

THE CLIMATE PATHWAY PROJECT



Development and evaluation of São Paulo State's decarbonisation pathway

FINAL REPORT

FINANCED BY



MAIN PARTNER



BENEFICIARY



PARTNERS





Abbreviations

AFOLU	Agriculture, forestry and other land use
BAU	Business as usual
C	Celsius
CE	Cost effectiveness
CCS	Center for Climate Strategies
CO₂	Carbon dioxide
CO₂e	Carbon dioxide equivalent
GDP	Gross Domestic Product
Ha	Hectare
IPCC	Intergovernmental Panel on Climate Change
MCA	Multi-Criteria Assessment
MWh	Megawatt hour
NICFI	Norway's International Climate and Forest Initiative
GDP	Gross Domestic Product
RCI	Residential, commercial, and institutional
SIMA-SP	Secretariat of Infrastructure and Environment of the State of São Paulo
TCG	The Climate Group
Tg	Teragrams
t	Metric tonnes
VKT	Vehicle-kilometres travelled

Executive Summary

This report includes a summary of the process of developing and assessing priority actions for the decarbonisation pathway of the State of São Paulo, Brazil, as well as the results of the following main stages of the process:

1. Developing the state's "business-as-usual" (BAU)/baseline planning scenario;
2. Defining of state targets to reduce net GHG emissions for 2030 and 2050;
3. Selecting priority actions for the pathway and their technical designs;
4. Assessing the expected impacts of the implementation of the action on GHG emissions, in magnitude of costs and direct savings, and on the state's macroeconomy.

A decarbonisation pathway is a transformational process to reduce greenhouse gas (GHG) emissions in the long term (2050) through a series of actions in key economic sectors and emitters that will alter the BAU pathway of these GHG emissions through the adoption of new technologies, process improvements, and improved natural resource management.

This executive summary has been translated into English, please note that the full technical report is only available in Brazilian Portuguese.

Pathway development and assessment process

This was a collaborative process between the São Paulo state government and an international technical team. State government actions were led by the São Paulo State Secretariat of Infrastructure and Environment (SIMA). The project team consisted of the Climate Group, Winrock International, Center for Climate Strategies (CCS), and support from the Intermunicipal Consortium of the Western Metropolitan Region of São Paulo (CIOESTE). Throughout the process, contributions and comments from other key public and private sector stakeholders were solicited and incorporated through face-to-face and virtual meetings and workshops.

BAU emissions scenario/planning baseline

The BAU planning scenario developed by the project revealed that in the base year 2015, São Paulo's total greenhouse gas (GHG) emissions were 153 TgCO₂e, and it was projected that these emissions would increase by 2030 and reach 168 TgCO₂e, continuing to increase until 2050, reaching 219 TgCO₂e. According to this analysis, several sectors contribute almost equally to the estimated BAU for São Paulo, on the order of 30-40 TgCO₂e (industry, agriculture and cattle ranching, and waste management), while the transport sector emerges with more significant contributions, around 100 TgCO₂e.

Decarbonisation target

The selection of a GHG emissions reduction target for São Paulo was based on the State's commitment to neutralise its net emissions by 2050. The state did not adopt interim targets for 2030 or 2040.



Selected priority actions

Twelve priority actions were selected to shape São Paulo's pathway:



Energy supply sector: 1) Centralised solar power generation, 2) Biomass power generation.



Industry sector: 1) Fuel use efficiency in light industry, 2) Carbon capture and storage in iron and steel production, 3) Reduction of process emissions during cement production.



Transport sector: 1) Smart urban planning, 2) Vehicle electrification, 3) Passenger mode shift.



Agriculture, forestry and other land use sector: 1) Climate-smart agriculture (use of low carbon emission techniques), 2) Restoration of the forest landscape, 3) Conservation of native vegetation.



Waste sector: 1) Methane energy use in landfills.

Expected impacts of implementing the actions

Expected impacts of action implementation on GHG emissions

With the implementation of the twelve actions, by 2030, GHG emissions reductions of 44 TgCO₂e (i.e. 27% compared to BAU levels) are expected. By 2050, reductions of 108 TgCO₂e (i.e. 50% compared to BAU levels) are expected. Most GHG emission reductions will come from priority actions in the transport (13% in 2050) and AFOLU (22% in 2050) sectors.

Although full implementation of the priority actions shown here points to a significant reduction in GHG emissions over the next decade, it is noted that the State's target of neutralising net emissions by 2050 will not be achieved. By 2030, the GHG emission reductions from the priority actions are estimated to be approximately two thirds of the reductions required to reach the 2030 target (44 TgCO₂e of the

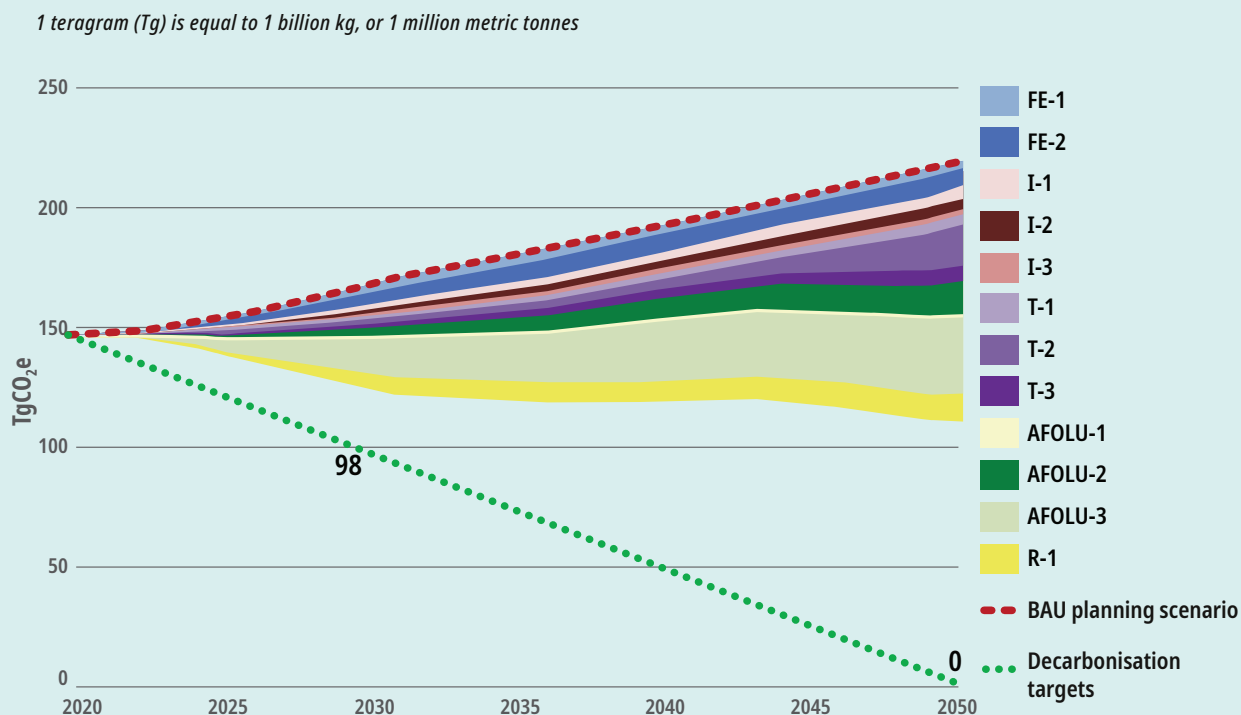


FIGURE 1. EXPECTED GHG REDUCTIONS FROM PRIORITY ACTIONS SELECTED BY SÃO PAULO

Note: FE: energy supply, I: industry, T: transportation, AFOLU: agriculture, forestry and other land use, R: waste management.

necessary 69 TgCO₂e). Similarly, by the year 2050, the GHG emission reductions from the priority actions are estimated to be approximately half of the reductions required to achieve the 2050 target (108 TgCO₂e of the necessary 215 TgCO₂e). To meet this 2050 target, it is necessary that the State reaches GHG emission reduction levels around 3.6 TgCO₂e/year for each year until 2050.

After the expected implementation of the priority actions in 2050, most of the emissions will remain in the energy supply and transportation sectors.

Through this project, São Paulo has set a very ambitious and transformative decarbonisation target, and the priority actions represent a significant initial effort by the state to achieve it. To meet the target, emissions will need to be reduced by 25 TgCO₂e by 2030 and another 107 TgCO₂e by 2050.

Expected impacts on cost magnitude and direct savings

Implementation of half of the priority actions (6 of the 12) is expected to generate net savings over time. These net savings are expected to be of small magnitude for most of these actions (4 out of 6) compared to the expenditure levels of the benchmark sectors. Generally, this is because the savings accrued over time are greater than the costs required to implement an action.

Similarly, for the other half of the priority actions that generate net costs, these costs are all expected to be small in magnitude compared to the expenditure levels of the benchmark sectors.

Actions that are expected to generate direct costs (for all actions of small magnitude) should not be considered a negative outcome. In addition to their GHG reductions, these actions can also promote indirect/macro-economic benefits for the state, as they include the potential to increase overall economic activity in the state and/or increase jobs.

Expected macroeconomic impacts

The vast majority of the priority actions have positive indicators, meaning that they are likely to generate a positive macroeconomic impact for São Paulo's economy if implemented to capitalise on key drivers of macroeconomic gain. However, it is important to consider that the priority actions do not represent significant deviations from socio-economic development patterns nor do they show the potential for a disruptive influence. The potential direct costs or savings is generally a small percentage of the associated sectors' expenditure level.

Additionally, all twelve priority actions show positive macroeconomic outcomes, and the actions may still attract external investment (or capital) and therefore expand the financial resources available in the state.

Conclusion

Through the development of this decarbonisation pathway, the State of São Paulo moves forward with an important step in its decarbonisation objectives, especially considering that the state has set an ambitious and transformative decarbonisation target, aiming to neutralise its net emissions by 2050.

The twelve priority actions propel the State into the 50% emissions reduction projected in its BAU planning scenario. As next steps, the State should identify the specific implementation mechanisms, besides mapping and securing possible financing sources for each of the actions, thus maximising its mitigation potential and generation of socioeconomic benefits.

Likewise, the State must establish monitoring, reporting and verification systems that make it possible to track the effectiveness of the implementation of the actions and measure their real impacts.

This is because the pathway needs to be flexible to adapt both to the technological advances that directly impact the climate mitigation potential and the cost/benefit of the implementation of the actions, and to the political-economic situation that influences the macroeconomic elements affected by the implementation of the actions.

Finally, it is important to highlight that there is still work to be done. The twelve priority actions included in the pathway partially contribute to the achievement of the ambitious GHG emission reduction targets selected by São Paulo, but not completely.

Therefore, São Paulo needs to identify additional actions to those listed in this work and/or increase the level of effort of the actions already listed to meet its targets. Nevertheless, São Paulo is very well positioned with the exercise carried out in the scope of this project to take firm steps towards reaching its climate objectives, as well as other socio-economic development goals fostered by the priority actions.

Additional information

All the intermediate products of this project are included in a folder attached to this report. Annexes I-VIII are summaries of the sectoral baselines; Annex IX is the proposed in-depth State decarbonization target; Annex X includes the sectoral catalogues of mitigation actions; Annex XI is the definition of the criteria employed in the multi-criteria assessment; Annexes XII to XXIII are the design documents and analyses for each priority action included in the pathway; Annexes XXV to XXXI are the Excel tools to calculate the baseline of the different sectors and the impacts of the actions on these sectors; and Annexes XXXII to XXXIV are the modules that show the detailed methodologies for assessing the impacts of the actions.