	WAS THE INFORMATION CONFIRMED?	DOES IT OVERLAP WITH NATIONAL MITIGATION POLICIES?	WHICH?	IS THERE A LETTER OF CONSENT FROM THE LOCAL GOVERNMENT?
1	MEDELLIN	North-South Cycle Route section. Design and construction of twenty kilometers of bike path.	Secretaria de movilidad de Medellín	Yes	Yes	NAMA TAnDem	Yes
2	MEDELLIN	Acquisition of 65 electric buses. Line Z. Electric bus line with connection to the José María Córdova airport.	Secretaría de Movilidad de Medellín	Yes	Yes	NAMA TAnDem	Yes
3	MEDELLIN	Introduce 100 new electric vehicles to the city's taxi fleet.	Secretaría de Movilidad de Medellín	Yes	Yes	ENME	Yes
4	BOGOTA	First Line of the Bogotá Metro	Empresa Metro de Bogotá	Yes	No	-	Yes
5	BOGOTA	Cycle Alameda Medio Milenio	Secretaría Distrital de Movilidad	Yes	Yes	NAMA TAnDem	Yes
6	BOGOTA	Technological upgrade of Zonal Transmilenio vehicles	Transmilenio S.A.	No	Yes	ENME	No
7	BOGOTA	TransmiCable	Transmilenio S.A.	Yes	No	-	No
8	CUNDINAMARCA	Regiotram del Occidente	Empresa Férrea Regional	Yes	No	-	Yes
9	MONTERIA	Bici Red: Cycling infrastructure	Secretaría de Tránsito y Transporte Municipal de Montería	Yes	No	-	Yes
10	PUTUMAYO	Cable car	No Identificado	No	No	-	No
11	CALI	MIO electric buses. Mass Public Transport (BRT electric vehicles).	Metro Cali S.A.	Yes	Yes	ENME	Yes

12	CALI	Sustainable mobilities (Bicycles).	Secretaría de Movilidad de Montería	Yes	Yes	NAMA TAnDem	Yes
13	CALI	Suburban train	Gobernación del Valle del Cauca y Secretaría de Movilidad de Cali	No	No	-	Yes
14	ORINOQUIA	Promotion of sustainable patterns in public transport	Not Identified	No	No	-	No
15	ORINOQUIA	Promotion of sustainable patterns in private transport	Not Identified	No	No	-	No
16	ORINOQUIA	Promotion of sustainable patterns in freight transport	Not Identified	No	No	-	No
17	ORINOQUIA	Promotion of bicycles	Not Identified	No	Yes	NAMA TAnDem	No
18	PEREIRA	Megabici	Instituto de Movilidad de Pereira	Yes	Yes	NAMA TAnDem	Yes
19	PEREIRA	Electric articulated buses	Megabús	Yes	Yes		Yes
20	SANTANDER	Encourage the use of environmentally friendly means of transport in the municipalities of the metropolitan area of Bucaramanga	Not Identified	No	Yes	NAMA TAnDem ENME	No
21	LA GUAJIRA	Promotion of non-motorized transport	Not Identified	No	Yes	NAMA TAnDem	No
22	CALI	Promotion of public transport scrapage	Not Identified	No	No	-	No
23	CALI	Promotion of green driving	Not Identified	No	No	-	No

SECTION II: ANALYTIC APPROACH

This second section presents the process of harmonizing actions with common metrics (Figure 6) using the ICAT CAAT tool. For the development of this project, the ICAT NSA guide and the ICAT CAAT tool that accompanies it were used as main resources. The ICAT CAAT was developed by WRI and the NewClimate Institute. This tool is easy to execute since it requires a minimum amount of information per action, and is also executed from Microsoft Excel®, thus avoiding the installation of additional specialized software. ICAT CAAT and relevant documentation such as user manual and tutorials can be downloaded at the following link: https://climateactiontransparency.org/icat-toolbox/climate-action-aggregation-tool/

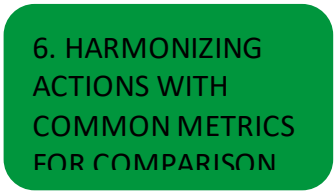


Figure 6. Roadmaps steps addressed in section II of this document.

2.1 Specific analyses proposed

For the development of the project, the WWF team proposed a series of specific analyses that were discussed and approved in working meetings with the WRI, ICAT and the MinAmbiente. Table 6 presents the description of the specific analyses proposed.

Table 6. Specific analyzes in the ICAT CAAT

SPECIFIC ANALYSIS	DESCRIPTION
1. Analysis of actions with and without overlap with national mitigation policies	Using the identification carried out in conjunction with MinAmbiente, a differentiated analysis is proposed as follows: *Run 1. Actions that overlap with national mitigation policies* *Run 2. Actions without overlap with national mitigation policies*
2. Comparison between actions with and without information confirmed with the actors	*Run 1.* Confirmed actions: All actions with information confirmed by WWF with stakeholders / implementers will be considered. *Run 2.* Unconfirmed actions: All actions with available information but without confirmation by WWF with the actors / implementers will be considered.
3. Differential analysis by subsector (private sector) and mode of transport (cities)	*Run 1.* Private sector: Divided into the following sectors: mining-energy sector, IPPU sector, tertiary sector and transport sector services. *Run 2.* Transport sector: Divided by modes of transport such as aerial cable, rail, BRT and non-motorized transport.
4. Aggregation of all electric mobility actions and comparison with the national electric mobility strategy (ENME)	This analysis focuses exclusively on quantifying the impact of the electric mobility actions planned or implemented, compared to the emission reduction goal associated with the integration of 600,000 electric vehicles into the fleet by 2030.
5A. Specific analysis for the transport sector - replicability for the measurement of electric buses (hypothetical action modeled by WWF)	The analysis was built under the hypothetical case that 15 capital cities change 10% of their diesel bus fleet for electric buses.
5B. Specific analysis for the transport sector - replicability for the measure of increase in cycling infrastructure (hypothetical action modeled by WWF)	Under the hypothetical case, an expansion of cycling infrastructure was built in the 100 cities with the largest population in the country.
6. Specific analysis for the aggregate of total actions	At the end, the aggregate case of all the actions identified is presented to provide an estimate of the mitigation potential identified by the entire process of the ICAT project in Colombia. This analysis does not include the hypothetical case of specific analysis 5.

2.2 Harmonization of actions in common metrics of comparison

Each actor stores and analyzes their information in different formats and documents. Some use confidential spreadsheets, others utilize files downloaded from corporate systems, etc. Additionally, the measurement units of each actor are different. In some transport projects, for example, metrics include total distances traveled by the fleet while in others fuel consumption is monitored. The total reductions are reported by some actors in tons, others in thousands of tons, and others in giga-grams of CO_2e. This implies the need to homogenize these units of measure to compare the different actions identified. This process is what this document refers to as the harmonization of actions in common metrics and it was developed in three stages that are described below.

2.2.1 Collection of information from relevant stakeholders

Based on the list of relevant stakeholders and actions agreed with the MinAmbiente, ICAT and WRI, all stakeholders were asked to fill out the forms developed by the project team to confirm the information. These formats had three main sections: general information on the actions with a description of the measures, information on calculation assumptions such as emission factors and expected growth rates, and detailed information on activity factors and total emissions in scenarios with and without a project. When the actors (private and local entities of the cities) filled out this form, the action was classified as "action with confirmed information".

2.2.2 Information processing

With all the necessary information in the Excel® formats filled out by the actors, a second stage was carried out in which the information of each project was processed before feeding it into the ICAT CAAT. This procedure was carried out since this tool only receives four main data for each action:

- Emissions in the base year (mandatory data)
- Emissions in the year of the last inventory (optional data)
- Percentage reduction of emissions with respect to the base year in the first target year (mandatory data)
- Percentage reduction of emissions with respect to the base year in the second target year (optional data)

The year-by-year emissions of each modeled action (Table 4 and Table 5) were calculated using the information provided by each actor and extrapolating according to the growth factors provided by the actors. Should there not be a provided growth factor, those of the corresponding sector in the national

projections was used. Subsequently, the information fed to the ICAT CAAT was homogenized following the following process:

- In the private sector, the base year is always the reference year defined by the company. If this value is lower than 2015, the base year for 2015 was projected following a growth factor provided by the actor, or the equivalent to that of its sector in the national projections. If the base year is after 2015 but less than 2020, that base year was taken into account.

- In cities, the base year will be the first year, prior to 2020, for which information is available. For formats in which only projected information was available (years after 2020) an extrapolation was made to 2020 and this estimate was used as the base year. The extrapolation was carried out using growth data provided by the actors, or failing that, the equivalent to that of their sector in the national projections.

- For actions that have already started, the last inventory year was defined as the last year before any action has been taken. For actions that are yet to begin, the last inventory year was set to 2020. The ICAT CAAT tool does not allow the year of the last inventory to be in the future and although this is optional data, with the information collected by the team it was possible to have a better estimate than the one performed by the ICAT CAAT tool by default based on local estimates.

- The first target year was 2020 for actions that have already started their execution, or the first year in which the action is projected to be 100% implemented. Although the actions could have different target years, the team recreated the emissions year to year with information from each actor, which offered more detail than the default values of the ICAT CAAT.

- The second target year was 2030 for all actions to be evaluated. Although this data is not necessary, by recreating the emissions year by year, it was possible to define all the actions ending in 2030 according to the agreed assumptions.

2.2.3 Introducing information into the ICAT CAAT tool

Once the numbers for each action were calculated, the corresponding format was filled out in the ICAT CAAT tool. In the case of private sector actions, the measures were classified according to the categories defined in the ICAT CAAT tool: i) electricity and heating (energy supply) ii) transport (energy) iii) buildings (energy) iv) industry (energy and processes). For cities, all measures correspond to the transport category and were classified according to the mode of transport of the intervention. Likewise, the actions were classified in categories of feasibility of execution, which are: i) unlikely, ii) possible, iii) likely.

Once the categories for the actions were defined, they were classified according to the specific analyses presented at the beginning of Section II, Table 6. It is important to mention that all the actions should go into at least three specific analyses since the categories of the analyses 1 and 2 are complementary and analysis 6 includes all the actions to be considered.

Finally, it was defined that the national trajectory emissions would be used, allowing for the projection of emissions for each actor should no action be implemented. Such national emissions can be fed into the ICAT CAAT tool year by year. In Colombia's case, the trajectories of the relevant subsectors were used for the modeling analysis. This information was the same used in the Low Emissions Analysis Platform (LEAP) for the last NDC update of Colombia (2020) and was shared with the WWF team by the MinAmbiente.

Modeling in LEAP presents two types of scenarios in the country's emissions projection: baseline scenarios and mitigation scenarios. The LEAP baseline scenarios, or baselines, were developed based on the sectors defined by the 2006 IPCC methodology and constitute 2050 scenarios in which no mitigation action is taken in the country. In this project, data from the reference scenario called R3 was used. This represents the final version of the national baseline and includes the estimated impacts of COVID-19 and the medium-term fiscal framework, according to official information from the Ministry of Finance. LEAP mitigation scenarios include national mitigation policies and were not used in the definition of these trajectories as this would lead to double counting of reduction potentials.

2.3. Information gaps and assumptions

For the development of the project, some assumptions were necessary since not all the actions had the necessary information for the proposed analyses. Below are the most relevant information gaps that should be addressed in order to reduce the uncertainty of the estimates, as well as the assumptions to take into account when interpreting the results.

2.3.1 Actions by private actors

2.3.1.1 Identified information gaps

- Companies do not generally carry out a projection of their baseline, but rather quantify their emission reduction with respect to the base year prior to the implementation of the mitigation action. Due to the fact that the NDC emission reduction goals have so far been referenced with respect to an estimated baseline until 2030, this generates gaps in the information collected and a discrepancy in the interpretation of results.

- The most common case of quantifying the impacts of the actions implemented by companies is in an aggregate manner. In other words, companies measure their emissions before and after implementing a set of actions without doing individual monitoring. A company X, for example, knows that its emissions in 2015 were 1,000 tCO_2e. After changing the fleet, training its drivers in best practices, changing lights and promoting the saving of electricity in its workers, its 2018 emissions were 900 tCO_2e, nonetheless, there is no monitoring of the impact of individual actions. In some cases, business groups do not monitor differently the different actors or business segments, which makes it even more difficult to quantify the reduction of emissions by specific actions.

- In line with the above, the reports of multinational companies often do not report differentiated emissions by country of operation, making it difficult to estimate emissions associated only with operations in the country. Reporting these emissions by country will be a fundamental step to homogenize company metrics with those of the national government.

- The information gap that most ruled out actions and companies from being included in this project is associated with the fact that many companies do not yet have an emissions inventory, or if they do, it is under review. Having an inventory is the first necessary step in quantifying emission reductions.

2.3.1.2. Assumptions

- The baseline growth rate for each company is equivalent to the estimated sales growth they report. If this value was not available, the estimated growth of the relevant subsector was used in accordance with the information from the reference scenario of the last update of the NDC. In any case, this value ranges between 3 and 6% annual growth.

- The emissions associated with the consumption of electricity were estimated from the emissions factor of the National Grid System (SIN) in the reference scenario built for the update of the NDC. Because the ICAT CAAT tool allows the entry of two years for the electric energy emission factors, a line of best fit was made between 2015 (0.138 tCO_2e / MWh) and 2030 (0.106 tCO_2e / MWh).

- For companies with renewable energy goals set for a year prior to 2030, it was assumed that once the goal was met there would be no increase in installed capacity, thus increasing electricity consumption. This implies that, if a company aims to supply 100% of its demand in 2025 with photovoltaic panels, it is assumed that the increase in demand for electricity between 2025 and 2030 will be supplied by the national interconnected system.

- The actions of electric vehicles do not include the emissions associated with energy consumption since there was not enough information to estimate the associated electricity consumption.

2.3.2 Actions for the Transport sector in cities

2.3.2.1 Identified information gaps

- Although information on the reduction of direct emissions associated with transportation projects that make use of electric modes (electric trains, cable cars and buses) was found, information on electricity consumption was not always easy to obtain. This information is part of the financial analyses that are developed for the projects so that there must be an estimate. However, electricity consumption is not generally taken into account when reporting the emission reduction, which made it impossible for the inclusion of scope 2 in these projects.

- In line with the above, cities don't always have an entity that centralizes all the detailed information on the reduction of emissions from the executed projects. Although environmental authorities are a good initial contact, they do not have information on changes in activity patterns, emission factors, or growth drivers necessary for these estimates. This implies that for many projects, the information gathering process ends up being more costly and time consuming, as it depends on many actors (usually in addition to environment, transportation and planning).

- In the reports of the latest NDC update, there was no estimate of electricity consumption for the transportation sector. This makes it the mitigation results difficult to analyze, in light of increases in consumption when electrifying the fleet. If emissions from the entire energy sector are included in the national trajectories, the impacts seem negligible, but if scope 2 is not included, the aggregate impact of these measures could be overestimated.

2.3.2.2 Assumptions

- The modes of transportation captured[13] by bicycle, cable and rail projects had to be assumed using secondary information as it was not always possible to find the relevant documentation. The estimation of reductions is very sensitive to this variable and in the future a greater effort must be made so that the captured mode is part of the supporting information and of rapid consultation in the reduction of emissions from the projects.

- In line with the above, the load factors of the different modes were also assumed for some projects, supported by secondary information. The uncertainty in the load factors is proportionally translated into uncertainty in the avoided emissions, so improving these estimates will help to significantly reduce the uncertainty of the results presented here.

- Emission factors and activity growth rates for all cities were assumed equal to the national averages used in the latest NDC update.

For the modeling of the specific analysis 5, which constitutes the hypothetical case of an increase in electric vehicles in 15 capitals of the country and an increase in cycling infrastructure in the 100 most populated cities, additional assumptions were made that are detailed later in the results section of Section III of this document.

SECTION III: RESULTS, DISCUSSION AND RECOMMENDATIONS

3.1 Results

The results for each of the specific analyses described in the second section of this document are presented below. In total, 48 actions were modeled in the ICAT CAAT tool, of which 25 are from private sector and 23 are transport in cities.

3.1.1 Specific Analysis 1: actions with and without overlap with national policies

This analysis involves separating the contributions of actions that overlap and those that do not overlap with national mitigation policies. Actions that do not overlap with national policies are actions that cities and the private sector have defined independently of national policies. However, if the national government considers that this action contributes to any of its policies, then the government can include it for the fulfillment of its national goal.

3.1.1.1 Private Sector

[13] Modes of transportation used before the implementation of the evaluated projects

Figure 7 presents the total emissions reduced by private sector actions that do not overlap with national policies. In total, in 2030, around 800 $ktCO_2e$ would be reduced through the 7 actions identified without overlap. It is worth mentioning that, of these 7 actions, only 4 could be confirmed with the actors that implement them[14]. The sum of the emissions reduced in 2030 by confirmed actions without overlap in the private sector is approximately 370 $ktCO_2e$.

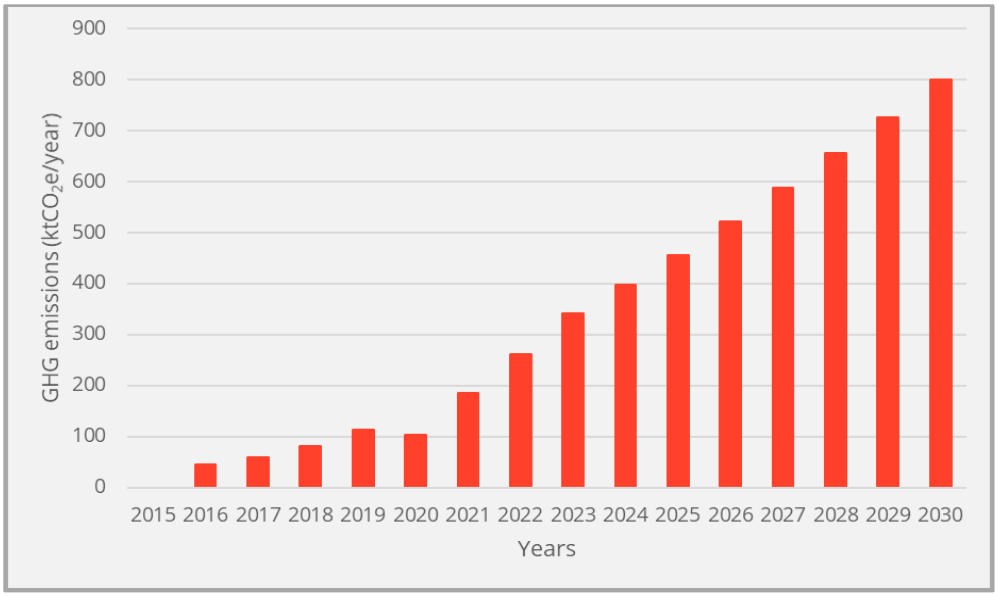


Figure 7. Reduction of emissions by private sector actors though actions without overlap with national mitigation policies.

Figure 8 shows the emission trajectories of actions without overlap for the private sector actors included in this analysis. The graph shows that emissions increase between 2015 and 2030, however, they manage to remain almost constant in the first 12 years of the analysis period. In a scenario without these measures, growth to 2030 would reach 2,600 $ktCO_2e$ versus the mitigation scenario which represents an increase of only 1,800 $ktCO_2e$. Of the total reductions in this analysis, about 50% of the reduction comes from measures related to transport and logistics. The other half is distributed almost equally between actions associated with production processes in industry and savings in electricity consumption in buildings in the service sector.

[14]The information regarding the 3 additional unconfirmed measures was obtained from the CDP platform of companies with a rating higher than F to harmonize and enter in the ICAT tool.

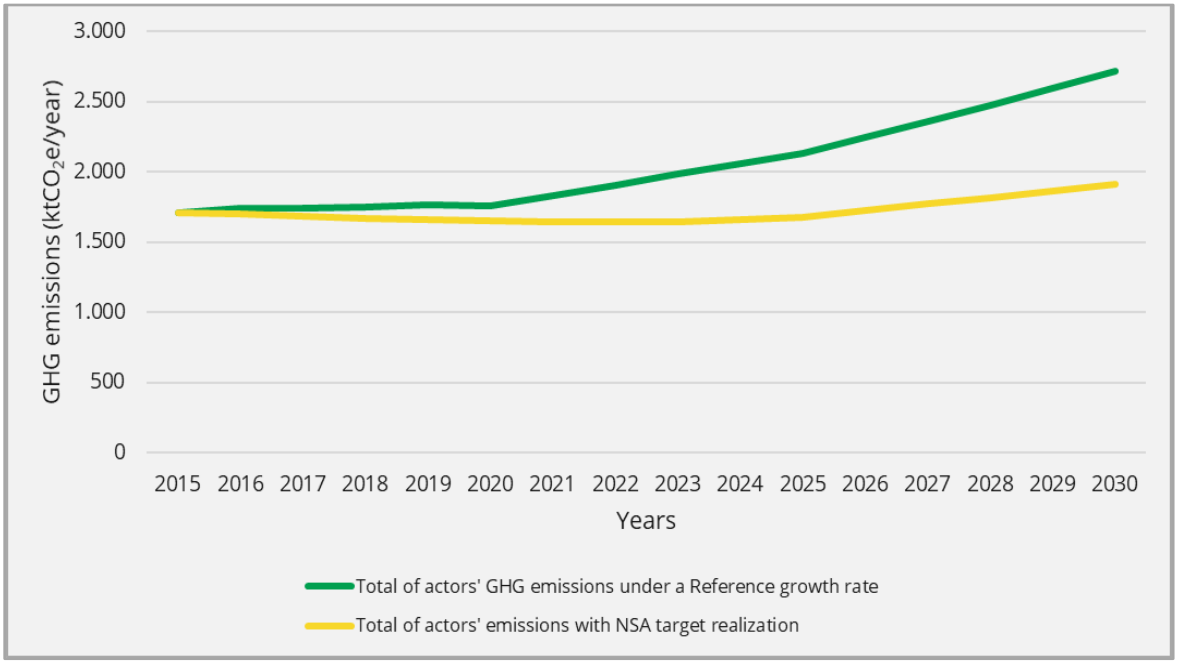


Figure 8. Projected emissions of actions without overlap for considered private actors. The green line represents GHG emissions under a growth that follows the national trajectory while the yellow line represents the emissions of private actors if the actions without overlap with national mitigation policies are achieved.

As mentioned before, there are a total of 7 private sector actions that do not overlap with national policies. By contrast, there are 18 private actions that do have an overlap with the policies modeled in the NDC update. The result of these is presented in Figure 9, where it is projected that by 2030 the overlapping actions would achieve a reduction of about 2,200 $ktCO_2e$. In other words, the private actors identified have the potential to contribute to the reduction of more than 2 million tons. This has already been modeled in LEAP for the NDC's update exercise, thus highlighting the role that this sector plays in achieving the goals set.

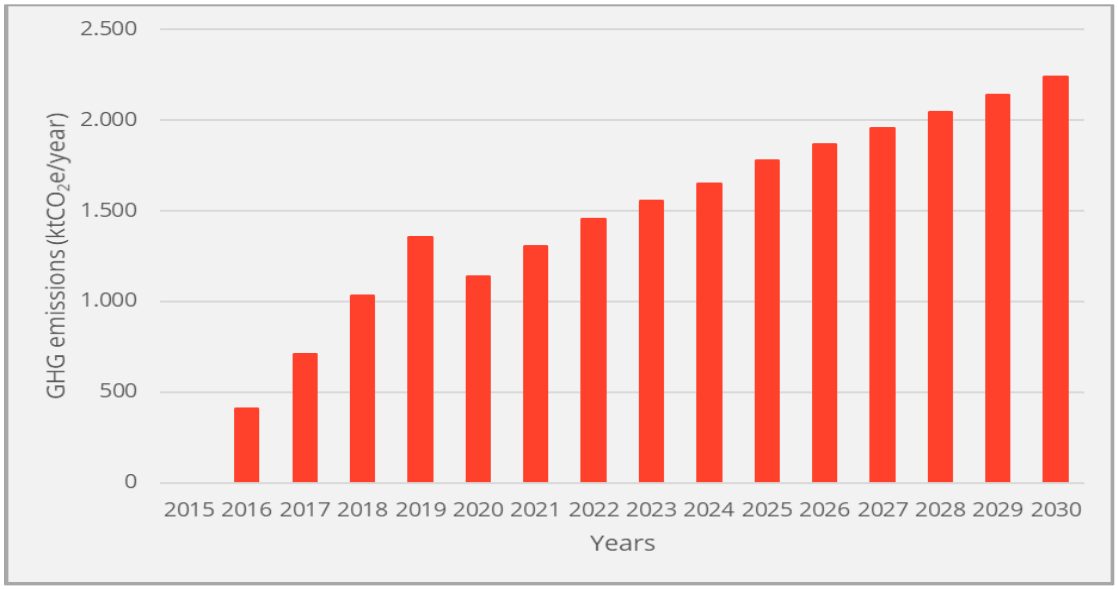


Figure 9. Reduction of emissions by private sector actors due to actions that overlap with national mitigation policies[15]

3.1.1.2 Cities

As with the private sector, the transport actions of cities can be divided into those that overlap with national policies and those that do not. Of the 23 measures considered for these analyses, 12 do not overlap and 11 do. Figure 10 and Figure 11 show the results for actions without overlap and with overlap, respectively. In the case of transport actions in cities, the actions without overlap identified in the transport sector reach a reduction of 320 $ktCO_2e$.

The overlapping measures are a combination of actions involving electric vehicles (overlapping with the national measure ENME and NAMA MovE), public bicycle systems and the expansion of cycling infrastructure (overlapping with the national measure NAMA TAnDem) in Bogota, Medellin, Guajira and Orinoquia. These add up to a reduction of about 160 $ktCO_2e$. It is worth noting that the information from Guajira and Orinoquia could not be confirmed with the local entities in charge of these projects, which, as mentioned earlier in this report, adds a degree of uncertainty to the non-confirmed action. Further work is necessary for these actions to be integrated with the NDC. The contribution of overlapping measures from Bogota and Medellin is 82 $ktCO_2e$. In other words, these 2 cities contribute to 50% of the emission reductions of actions with overlap analyzed.

[15] The reductions grew markedly between 2016 and 2019 due to the decarbonization of the energy matrix thanks to actions of the generator Celsia. The benefits of this action extend until 2030 but at a lower annual rate.

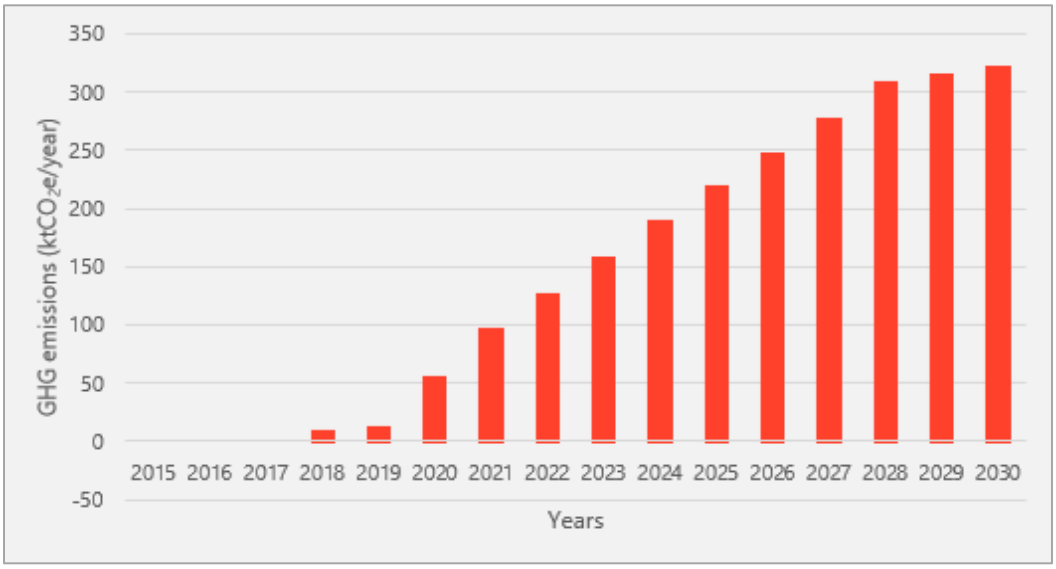


Figure 10. Reduction of emissions in cities by transport activities without overlap with national mitigation policies

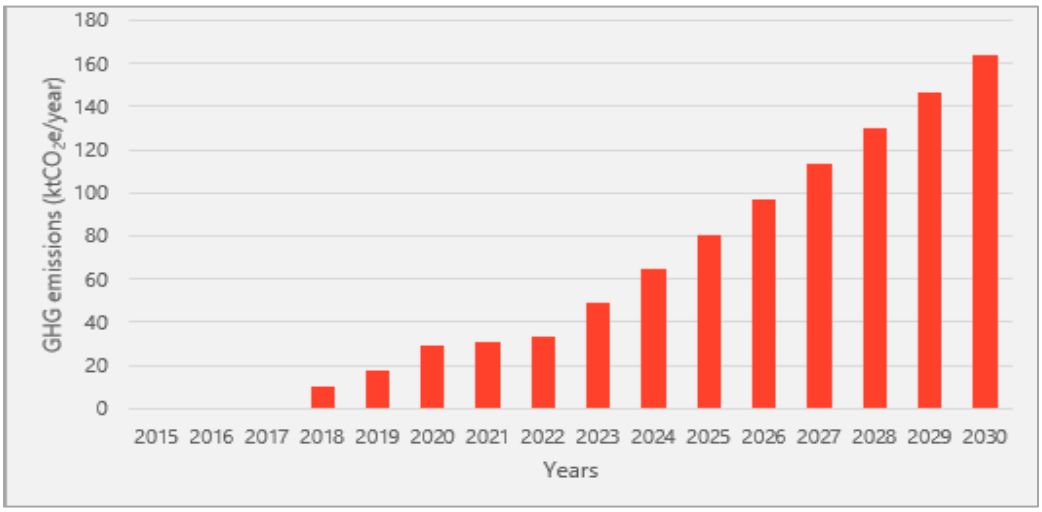


Figure 11. Reduction of emissions in cities by transport activities with overlap with national mitigation policies

In total, the actions identified both in the private sector and in cities could contribute to a reduction of up to 1,120 $ktCO_2e$ in 2030. These would be additional to expected reductions from national mitigation policies. 71% of these reductions correspond to private sector actions. The actions with overlap amount to reductions of up to 2,360 $ktCO_2e$, of which 93% come from the private sector.

3.1.2 Specific Analysis 2: Actions with and without confirmed information by the actors

As explained in Section I, the WWF team tried to confirm information found in the preliminary databases with the actors responsible for the different actions. Unfortunately, not in all cases was it possible to establish contact with the responsible actors. This was due to a variety of reasons, for example information was not received within the timeframe of the project or because it was not possible to establish communication with the teams in charge. Those actions that could not be

confirmed but otherwise met the consistency criteria explained in Section I (goal with an order of magnitude consistent with the sector, clarity in the year of compliance), were included in the ICAT analysis under the label of "Actions without confirmed information." In a second phase, more time could be spent confirming this information with responsible entities.

The results of the actions are presented below, separated into the following categories: “with confirmed information” and “without confirmed information”. It is important to highlight that having confirmed the actions with the actors demonstrates the level of progress and commitment of those actions, as well as the reliability of the information. Despite the added certainty, the values of the unconfirmed actions represent an estimate of significant mitigation potential, for which it is necessary to make subsequent validation efforts.

3.1.2.1 Private sector

In total, 25 actions were modeled in the private sector, which contribute to a reduction of around 3,000 $ktCO_2e$. Of these, 15 actions were confirmed, adding up to a reduction of 600 $ktCO_2e$ by 2030, or 20% of the reduction in the total estimated potential. The results of the annual reduction in emissions from confirmed actions are shown in Figure 12.

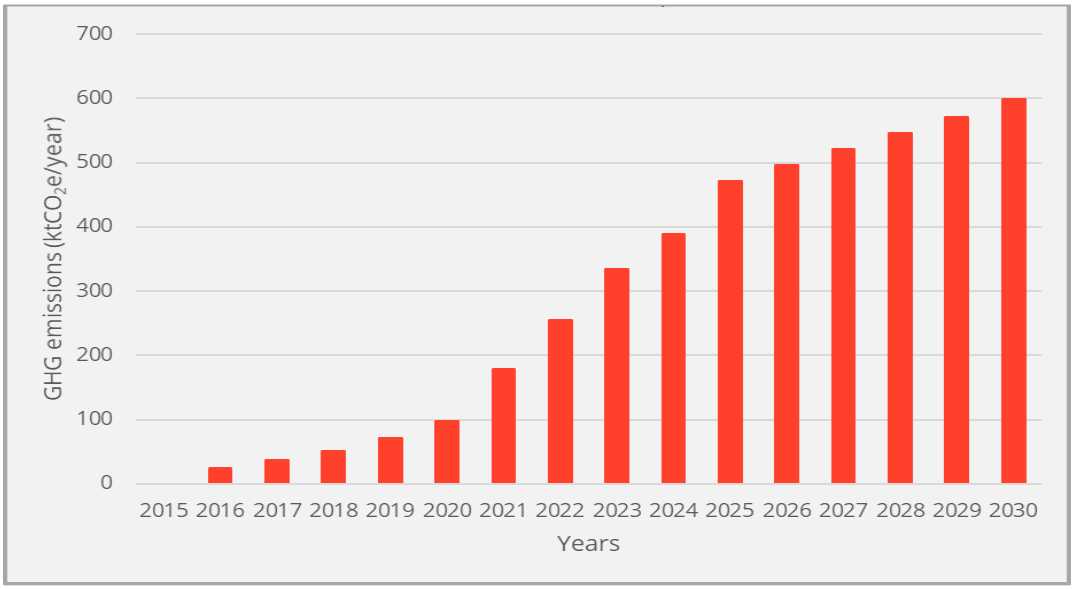


Figure 12. Reduction of emissions by private sector actors through actions confirmed by WWF with the corresponding actors

3.1.2.2 Cities

For transport actions in cities (23), information on 12 actions was confirmed. These actions are equivalent to reductions of 200 $ktCO_2e$ in 2030, which represents 40% of the actions modeled for the transport sector at the city level. These results are presented in Figure 13.

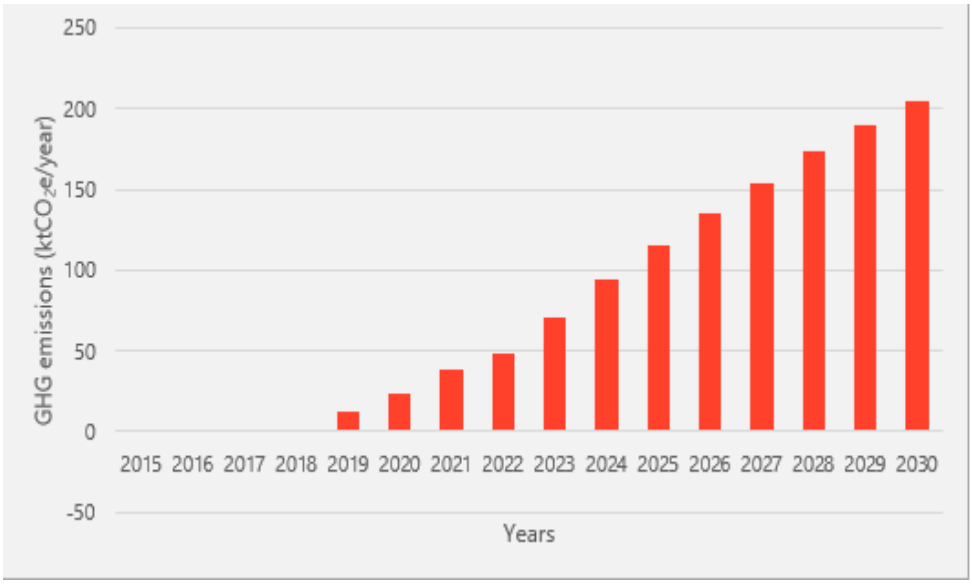


Figure 13. Reduction of emissions through confirmed actions for the transportation sector at the city level

3.1.2.3 Summary of private sector and city transportation actions with overlap analysis and confirmation of information

The combination of specific analyses 1 (with and without overlap) and 2 (with confirmed and unconfirmed information) for the private sector is shown in Figure 14. Although in total the actions identified in the ICAT project for the private sector add up to reductions of about 3,050 $ktCO_2e$ in 2030, the majority (2,017 $ktCO_2e$) correspond to actions with overlap (that is, they are included in the national mitigation policies and in the MinAmbiente accounting processes).

Of the 800 $ktCO_2e$ in emission reduction for private sector actions without overlap, it was only possible to confirm 47% - corresponding to 376 $ktCO_2e$. The information of the actions without overlap was sent to the MinAmbiente as possible additional actions that can contribute to the NDC. For this subset of actions, it was possible to have companies volunteer their confirmed actions to be included in the NDC update process. With respect to actions without overlap and without confirmed information, additional work is required to achieve this same degree of verification and commitment.

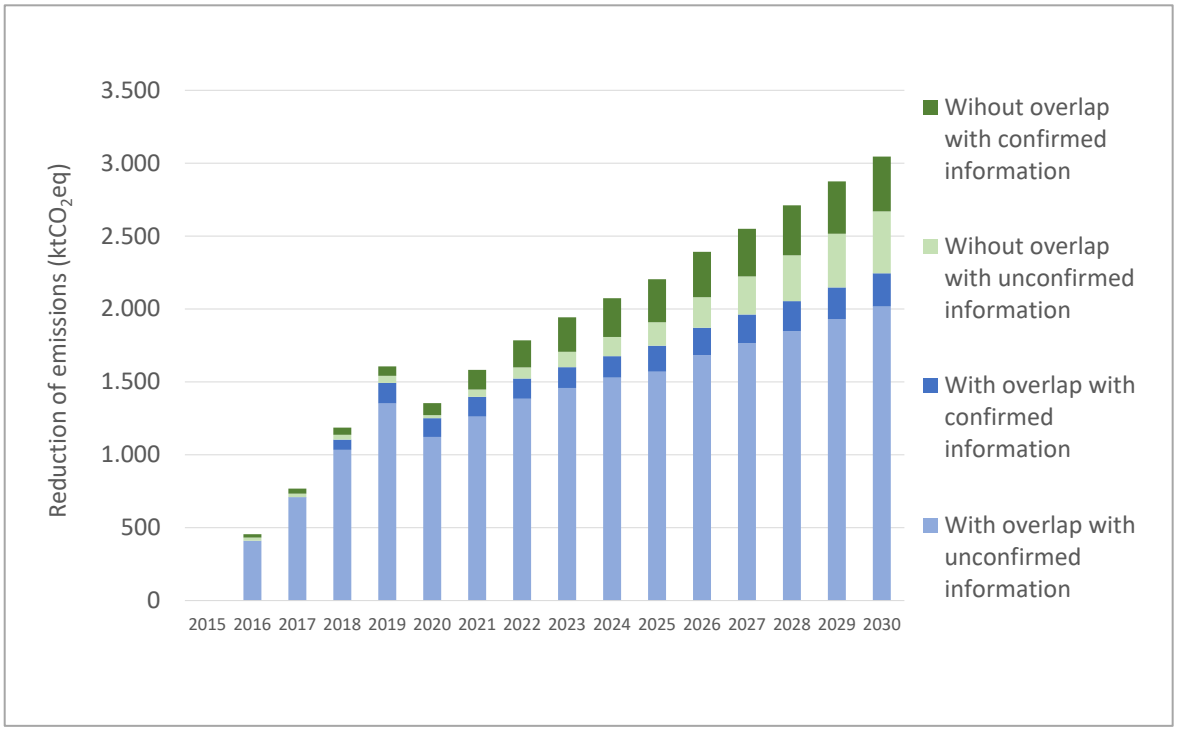


Figure 14. Reduction of emissions through private sector actions. The information is disaggregated by confirmed and unconfirmed actions and by actions with and without overlap with the national mitigation measures[16].

The combination of the specific analyses 1 and 2 for the cities is shown in Figure 15. The total of the actions identified in the project for cities adds up to a reduction of 500 $ktCO_2e$ in 2030, but in this case, 45 % (227 $ktCO_2e$) are actions without overlap and with unconfirmed. This highlights the need to establish better communication channels with cities and local entities in order to reduce the uncertainty of actions and increase the commitment of subnational governments to be part of the NDC registration process. For the majority of actions without overlap, there was a letter of consent obtained from mayors to include the emission reductions generated by these actions in the NDC[17].

[16] The reductions of actions with overlapping and unconfirmed grow markedly between 2016 and 2019 due to a decarbonization of the energy matrix thanks to actions of the generator Celsia. The benefits of these actions extend until 2030 but at a lower annual rate.

[17] Letters of consent referenced in Table 5, section I

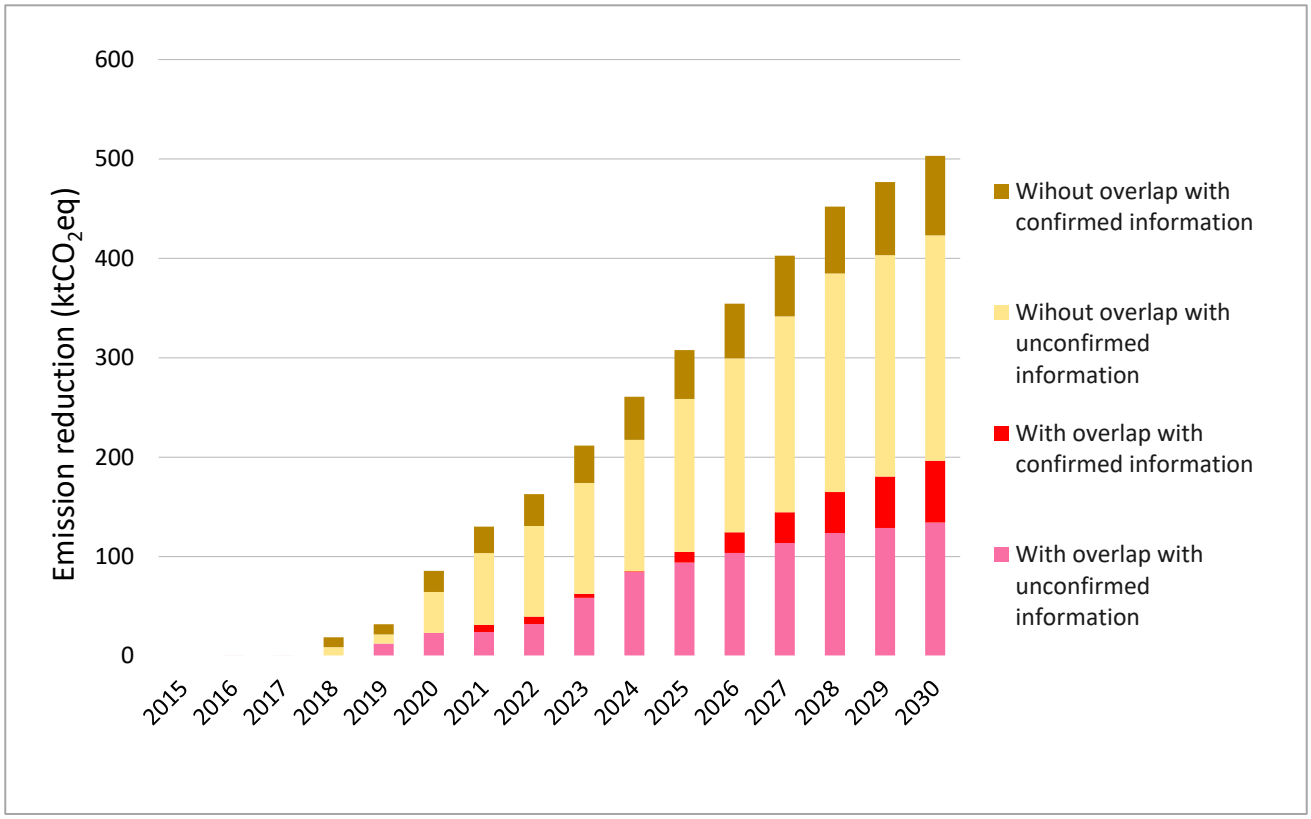


Figure 15. Reduction in emissions from transport sector actions in cities. The information is disaggregated by confirmed and unconfirmed actions and by actions with and without overlap with the national mitigation measures

3.1.3 Specific Analysis 3: Differential analysis by type of action

A third specific analysis was carried out in order to compare reduction potential across different emissions subsectors. This section briefly describes the results of this comparison.

3.1.3.1 Private sector

The actions of the private sector could contribute to total an emission reduction in 2030 of more than 3,000 $ktCO_2e$. These actions were broken down into four categories according to the ICAT CAAT tool: i.) Energy consumption in buildings, ii) transportation, iii) actions for the generation of electricity, and iv) actions in industrial processes. Figure 16 shows the total reductions of all the actions implemented by private parties, the trajectory of all the actors, and the emissions reduced by subsector. Of the total, the greatest reductions are from actions aimed at reducing emissions from industrial processes (graph F), which in 2030 contribute 1,550 $ktCO_2e$ in reduced emissions. The second subsector that contributes the most is the consumption of electricity (graph E), which in 2030 reaches a reduction of 740 $ktCO_2e$.

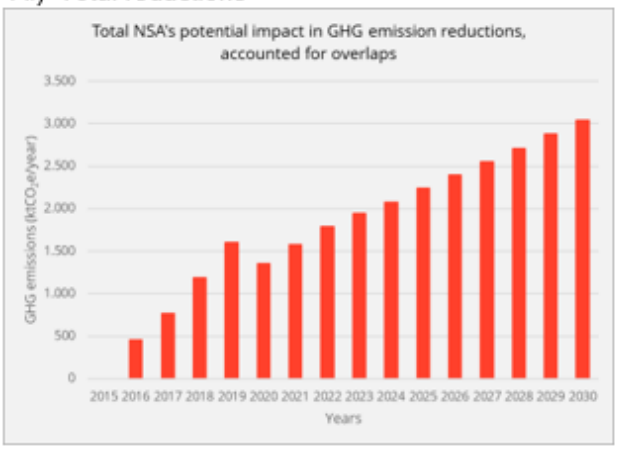
The magnitude of emissions reductions depends to a large extent on the emissions associated with the consumption of electricity. Thus, their real contribution will depend on the GHG emissions of the

national electric grid. In this exercise, the emissions per unit of electricity for 2015 and 2030 established in the reference scenario of the last update of the NDC of Colombia (2020) have been used. That is if we assume that no additional mitigation actions are carried out in the national electricity grid. However, as decarbonization takes place in the national grid, the private sector will have to implement off-grid projects with renewable energy sources to guarantee further reductions.

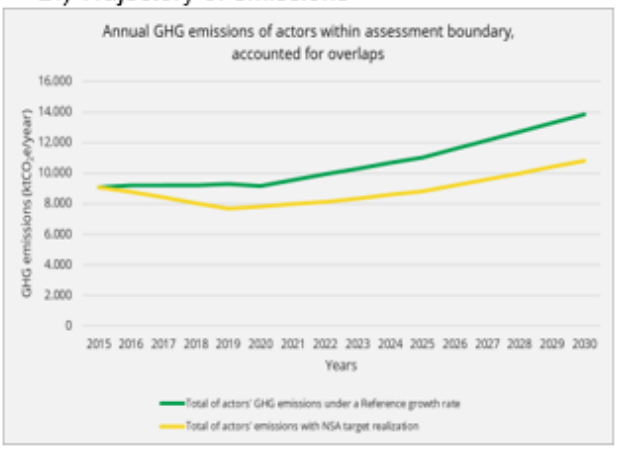
3.1.3.2 Transport in cities

Transport actions in cities could contribute to a reduction of around 500 $ktCO_2e$ by 2030; These were divided into three different categories: i.) actions in buses, private vehicles, taxis and trucks, ii) actions to promote active transport (bicycles and pedestrians), and iii) actions in rail transport (subways, trams and trains) and cable cars. As shown in Figure 17, more than half of the total emission reductions (54%) comes from actions associated with rail transport and cable cars. The other half is distributed almost equally between actions for reducing other types of motorized land transport (120 $ktCO_2e$) and actions aimed at promoting active transport (110 $ktCO_2e$).

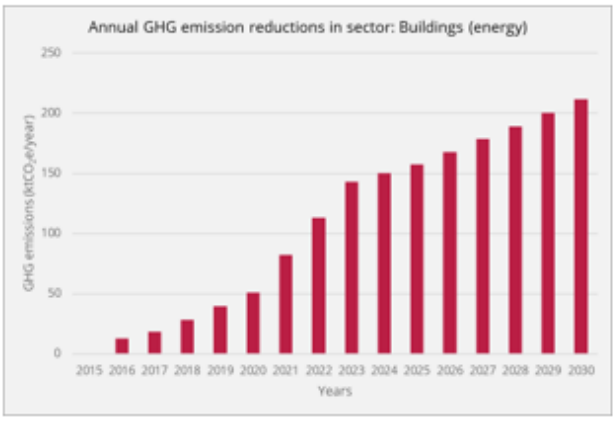
A.) Total reductions



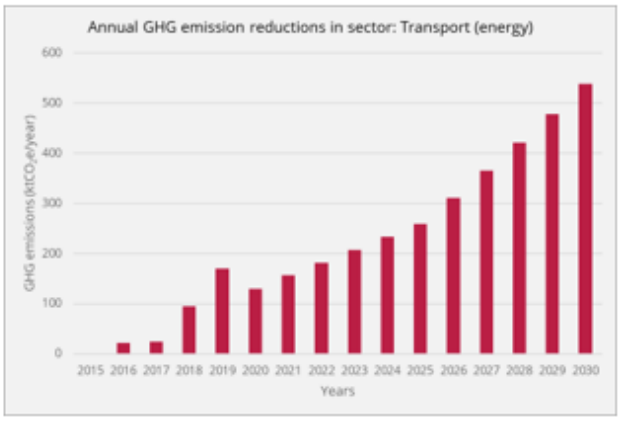
B.) Trajectory of emissions



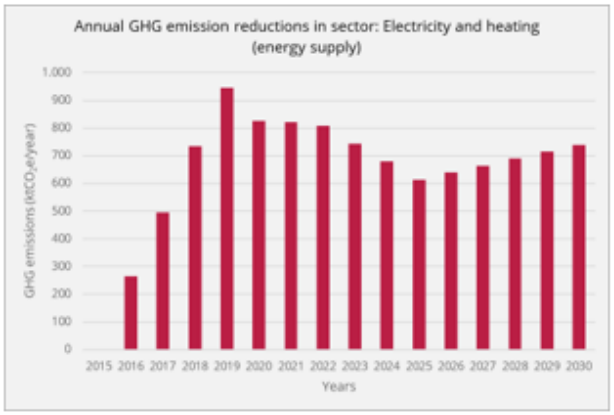
C.) Reduction of emissions (energy in buildings)



D.) Reduction of emissions by transport



E.) Reduction of emissions generated by electricity and hydrocarbons



F.) Reduction of emissions (Industrial processes)

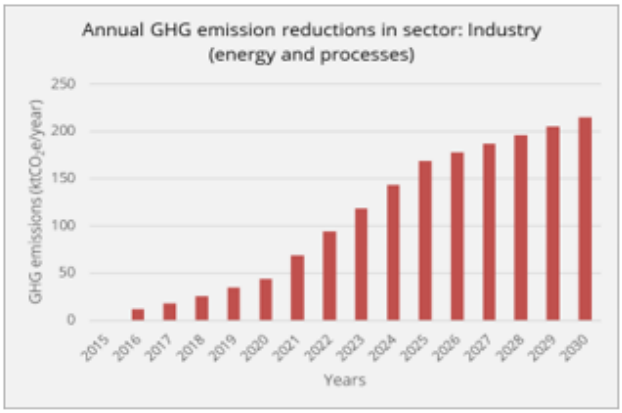
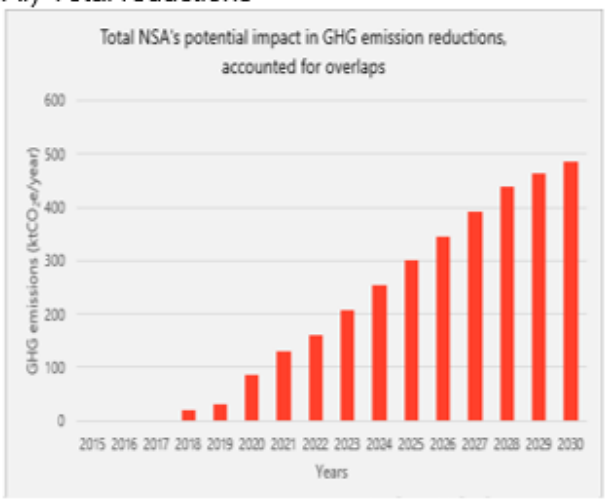


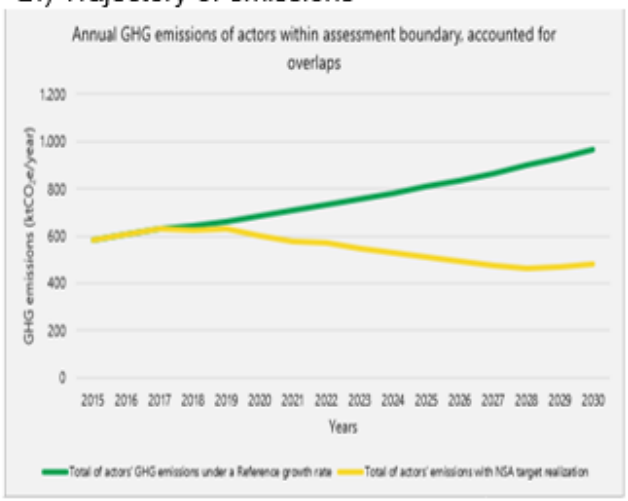
Figure 16. Total reductions in the private sector for identified actions, broken down by type of action[18]

[18] The reductions in figures E and F grew markedly between 2016 and 2019 due to the decarbonization of the energy matrix thanks to actions of the generator Celsia. The benefits of this action extend until 2030 but at a lower annual rate

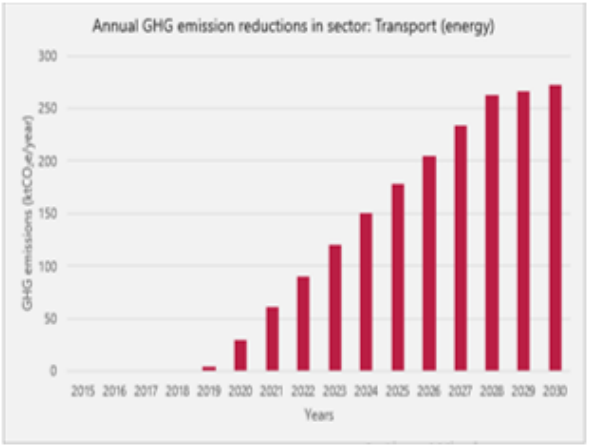
A.) Total reductions



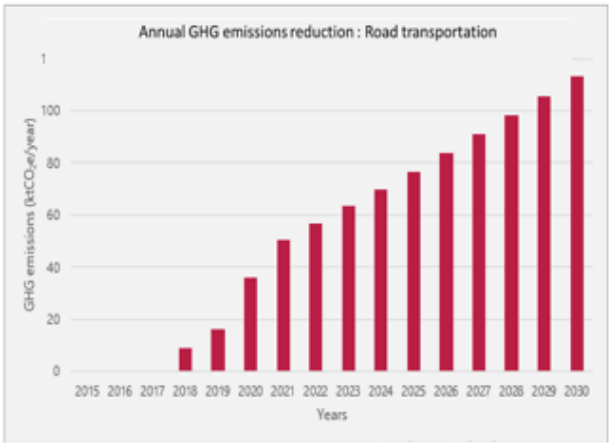
B.) Trajectory of emissions



C.) Reduction of emissions (railroad and. cable cars)



D. Reduction of emissions for land transportation (Buses, taxis, trucks)



E) Reduction of emissions by promoting active transport (Bicycles and walking)

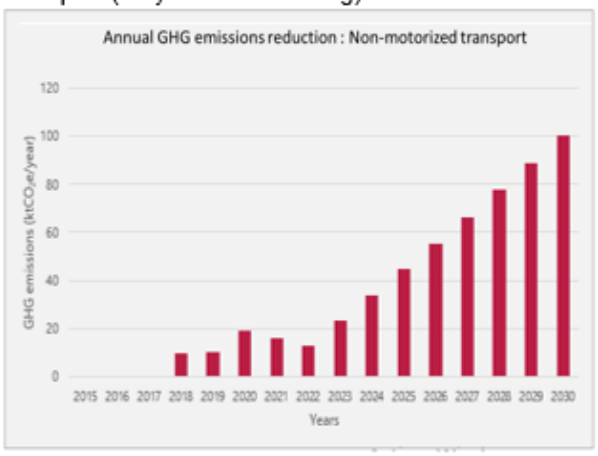


Figure 17. Total reductions in the transport sector in cities broken down by action

3.1.4 Specific Analysis 4: Contribution to the national electric mobility strategy

Given that some actions identified in both the private sector and cities are associated with electric mobility, an analysis was conducted to compare the aggregate contribution of these measures with the national goal established in the ENME. This provides a sense of how close we are to meeting the ENME goal based on actions currently in implementation or planned in the near future. In total we identified 7 electromobility actions[19] that overlap with the ENME and result in reductions of 180 $ktCO_2e$ in 2030, as presented in Figure 18. Because the greatest contribution in reducing emissions through electromobility actions in cities comes from actions implemented in Bogota, the figure shows the value contributed by Bogota independently of the contribution of the other cities analyzed.

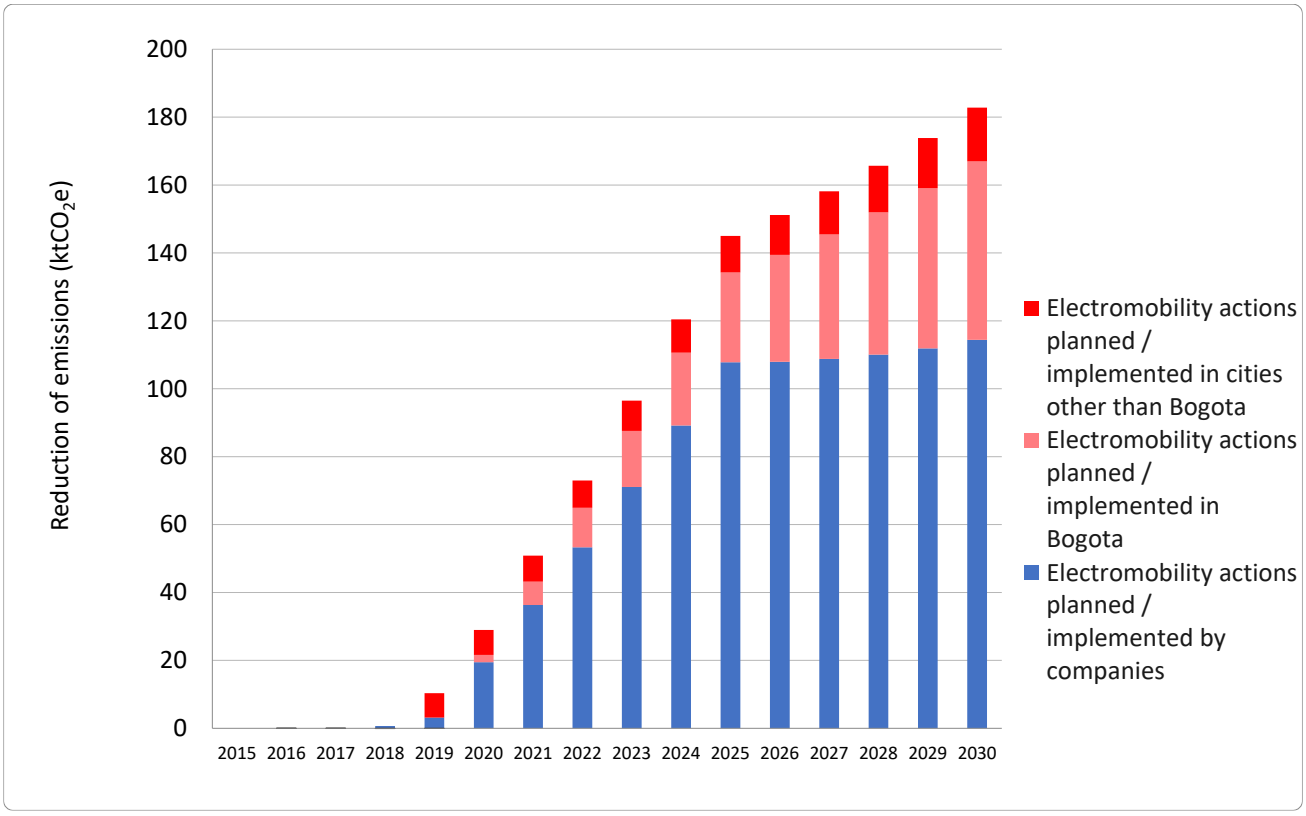


Figure 18. Emissions reduction for all electric mobility actions currently being implemented or planned (transport in cities and private sector)

[19] Of the 7 measures, 2 correspond to the private sector and the remainder to initiatives in the city. The following are the identified actions: 1. Replace 86% of the diesel buses for the transport of employees on the Montelíbano - Cerro Matoso route with electric buses, which is equivalent to replacing 12 of the 14 buses in the fleet (Cerromatoso), 2. Reach 15% of the local fleet with zero emission vehicles (TCC), 3. Electric buses (Medellín), 4. Electric taxis (Medellín), 5. Technological upgrade of zonal vehicles (Bogotá), 6. Electric buses (Cali) and 7. Electric buses (Pereira).

According to the reference scenario of the last update of the NDC, total emissions from land transport in Colombia in 2030 will amount to 50,300 $ktCO_2e$. The ENME aims to reduce 4,240 $ktCO_2e$, equivalent to 8% of total transport emissions, through electromobility actions. Meanwhile, the actions modeled in this analysis were estimated to avoid 183 $ktCO_2e$, which represents 4% of the ENME goal. Put another way, the analyzed actions represent a reduction of 0.35% in total emissions from land transport in the country. The above is represented in Figure 19.

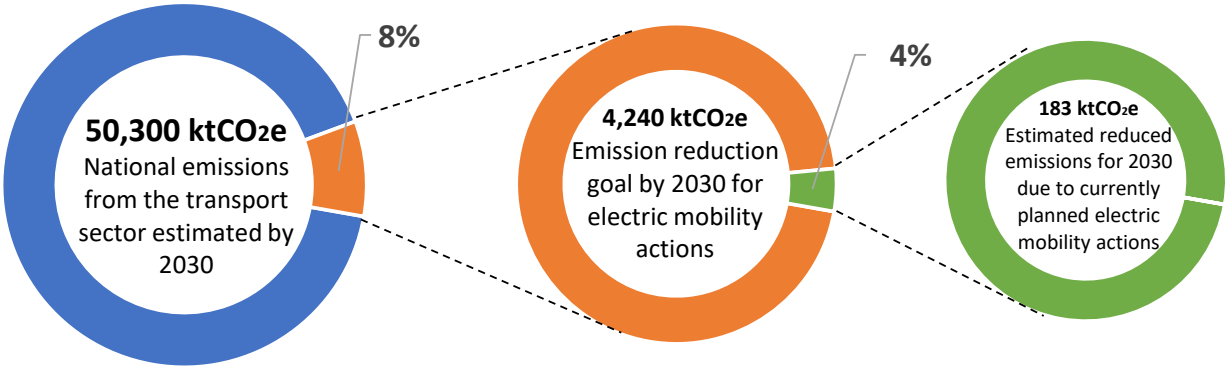


Figure 1. 2030 emissions reductions from the electric mobility actions identified in the ICAT Project, as a share of national goals.

Of these 183 $ktCO_2e$ in avoided emissions, 114 $ktCO_2e$ (62%) are from actions implemented by companies, 52 $ktCO_2e$ (29%) are from actions implemented in Bogota, and 16 $ktCO_2e$ (9%) are implemented in other cities. This represents an urgent message to the national government: if the goal defined in the ENME is to be achieved, it will be necessary to accelerate the implementation of more ambitious electric mobility measures, such as the implementation of the Electric Mobility NAMA (NAMA MovE).

Although when compared with national emissions the values are low, this exercise only considers actions of identified actors, and it is also meaningful to compare the reductions with the emissions for which these actors are responsible. In the case of private actors, fleet electrification actions lead to a 29% reduction in their transport emissions by 2030. Taking this into account, private actors identified in this analysis are actually meeting a goal three times higher in terms of ambition than the ENME set for the whole country.

Reductions achieved by fleet electrification actions are also not distributed equally among the actors, and the contribution of cities with respect to their emissions continues to be low. The electrification of the fleet in Bogota, which is the most ambitious city in proportional terms, results in a reduction of

53 $ktCO_2e$. This figure is equivalent to 1% of transport emissions in the city according to its latest GHG inventory from 2008[20].

3.1.5 Specific analysis 5A: Replicability analysis for transport sector measures

Based on the analyses carried out for the transport sector in cities, two actions with a high potential for replicability in other regions of the country were identified. The first is the electrification of part of the collective public transport fleet (buses). As part of this exercise, the WWF team estimated potential emissions reduction impacts if this action is replicated in the country's public transport systems. The corresponding results are presented below:

To model an increase in the electric bus fleet in the country's public transport systems, the following was assumed:

- The calculations were made for 15 capital cities of the country using as a starting point the projection of Bogotá's fleet of 1,485 electric buses in the short term. The replication scenario takes into account that this is the most ambitious plan in the country currently in planning / implementation, and it represents a conversion of approximately 10% of Bogota's total bus fleet. Based on this, the replication scenario assumed a conversion of 10% of the bus fleet from diesel to electric buses for 14 other department capitals in the country.
- The cities included are Bogota, Cali, Medellin, Pereira, Barranquilla, Bucaramanga, Cartagena, Armenia, Monteria, Neiva, Pasto, Popayan, Santa Marta, Sincelejo and Valledupar.
- The emission reduction was calculated and analyzed assuming that gradually until 2030, 10% of public transport buses with diesel engines in these cities are replaced by electric buses with equivalent capacities (in number of passengers) and activities (distances traveled per day).
- The emission factors of the replaced buses corresponds to the average of the emission factors reported by the Mining and Energy Planning Unit (UPME) in the FECOC[21], weighted by the number of vehicles reported in the single national transit registry (RUNT) of buses in the cities.

The emission reduction potential of electrifying 10% of the fleet of the 15 modeled cities (the 15 largest capitals) would correspond to a reduction of just over 180 $ktCO_2e$ in 2030, as shown in Figure 20.

[20] Inventory of greenhouse gas emissions for the Bogota-Cundinamarca region. IDEAM, 2012. P.69, table 5.1. Retrieved online January 7th 2021 at: https://oab.ambientebogota.gov.co/wp-content/uploads/dlm_uploads/2018/11/informe-tecnico_gei_1.pdf

[21] Emission factors of Colombian fuels

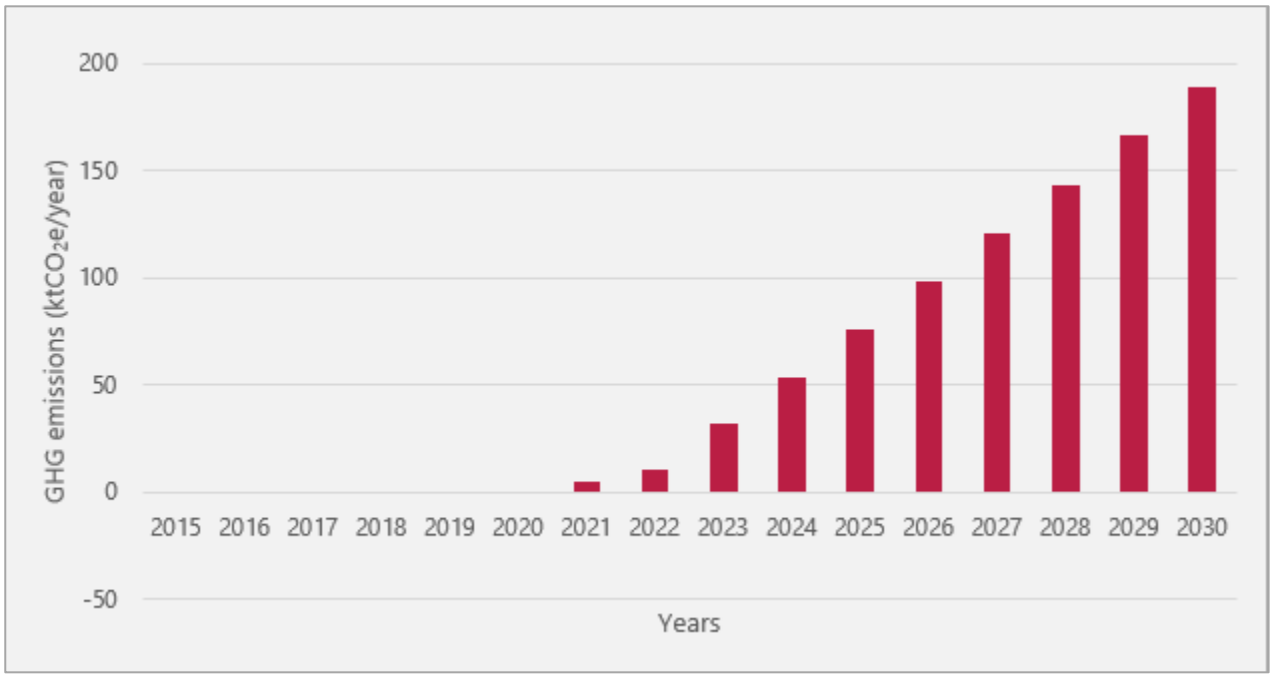


Figure 20. Estimated annual emission reductions under the assumption that by 2030, the 14 largest capital cities electrified 10% of the public transport bus fleet

As mentioned before and presented in Figure 21, according to the baseline scenario of the last update of the NDC, emissions from all land transport in Colombia in 2030 will be 50,300 $ktCO_2e$ and the ENME has the goal of reducing emissions by 4,240 $ktCO_2e$. If these new actions from this hypothetical analysis are added to those identified in previous section, we see that they only represent 7 % (298 $ktCO_2e$) of the national electric mobility goal. This further emphasizes the urgency of establishing more ambitious electric mobility goals as mentioned above.

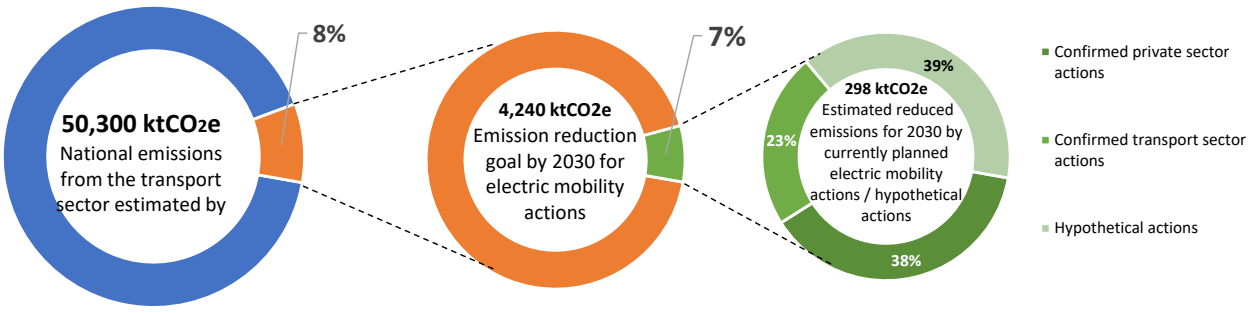


Figure 2. Share of emissions reductions from replicability scenario 5A

In these specific analyses, electric mobility actions are modelled and compared with the ENME to quantify progress toward national goals. Specific analysis 4 only included actions that are already under implementation or that have concrete implementation plans identified by this

project. Meanwhile, specific analysis 5A represents a hypothetical case built by the WWF team with electric mobility actions that have not been proposed so far. The comparison of emission reduction in these two scenarios illustrates that, although the hypothetical case represents a significant increase in ambition in cities, it is still insufficient to fulfill the national goal established in the ENME.

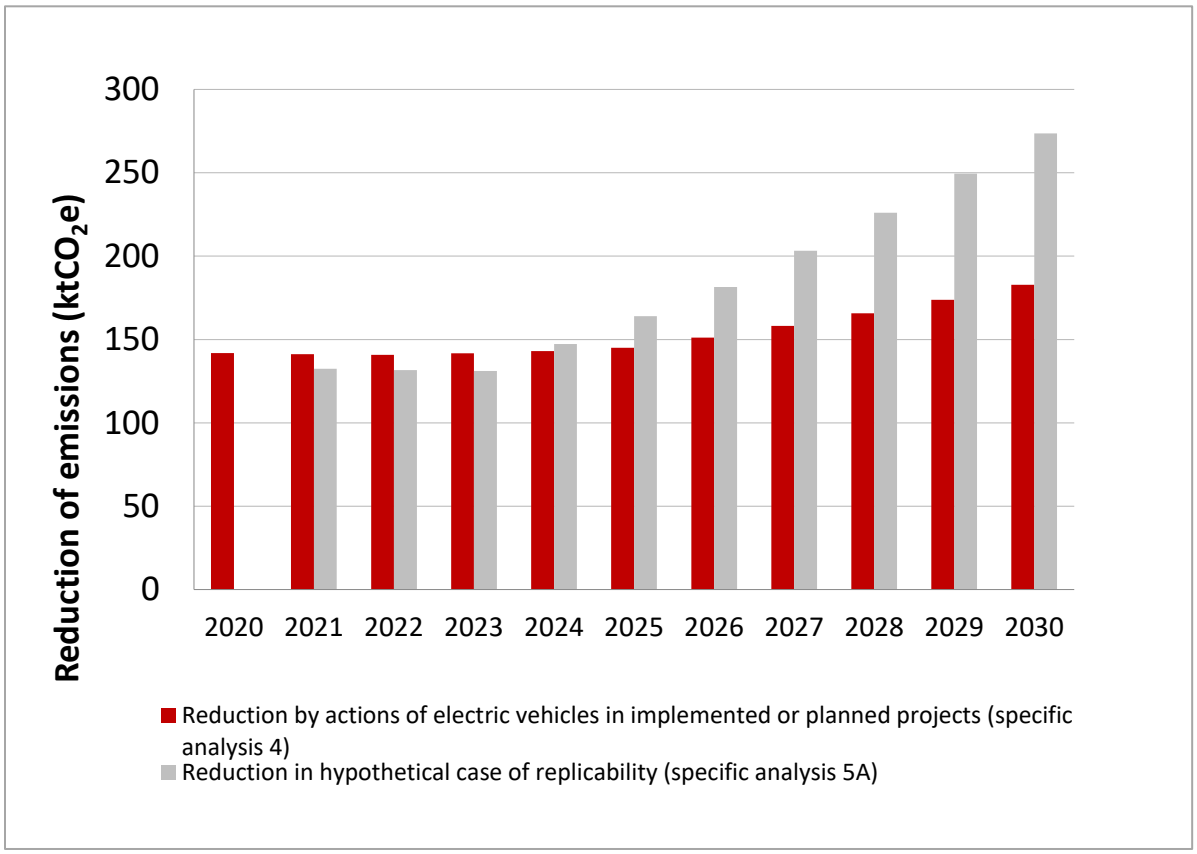


Figure 3. Reduction of emissions from electric mobility actions in cities in projects planned, or under implementation (Specific analysis 4), and in the hypothetical case of electrification of 10% of the fleet in 15 capital cities (specific analysis 5A).

Figure 22 shows the comparison of emission reductions from specific analysis 4 and 5A. Should the replicability scenario be executed, there would be an increase in emissions reductions of about 19 by 2030.

3.1.5.2 Specific analysis 5B: Replicability analysis for increasing cycling infrastructure

Increase in cycling infrastructure

The second replicability analysis considered in this study was increasing bicycle infrastructure. For this exercise, we assumed the following:

- The calculations were made for the 100 cities with the largest population in the country.

- Goals for additional cycling infrastructure were assumed according to the city's population: Bogota 200 km, Medellin 100 km, Cali 100 km, cities with more than 300,000 inhabitants 20 km, and 10 km for all the others. A total of 1,580 km of bike infrastructure was modeled. The number of trips per kilometer of infrastructure[22], the modal distribution of the trips, and the average length of trips were taken from the study by Espinosa, Pacheco and Franco (2018). This study represents the best information available to estimate these variables, but it is based on data exclusively from Bogota. This implies a relatively optimistic scenario since Bogota is one of the cities with the highest proportion of bicycle trips in the entire Latin American region.
- The emission factors of the trips that are no longer carried out in motorized modes correspond to the average of those reported by UPME in the FECOC, weighted by the number of vehicles reported in the RUNT.

The potential for reducing emissions by increasing cycling infrastructure in these 100 cities corresponds to about 51 $ktCO_2e$ in 2030, as shown in Figure 22. For the year 2030, the goal of the NAMA TAnDem corresponds to 130 $ktCO_2e$. This goal was included in the NDC update modeling as the national goal of actions related to bicycle systems and increase of cycling infrastructure. Thus, the reduction of emissions in this scenario corresponds to approximately 39% of the national goal of reducing emissions by increasing the modal share of bicycles.

[22] It was assumed that **455 trips are attracted per day for every additional kilometer** of cycling infrastructure that is built. This is in accordance with table 3 of Espinosa et al, Revista DYNA, 85(205), pp. 305, 2018.

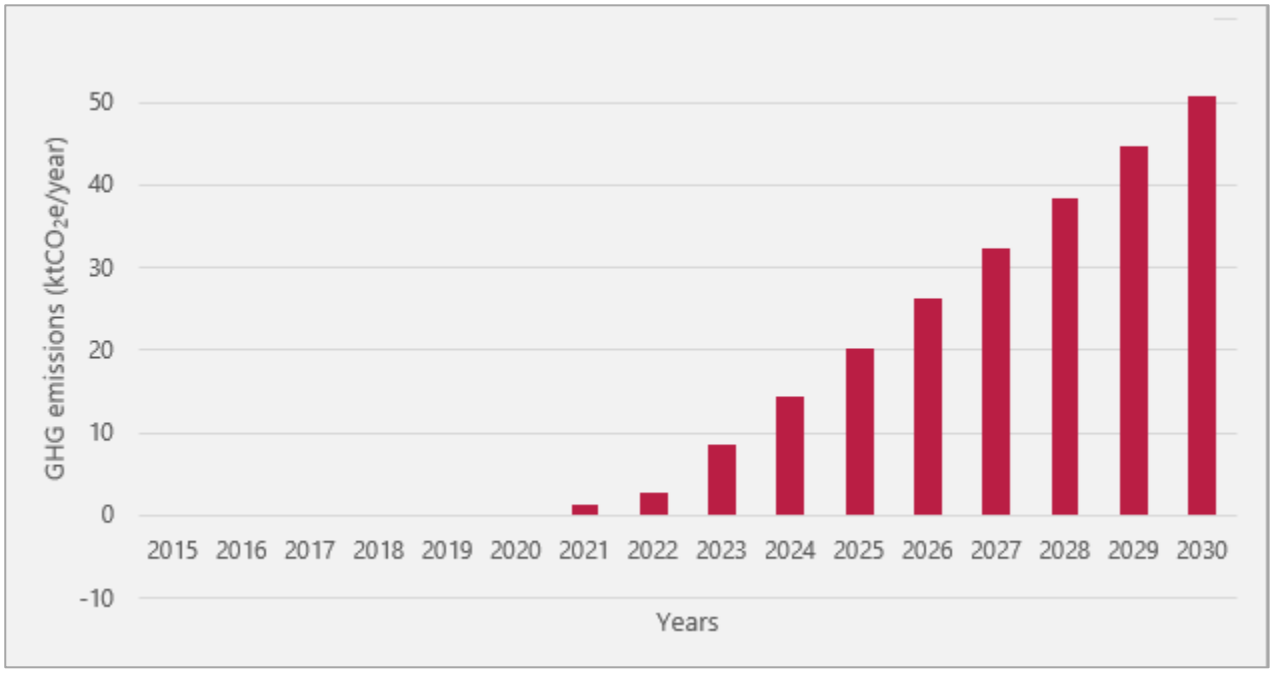


Figure 23. Estimated annual emissions reduction under the assumption that by 2030 the 100 most populated cities increase the country's cycling infrastructure by 1580 km.

3.1.6 Specific Analysis 6: aggregate of all actions

Finally, a last specific analysis was carried out which presents the total emission reduction of all the actions considered in this project. This includes all the actions that were identified regardless of whether they were from the private sector or cities, confirmed or not, or with or without overlap. The actions of the specific replicability analysis are not included as they are actions that were modeled for illustrative purposes, but they are not existing initiatives. This analysis represents the total contribution of all the actors identified in the ICAT project.

The total emission reduction of all the actions identified in the ICAT project is 3,550 $ktCO_2e$ (Figure 24). The latest update of the NDC in Colombia estimated total emissions in the reference scenario (R3) at 358,600 $ktCO_2e$ in 2030. Thus, these actions could represent a 2030 reduction of 0.8% of national emissions.

The LEAP model estimates for the NDC update include two mitigation scenarios. M1 represents the least ambitious scenario and only includes the sum of reduction potentials from validated government data. In this M1 mitigation scenario, the reductions stand at 96,162 $ktCO_2e$ in 2030 with respect to the reference scenario, amounting to a reduction of 28%. The above implies that the actions of this project correspond to 3.6% of what is estimated in the NDC update. When compared to national targets, it should not be surprising that the values are low since only a subset of actors and actions have been included in this study.

Figure 24 shows the total estimated reductions separated by types of actions for both the private sector and cities. In total, the reduction in emissions from all actions in the transport sector, that is, transport actions in cities plus private transport actions, comes to 1,040 $ktCO_2e$. This value represents 2% of the projected emissions for 2030 in the baseline scenario for all land transport in the latest NDC update. Likewise, the reduction of emissions from industrial processes and consumption of electricity represent 8% and 4% of the emissions in the reference scenario, respectively.

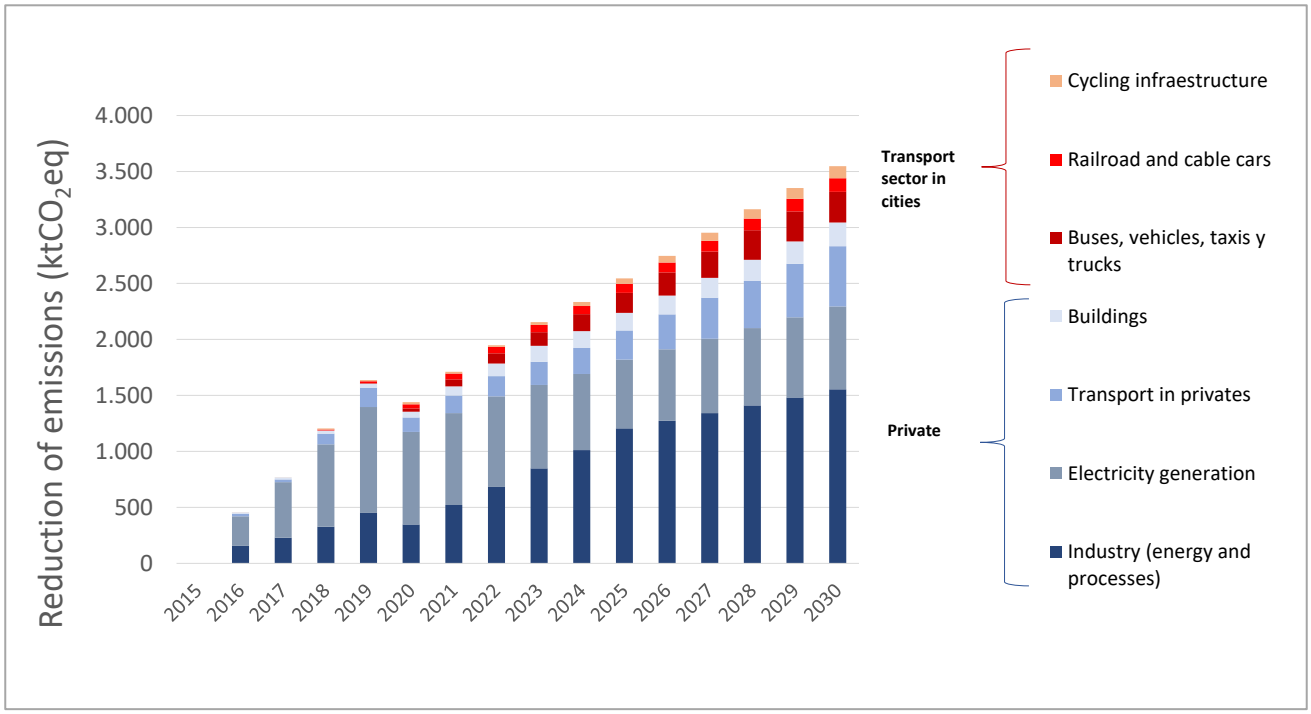


Figure 24. Reduction of the total emissions of all the actions considered in the Project separated by the type of actor and type of action[23].

Despite the total contribution seeming modest, private actors presented here are making efforts in line with the goal of a 20% reduction based on the 2015 NDC. We estimate total emissions in 2030 for all private actors in this analysis—without any mitigation actions—to be 13,900 $ktCO_2e$. However, assuming the achievement of identified actions, estimated emissions in 2030 are 10,800 $ktCO_2e$. This figure corresponds to a reduction of 22% (Figure 32) over the baseline scenario for these actors. If only confirmed actions are counted, the reduction stands at 4% of their total emissions in the baseline. This emphasizes the importance of improving communication channels for the registration of actions in RENARE for the NDC implementation phase.

[23] The reductions of actions with overlapping and unconfirmed grow markedly between 2016 and 2019 due to a decarbonization of the energy matrix thanks to actions of the generator Celsia. The benefits of these actions extend until 2030 but at a lower annual rate.

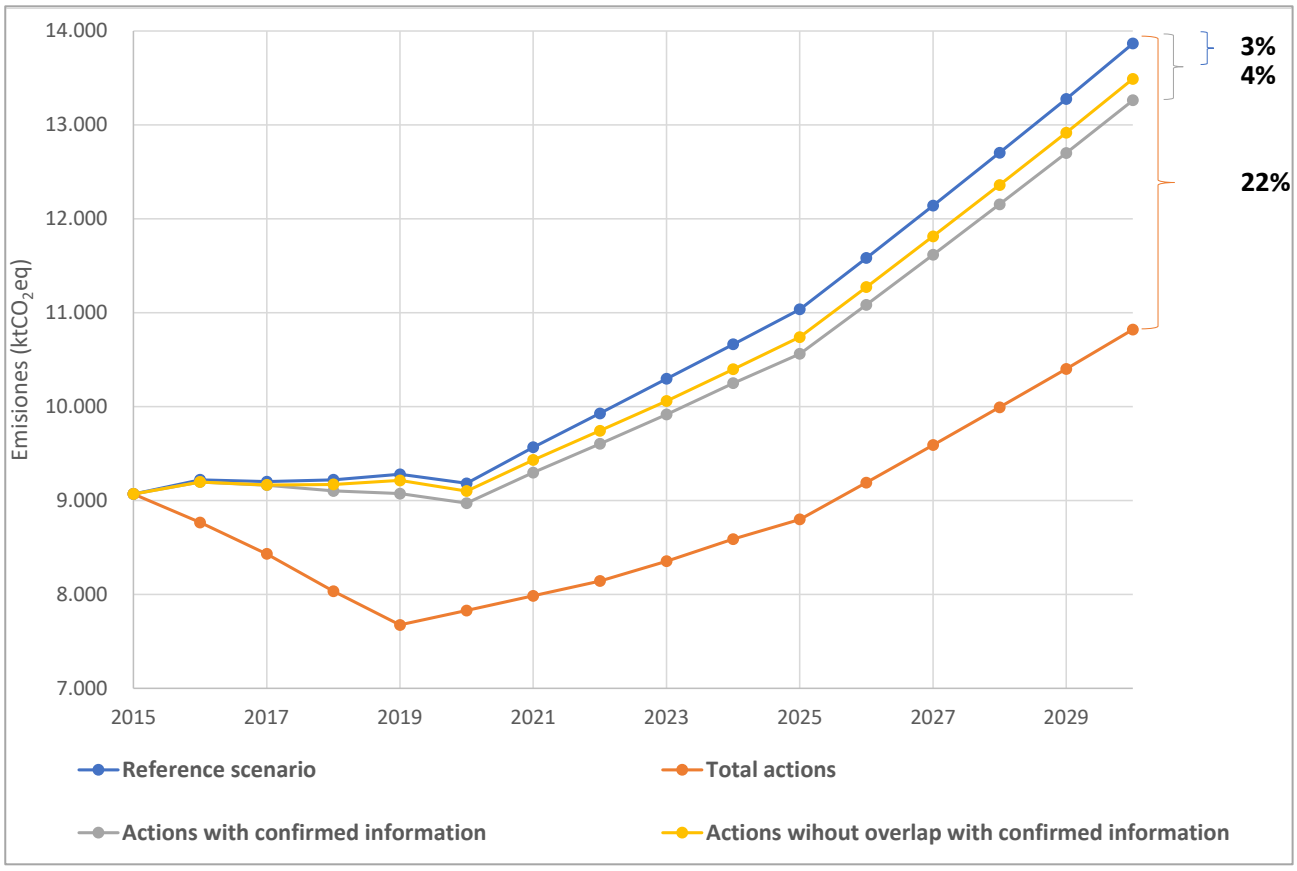


Figure 25. Emission trajectories for the private sector in accordance with the state of information

3.2 Discussion of results

This document presents the results of the implementation of the ICAT NSA project using the ICAT CAAT tool. The totality of identified actors would emit a total of 16,800 $ktCO_2e$ in 2030 if no action were implemented, representing 4% of the country's total emissions in that year. The process made it possible to estimate and analyze 48 actions (25 from the private sector and 23 from transport in cities) which are equivalent to a reduction of 3,550 $ktCO_2e$ in 2030. This reduction corresponds to 0.8% of total national emissions in the reference scenario from the latest update of the NDC (2020). Considering that this analysis has only included some actors in select sectors of the NDC, the reduction is not negligible. Moreover, it sheds light on the high potential for quantifying emissions reduction associated with the involvement of non-state and sub-national actors in NDC update and implementation processes in Colombia.

Of the 48 actions analyzed in the ICAT project, 24 were included in the modeling of the NDC update (These actions are shown in detail in tables 4 and 5, they are those that have a letter of consent from companies, municipalities or governments). The remaining 24 could be included in a future update exercise.

Currently the only way for a private actor or a city to directly contribute toward the NDC is by registering their emission reduction actions in RENARE. The specific analyses considered in this study were designed to better understand the potential of these actors (private and cities) and their possible integration with the NDC.

Specific analysis 2 (confirmed and unconfirmed actions) shows that there is still a need to improve the availability of primary information coming from implementing actors. It is thus important to strengthen communication and information gathering strategies. Of the 25 actions in the private sector, only 15 (corresponding to 20 % of the potential emission reductions) could be confirmed directly with the companies. The information of the other actions was obtained from sustainability reports of the companies and some online platforms such as CDP. Unfortunately, it was not possible to confirm with many implementing actors whether values were correct, up to date, or if the execution plans were still in place. Improving communication channels with private parties would help overcome these challenges.

Similarly, only 28% of the identified transport actions in cities were confirmed. This also has important implications for the quantification of additional reductions relative to what is already modeled in the NDC. While the actions identified in this project could represent an additional 1,100 $ktCO_2e$ in 2030, only 460 $ktCO_2e$ of these could be confirmed. Future work and analyses can confirm information from a larger number of actions, thus reducing uncertainty.

Regarding fleet electrification actions, the analysis showed that actions that are under implementation or with concrete plans represent 4% of the national goal for reducing emissions through electric mobility projects established in the updated NDC. However, private actors identified in this study achieve a 29% reduction with respect to their baseline, based on their fleet electrification actions. In comparison, Bogota, the most ambitious city in this area, barely reaches a 1% reduction with respect to its last GHG inventory from 2008. This suggests that the goals of private actors involved are more ambitious than the national goal, highlighting a great opportunity to work with the private sector for the implementation of these types of actions. These results also suggest that it is easier for the private sector to establish ambitious goals when compared to those of the cities. This may be attributed to the fact that the private sector is autonomous in its decisions and its budget, while cities require plans, policies and regulations to direct and accelerate decarbonization in the transportation sector.

The ENME emission reduction goal is estimated to avoid between 600,000 and 4,240 $ktCO_2e$. To reach this goal, the country formulated 2 projects: Transfer 3 and NAMA MovE. The latter was approved by the NAMA Facility for 19 million euros, to be implemented between 2021 and 2025. A specific analysis on electromobility replicability was conducted to explore the emissions reduction potential if fleet electrification actions were replicated in 14 capitals of the country. Bogota's target was used as a point of reference, given it is the most ambitious city level plan thus far. According to this analysis, electrifying 10% of the public transport fleet in 15 departmental capitals would reduce emissions in 2030 by 180 $ktCO_2e$. This figure represents only 4% of the national goal of reducing emissions through electric mobility projects. This highlights an urgent message to the national government: if the goal defined in the ENME is to be achieved, it is necessary to accelerate the implementation of more ambitious electric mobility measures. Examples of such are: the implementation of the Electric Mobility NAMA (NAMA MovE already approved and in the program design phase) or other actions that will popularize this type of mobility in the next 10 years in Colombia.

Another replicability analysis was carried out in order to explore the emission reduction potential of the promotion of non-motorized transport through the construction of cycling infrastructure on a larger scale in the country. The mitigation potential of cycling infrastructure construction in the 100 most populous cities was estimated to be an additional 51 $ktCO_2e$ in 2030. It is important to mention that, although the potential is much lower than that estimated for the hypothetical case of an increase in the electric fleet, this measure usually has lower investment costs and additional benefits of urban development. Additionally, considering the current situation of COVID 19, active mobility is one of the best options to comply with the rules of social distancing.

The evaluation presented here is an important step in the harmonization of measures aimed at reducing GHG emissions in Colombia, either from the national government, non-state actors or sub-national actors. This project is part of an effort to include the contributions of private actors, regions and cities in the quantification of national mitigation. Its results will help to take informed decisions and identify additional challenges and opportunities to achieve established goals. The analysis has made it possible to identify information gaps, high-potential actions, and key actors that will help reduce uncertainty in some cases.

The results of the implementation of the ICAT guide in Colombia made it possible to analyze in more depth and detail specific information from non-state actors and subnational governments. This has resulted in the identification of measures, processes and good practices to allow information to be reported with greater precision and efficiency, in line with transparency commitments established by

international community. The roadmap defined by the WWF team, the tools available for the evaluation, and the contacts established in this project all contributed to this study. Building on this, future work can continue to close the gap between the different stakeholders interested in reducing and quantifying GHG emissions and contributing to the NDC. Additionally, further work could continue to identify specific support required by actors during the registration of their actions in the NDC.

In this document, many information gaps and assumptions were identified which can contribute to uncertainty in results. In the case of private companies, information gaps and assumptions were mostly related to methodological differences in the quantification of emissions between the national government and the private sector. This is because the latter tend to favor an aggregate quantification of all their actions from year to year instead of specific monitoring of each action. This implies that there is little information regarding baseline emissions projected to 2030 in a counterfactual scenario without actions, and that quantification by individual actions is difficult. Companies can track their emissions annually and thus be able to identify their reduction from one year to the next. However, they do not have enough information to identify the reduction potential of each action, nor to estimate emissions if mitigation actions had not been implemented.

In the case of transport projects implemented in cities, identified information gaps and assumptions were not methodological but mostly corresponded to a lack of complete documentation in the estimates. Information such as captured mode, electricity consumption and load factors could be found more easily if there was an entity that centralized such information and supporting documentation. Contrary to the case of private companies, cities do report the reduced emissions associated with specific actions, as well as scenarios without mitigation actions. However, documentation that supports these estimates is not always clear and often difficult to obtain.

3.3 Recommendations

Colombia's updated NDC will be implemented during 2020 and 2030. It is important to implement mitigation actions as well as to quantify and report them in a transparent and consistent manner. An integral part of the NDC implementation process will consist of identifying projects with significant mitigation potential and reporting them as mitigation actions in RENARE.

This project uncovered two major obstacles for companies and cities in reporting their emission reductions from actions. First, the actors do not have sufficient information to make a complete emission reduction estimate. This may be either because the companies have not carried out an emissions inventory or because the information captured from the transport projects in cities is not available. The uncertainty inherent in their estimates refrains actors from sharing data and

information if it implies they may be held accountable for these reductions by the national government. On the other hand, many a times the information is available, but the uncertainty is high. In such cases actors do not know how to reduce such uncertainty without collecting more primary information. Thus, it is necessary to establish a plan to support private actors and cities and strengthen their capacity to adequately report the emission reductions of their actions.

According to the MinAmbiente guidelines, it is necessary to report and record emission reductions in RENARE so that they can be taken into account in the national emission reduction goal. Nonetheless, to register a specific action in RENARE, it is necessary to have an MRV (monitoring, reporting and verification) scheme designed for the project, which is not available in most cases. This barrier must be overcome, otherwise, few projects will register their emission reductions in RENARE. Consequentially, it will be very difficult for the country to demonstrate compliance with its NDC.

During the development of this project, many private actors and sub-national governments showed their interest and commitment in being part of the NDC. Some even signed letters of intent to ensure that specific projects would be included in the NDC update. However, they need more information on what are the steps to follow for these actions to be registered.

The registration process in RENARE has several stages. The first stage is a feasibility stage in which general information about the project is requested. Unfortunately, many actions will not make it beyond the feasibility stage in the registration process due to the lack of clear monitoring mechanisms. This kind of information is requested in the subsequent stages (formulation, implementation and closure).

Therefore, it would be helpful to establish a mechanism through which interested stakeholders could request the National Government for support in strengthening their capacities in MRV design and RENARE registration. One option could be to enable the request for this support through the RENARE platform in its initial feasibility phase. In this manner, all those interested in the issue could be invited to register in the feasibility phase and request the National Government for support to complete the process. Alternatively, there could be a campaign informing non-state actors and local governments through the regional nodes, which is the mechanism to request support for these activities. Dissemination of the procedure for requesting support by the private sector could be achieved through associations or development banks that finance projects with GHG mitigation potential.

Second, the analysis and quantification of actions, from either the private sector actors or in cities, could play a more important role in future NDC updates. This exercise has made it possible to identify some areas for which more ambitious actions are needed to achieve national goals, for example, the goals associated with electric vehicles in cities. It has also identified some private actors that have made significant progress in these areas. In order to understand which actions are replicable and have high mitigation potentials, and to better document the challenges that exist, and opportunities provided by national policies, it will be essential to include non-state and sub-national actors in the next NDC update. The integration of these results in the 2020 update of the NDC was quite limited because the electric mobility goals were already included in the modeling. Nonetheless, it is in the implementation phase where the replicability and compliance analyses become more important. The necessary work to incorporate electric mobility goals implemented by cities or private companies into the NDC is something that could be developed in a second phase of this project.

The process of updating the NDC is the responsibility of the MinAmbiente, however, efforts have been made, and should continue, to develop it in conjunction with non-state and sub-national actors. Thus, the associated documentation should help to make this joint effort visible. It will also help in revising the goals of subnational and non-state actions to make them more ambitious. Additionally, this kind of analysis also helps recognize where the existing progress in achieving reductions may be coming from, and where there may be potential for accelerating mitigation goals.

In future projects it will also be important to have a more complete sample of actors involved. One way to achieve this is through direct communication with industry associations that can more directly reach a larger group of stakeholders. To gather information for this project, WWF held a series of workshops with the ANDI, which allowed the sample to be improved and expanded. The involvement of industrial associations will be key to ensure that there is a broad sample of actions and opportunities to contribute to the NDC. This should also allow for the identification of challenges and support needs of the public sector and of large, medium and small companies. The companies that participated in this exercise were those that have made the most progress, and thus have the greatest intention of giving visibility to their actions. However, they are not necessarily representative of the reality of the country and our sample therefore has a self-selection bias. Expanding the spaces for dialogue with other companies will be key to increasing the private sector's commitment to reducing emissions.

Industrial associations and similar actors could also play a role in the design of emission reduction monitoring protocols in the private sector. The identification of emission reductions due to specific actions is important in these exercises. It also helps to estimate the potential of similar actions in other companies. However, if companies continue to only monitor their annual emission inventories and not report a reduction associated with a set of measures, it will be difficult to define which actions have the greatest potential for replication. Thus, a more integrated and comprehensive process is needed.

Throughout the year, the WWF team was in contact with several stakeholders who have very detailed information on their clients' emission reduction projects but not on their operations, so it was not possible for them to share it. Some examples of actors of this type are private banks that offer soft loans for projects aimed at reducing environmental impact, or marketers of electric fleets. It is important to define an information exchange system with these actors who are not the implementers of the actions themselves but do facilitate them and have access to complete information.

This process made it possible to take a first step in integrating the efforts of sub-national and non-state actors in the update of the NDC. A suggested next step is to start a confirmation process for unconfirmed actions, including those that were identified in this exercise. This could also be accompanied by an effort to identify barriers in the reporting of these actions. Reducing the uncertainty of actions that have not been confirmed would help close the gap between the emissions reduction potential presented here. It could also help identify more actions that were not taken into account in this exercise and, thus, increase estimated mitigation potential.

Another important next step is the detailed identification of replicable actions beyond the electrification vehicle fleets and the creation of cycling infrastructure. Of all the identified actions, these two were the only ones for which a replicability analysis was performed, as there is information at the required level of detail to scale the exercise. The private sector could also have actions that could be scaled up at the national level if sufficient data were provided. Similarly, an investigation of barriers and opportunities in the implementation of electric mobility would help to better understand why the process has seen accelerated implementation in the private sector but not in the public sector.

Since the inception of this project, the scope in cities was limited to quantifying actions in the transport sector. Nonetheless, it is important to advance similar analysis for other key sectors to evaluate the potential for further reduced GHG emissions in the country. For example, sectors such as waste and AFOLU were not included in this analysis and have high mitigation potential. Moreover, industrial actors included here are the result of a first effort to identify key actors, but this work can be expanded and diversified in a later phase.

Additionally, it is worth taking advantage of the momentum resulting from this project in both cities and the private sector. Many contacts between key actors were made, which can be leveraged moving forward. Although through the project it was possible to estimate mitigation potentials, many of the actors are currently waiting for instructions and next steps to convert their actions into mitigation projects with defined monitoring tools. This would also further advance the registration of actions to demonstrate their contribution to the NDC and climate agenda.

PREPARED UNDER

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