KONRAD ADENAUER STIFTUNG

Cities and Vertical Integration of Brazil's Nationally Determined Contribution (NDC)

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CLIMATE CHANGE
NEW DISCUSSIONS IN BRAZIL AND IN THE WORLD

Cities and Vertical Integration of Brazil's NDC

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CLIMATE CHANGE

NEW DISCUSSIONS IN BRAZIL AND IN THE WORLD

On July 24, 2019, the Brazilian Center for International Relations (CEBRI), together with the Konrad Adenauer Foundation in Brazil, held the second roundtable of the project "*Climate Change and Environment: the role of Brazil in strengthening multilateralism*". The project aims to contribute to enhancing the knowledge of Brazilian society on global environmental issues, especially those relevant to the country's national development and international insertion that relate to the implementation of the Paris Climate Agreement and its connection to Agenda 2030 and the Convention on Biological Diversity (CBD).

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Introduction

Cities are responsible for around two thirds of the global demand for energy, for 80% of greenhouse gas emissions and 50% of the global production of waste (OECD, 2019). Severe climate impacts on the quality of life are a real prospect. Cities, as well as other instances of subnational government, businesses and other non-state actors have been implementing numerous actions to mitigate climate change over the last decade. They do so on their own, within international networks and often in partnership with national states and international organizations (Bulkeley et al., 2014).

There are several international organizations aimed at engaging cities in climate policies, by providing support to municipal planning that includes climate considerations, or by disseminating positive experiences to encourage other cities, or even by fostering efficient production and conscientious consumption. Such is the case of the Global Covenant of Mayors for Climate and Energy (GCoM), a global alliance for city climate leadership, built upon the commitment of over 9,000 cities to combat climate change; the Carbon Disclosure Project (CDP), which disseminates the environmental achievements of more than 7,000 cities, states, and regions; Local Governments for Sustainability (ICLEI), a global network of more than 1750 cities and regions committed to building a sustainable future; and C40, a network of global megacities committed to addressing climate change, sharing knowledge and driving meaningful, measurable and sustainable action.

Even the UNFCCC (United Nations Framework Convention on Climate Change) in its Conference of the Parties (COP 21), when establishing the Paris Agreement, which consolidated the new climate regime, recognized the importance of cities in addressing climate change.

This new regime (Decision 1/CP.21) is no longer based on a regulatory model of binding emission targets but rather on a "catalytic and facilitating" model. It defined a leading role for "non-party stakeholders" (civil society, private sector, financial institutions, cities and other subnational authorities, local and indigenous communities) to combat climate change (Hale, 2018).

Since then, local governments are playing an even more important role in climate change issues and this is reflected in Brazil, where climate policies are implemented in a significant number of Brazilian cities[1]. The Non-State Actor Zone for Climate Action (NAZCA, UNFCCC) includes 60 Brazilian cities, which develop 83 actions directly or indirectly related to climate change. These cities have the support of the Global Covenant of Mayors for Climate & Energy and several other non-governmental organizations that have been fostering and supporting local initiatives in Brazil for some time.

Such is the case of the Konrad Adenauer Foundation (KAS), which, since the 1990s, has been working together with cities and is now consolidating this effort in the ICLEI and CB27 forums, the latter inspired by C40, where

1. For the purposes of this paper, municipalities and cities are being considered the smallest unit in the country's organization, whereas in fact a municipality may encompass more than one city.

Environment Secretaries of Brazilian state capitals receive support for their actions, hoping to influence their mayors to undertake more ambitious local climate policies.

The main challenge of this forum has been to think of cross-cutting municipal policies and municipal environmental management from the perspective of addressing climate change. The results are already interesting: 77% of the cities in which the Forum is active have some kind of public policy related to climate change, and 14 of the 27 state capitals already have greenhouse gas emissions inventories. C40, despite its name, brings together 94 cities which today lead the climate agenda. In Latin America, there are twelve C40 cities and, in Brazil, there are 4: Rio de Janeiro, São Paulo, Salvador and Curitiba.

Many of the metropolitan regions in Brazil, highly populated areas, already face environmental problems such as floods, landslides, water and air pollution. As climate changes become more intense, these problems will aggravate. To make matters worse, as most metropolitan regions are on the coast, they will also undergo the impacts from sea-level rise. Given the climate emergency, associated to often fragile urban conditions in many Brazilian cities, it is imperative that discussions go beyond forums and documents to become ambitions actions that effectively improve living conditions, increase resilience of cities to the impacts of climate change and reduce greenhouse gas emissions. This paper summarizes suggestions and expectations for Brazilian cities to participate in global efforts to combat and adapt to climate change, as conveyed during the 2nd CEBRI-KAS Roundtable on Cities and Vertical Integration of Brazil's NDC, held on July 24, 2019. It will list the urgent development needs of Brazil as well as the opportunities for cities to contribute to Brazilian commitments under the Paris Agreement. It will also detail the benefits that can be reaped by the efforts that cities employ to combat climate change and the instruments for implementing local policies, bearing in mind the conditions prevailing where climate policies are formulated and executed.

> "Local governments are playing an even more important role in climate change issues and this is reflected in Brazil, where climate policies are implemented in a significant number of Brazilian cities."

Benefits to cities arising from efforts to combat climate change

When cities take part in efforts to mitigate and adapt to climate change, they reap several co-benefits[2]. In an opposing, but equally beneficial sense, "policies that are aimed at supporting innovation, delivering economic benefits and enhancing the quality of life of citizens can potentially lead to major climate co-benefits (e.g. reduced greenhouse gas emissions) which would be more challenging to achieve if climate action were the primary objective" (C40, 2016). Still according to C40 (2016), "at the city level, the potential of co-benefits is particularly great as citizens can often witness the results of policy actions more directly on their daily lives".

Hamilton et al. (2017) list the following general co-benefits that also apply to cities when implementing climate actions:

- Reduced air pollution damages to health[3]. There may also be distributional benefits associated with reduced pollution, since poor people ore often the most exposed to air pollution;
- Increased labor productivity linked to reduced air pollution exposure;
- Increased enjoyment of environmental amenities linked to reduced pollution emissions;
- Decreased congestion costs from transport sector investments, including air pollution damages (while stuck in traffic), energy costs, the opportunity cost of time, and lost productivity; improved health from active transport (walking and cycling) may also be significant;
- Rising real incomes and increased competitiveness generated by efficiency gains, particularly energy efficiency;
- Increased energy security;
- Benefits generated by green innovation and green jobs;
- Increased ecosystem service provision by conserving and increasing forest cover linked to reduced emissions from deforestation and forest degradation (REDD) and selected adaptation investments;
- Agricultural productivity increases from conservation and the increase of the amount of carbon in soil; and
- Improved weather and land use information generated by monitoring systems for climate adaptation.

2. There are numerous definitions for co-benefits. In this context, co-benefits (and co-costs) are the externalities associated to a given policy intervention. In an ideal economy, all externalities would be internalized in the process of maximizing well-being. Co-benefits of climate actions are far superior to the co-costs, according to specialized literature.

3. See the damage to health experienced by São Paulo residents from urban transport systems pollution and by Amazon Region cities from forest burning.

According to Blanco G. et al (2014), "estimates in the literature for the monetized air quality co-benefits from climate change mitigation range from 2 to 930 US$ 2010/tCO_2, and co-benefits in developing countries around twice those in industrialized countries". According to the World Bank (2016), the global economic costs from air pollution were US$ 3.552 trillion 2013, while Latin America and the Caribbean came to US$ 122 billion in the same year. C40 (2016) states that the New York City metropolitan region alone is estimated to lose US$ 13 billion annually as a direct result of traffic congestion. Young et al. (2013) estimate the costs of lost time on the way to work in the Metropolitan Region of Rio de Janeiro to range from R$ 6.7 to R$ 13 billion, or from 1.9 to 3.8% of the state GDP, in 2010. Oberling, D. (2018) in a comparative scenario analysis (reference vs mitigation), considering a replacement of about 40% of the diesel fleet by electric vehicles in just nine metropolitan regions, estimated the co-benefit at R$ 16 billion[4] for the 2030-2050 period, merely from decreased particulate material and ensuing reduction in morbidity and mortality (considering only hospital costs and lost production).

Despite the different metrics and scopes, studies show that GHG emission mitigation policies can generate major local benefits. There are also numerous other benefits from climate adaptation, such as fewer floods, landslides, disease carrying insects and rodents. Cities can reap these benefits, generating well-being and increasing the quality of life.

> "In cities, the potential of co-benefits is particularly great as citizens can often witness the results of policy actions more directly on their daily lives."

4. Reals (2015).

Cities and Climate: planning instruments

Cities can have a vital role in the global response to climate change, reducing their greenhouse gas emissions and adapting themselves to the effects of climate change. Local governments[5] should carry out climate actions by developing strategies and programs and integrating these to continuous urban development, by identifying options to best respond to the socioeconomic aspirations of the city and by establishing the partnerships required to provide effective climate responses.

OThe general principles for planning mitigation and adaptation actions provide for the following stages: planning, implementation, monitoring, reporting, evaluation and improvement, as summarized by UN-Habitat (2015).

It is necessary to establish an overview of climate change mitigation and adaptation that considers the challenges and capacities of cities to address them, in order to establish guidelines and determine the scope of the climate action plans. It is also essential to establish political commitments, obtain the support of the major private sectors and of stakeholders in general to implement a comprehensive and integrated intersectoral approach, including actors beyond their own administrative borders.

Mitigation actions begin with the preparation of GHG emissions inventories, a stage of the planning process that reveals the current levels of emissions, thus identifying the baseline emissions and their sources and opportunities for immediate mitigation[6].

Then, emissions scenarios are drawn up to identify possible future emission trends based on different socioeconomic growth and climate mitigation assumptions and presumptions. The results of this analysis are used to establish targets and identify priority actions. Building scenarios allows for: (i) projection of the baseline, i.e., the identification of how the future would be (in terms of emissions) assuming that additional climate efforts were not carried out and (ii) evaluation of the results of different climate strategies that could be adopted, such as plans of action, projects, etc., to reduce emissions.

Cities should evaluate their capacity to implement actions and consider how to leverage other existing policies, plans and actions, such as those related to energy, environment and urban management, thus making mitigation efforts consistent with existing ones.

Using scenario analyses and capacity assessment, cities can define their emissions reduction targets for different periods, depending on the availability of resources, political commitments, and others.

5. Preferably in a joint manner when they belong to same metropolitan region, because some problems cannot be solved in isolation.

6. The main protocol used for city emissions inventories is the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), created jointly by WRI, C40 and ICLEI in order to obtain international compatibility among cities. IPCC's manual (2006) for countries can also be adapted for cities.

After these stages, cities can identify priorities and draft plans of action with objectives and targets whose implementation can be monitored, reported and verified (MRV) and constantly reevaluated.

The same stages apply to investments for adaptation. Firstly, a vulnerability assessment is carried out, which includes the physical, environmental, social and economic vulnerabilities to climate change, in order to identify current and future risks and impacts, based on the various climate scenarios.

When potential impacts are understood, local capacities to adapt to impacts should be evaluated, considering policies, plans, programs, urgent needs, priorities, etc. Then adaptation goals can be defined for different periods, always securing political commitments to their implementation.

> "Local governments should carry out climate actions by developing strategies and programs and integrating these to continuous urban development, by identifying options to best respond to the socioeconomic aspirations of the city and by establishing the partnerships required to provide effective climate responses."

Urgency of climate change and the political context

As seen in international forums, the scientific community is increasingly worried about the threshold of 450 ppm in CO2 concentrations in the atmosphere, estimated to be reached within two to three years, indicating the urgency of large scale and consistent global actions to mitigate emissions. This concern is increased because of current geopolitical conditions, that are quite different from those at the time of the Paris Agreement, far more cooperative. Previous conditions were basically aligned in an agreement among the US, European Union, France, Germany and China.

Recently, with the new US government position, with a fragmented Europe due to the advent of more radical parties, with China and US in commercial disputes and, furthermore, with a growth of denialism, the global scenario seems undefined, surrounded by a certain degree of disbelief, which all give rise to global concern and generate a sense of urgency in addressing climate change.

Brazil, historically at the forefront of international climate negotiations, now seems to have stepped back. This does not mean that institutions aren't working hard at the technical levels to maintain certain positions, as is the uncompromising action of negotiators from the Ministry of Foreign Affairs and the Ministry of the Environment to regulate Article 6 of the Paris Agreement and thus enforce rules that allow greater flexibility of the carbon credits market, seen favorably by the current government.

In the Federal Government there are significant niches favorable to a positive climate agenda given the negative impacts on the economy that may arise from a position contrary to the Paris Agreement and other environmental issues. It is the case of the Ministry of Agriculture, Livestock and Food Supply, concerned with commodities exports and of the Ministry of the Economy, interested in the benefits that can be gained from carbon markets.

The Ministry of Science, Technology, Innovations and Communications continues, as before, to produce data and information, including the Brazilian GHG emissions inventory and the biannual reports, considering UNFCCC rules and the annual GHG emissions estimates for the National Climate Change Policy (Decree No. 7390/2010, replaced by Decree No. 9578/2018, which regulates Law No. 12187/2009).

Furthermore, there are ongoing discussions in the Federal Government, in scientific institutions and in the private sector on carbon pricing (emission permits price and market) as a way of achieving NDC targets more cost-efficiently.

However, a definition of the means of implementation of the NDC is still on hold, be it the specific policies, be it the distributing of coordinated institutional responsibilities or even the adoption of a regulation mechanism that formalizes parameters so that public and economic agents can act.

While definitions are awaited at the federal level, we see a movement to engage cities and subnational structures in climate issues,

such as the meeting of the Brazilian Climate Change Forum (FBMC) held last April, when "six governors sent videos endorsing the idea that Brazilian states should take on a leading role in climate change, remain in the Paris Agreement and contribute to the Brazil's NDC... another six sent Secretaries or Undersecretaries or other high level officers responsible for climate issues" (FBMC, 2019).

More recently, governors of the Amazon Region have been acting together and meeting representatives of international donors to recover the resources of the Amazon Fund, an eloquent sign that they will not abstain from expending efforts to protect the forests in Brazil. State and municipal administrators in the region are establishing consortia and other innovative governance mechanisms, in addition to undergoing technical capacity building to manage these and other resources from national and international investment funds and banks, which have recently committed to follow the UN and Paris Agreement targets for sustainable development and combating climate change.

In this regard, the agenda of Amazon cities acquires strategic relevance, because of its potential not only for promoting international cooperation, but also for dialogue with the Federal Government. With this in mind, CEBRI and KAS have planned to dedicate the third roundtable of this project to the urban agenda in the Amazon Basin. Held together with the Pará State Secretariat for Environment and Sustainability, the roundtable "Challenges of the Environmental Agenda and of Cities in the Amazon in the Implementation of the Paris Agreement: The Case of Pará" aims to promote discussions among the various stakeholders on the realities and demands of the cities in the Amazon Region, with a view to drawing up a consistent, pragmatic urban environmental agenda with replicating potential. The initiative seeks to promote the institutionalization of sustainable urban policies and the building of efficient and innovative mechanisms for land use management and carbon emissions reduction as a driver for reconciling economic development and environmental preservation (particularly preventing deforestation). Sustainable development in this region can be achieved by providing economic alternatives to the predatory activities that generate income and employment in sustainable production chains like cocoa and açai berry, as well as through incentives for the bioeconomy and the circular economy.

Several states and cities already have a long tradition in climate issues. The city of Rio de Janeiro was the first one to develop an inventory, in 2003. It was developed to enable Rio to take part in the Campaign Cities for Climate Protection, an ICLEI global program. São Paulo came next, publishing its first inventory in 2007. Since then, many other inventories, scenarios, mitigation and adaptation plans based on climate policy legislation have been implemented throughout the country. Nevertheless, there is still much to be done to increase the participation of cities.

Because there is no central coordination, subnational efforts do not follow a standard and are not integrated into a single system that can provide support for financing mechanisms or even, in the future, integrate an emissions trading scheme that ensures "carbon integrity" or prevents double counting (abating the same carbon twice).

Be it through a collective effort coordinated nationally, or through parallel efforts, subnational entities may become leaders of climate action, as seen in countries like the US and Canada. The opportunities for Brazilian cities are many.

Brazilian commitments under the Paris Agreement and opportunities for cities

In the Paris Agreement, Brazil committed to reducing emissions by 37% and 43%, in 2025 and 2030, respectively, compared to 2005, which means limiting national emissions to 1.3 GtCO2e in 2025 and 1.2 GtCO2e in 2030. In this way, Brazil hopes to obtain a double dividend, contribute to the global climate and promote sustainable development. As for the cities, according to the NDC, "Brazil recognizes the importance of the engagement of local governments and their efforts in combating climate change".

The targets to be achieved are economywide, as stated in Brazil's NDC, which, however, details the means of implementation to attain them:

> **(i)** Increasing the share of sustainable bioenergy in Brazil's energy mix (more ethanol and biodiesel);
>
> **(ii)** Strengthen enforcement of the Forest Code at the federal, state and municipal levels; attain zero illegal deforestation in the Brazilian Amazon by 2030 and compensate emissions from legal suppression of vegetation by 2030; restore and reforest 12 million hectares of forests by 2030 for multiple purposes; enhance sustainable native forest management systems;
>
> **(iii)** Achieve 45% share of renewables in the energy mix by 2030, including: expanding the use of renewable sources in addition to hydropower (wind, biomass and solar); achieving 10% efficiency gains in the power sector by 2030;
>
> **(iv)** Strengthen the Low Carbon Emission Agriculture Program (ABC), including restoration of an additional 15 million hectares of degraded pastures by 2030 and increase of 5 million hectares of integrated cropland-livestock-forestry systems (ICLFS) by 2030;
>
> **(v)** Promote new standards for clean technologies and further enhance energy efficiency measures and low-carbon infrastructure in industries; and
>
> **(vi)** Promote efficiency measures, improve transport infrastructure and public transport in urban areas.

The contribution of Brazilian cities recommended in Brazil's NDC is a valuable strategy that should be promoted to achieve mitigation targets and even beyond, increasing the country's ambitions. Municipalities can contribute to all the means of implementation of Brazil's NDC.

We should particularly highlight the valuable contribution that can be obtained from those municipalities that have large forestry and agricultural areas in the Amazon and other biomes with means of implementation (ii) and (iv). Municipalities can promote programs to increase compliance with rural environmental regulations, recover degraded areas, prevent and control fires and promote sustainable economic activities, such as the agroforestry systems and bioeconomy. Strong and consistent environmental management makes it easier for producers to have access to programs and policies with closer and faster service; attracts public and private investments; facilitates land use planning; and enhances local social participation. There is an invaluable space for developing production activities compatible with maintaining forest carbon stocks and biodiversity that could be fostered by the municipalities. By enhancing the value of standing forests, municipalities can generate income and jobs and contribute greatly to reducing predatory activities carried out by settlements, land grabbing and organized crime, among others, or even contribute to reducing legal deforestation, within the applicable regulations.

Municipalities can also make effective contributions in means of implementation (v) since, in the road system of major Brazilian cities, mobility is precarious and pedestrians, bicycles, motorcycles, cars, vans, buses and trucks compete for space, leading to not insignificant congestion and air pollution[7]. Even small cities suffer from the lack of transport options. Investments in mobility such as increasing public transport options, especially metro rail network, electric buses, incentives for non-motorized transport, implementation of bus lanes, prioritizing high occupancy vehicles, congestion or peak hour charges, installation of smart traffic systems, implementation of structural and operational measures and restrictions for private vehicles in saturated areas can reduce fuel consumption considerably and, consequently, emission of local and global pollutants, in addition to reducing time wasted during transportation. With transport and urban mobility plans that foster the use of biofuels in bus fleets – public or those under concession –, cities can provide a major contribution to means of implementation (i).

A large number of measures in the means of implementation (iii) and (v) are of interest to cities, such as: creation of incentives for distributed solar generation; promotion and adoption of energy efficiency and labeling programs (carbon content and energy consumption); adoption of norms and standards that foster energy savings during the useful life of buildings in general and homes in particular; implementation of energy efficiency and recycling programs for industry; smart public lighting systems; and, fundamentally, those that promote land use and distribution of services and jobs that reduce the distances that must be traveled every day by citizens.

Although not mentioned specifically in the NDC, the use of biogas from sanitary systems strengthens means of implementation (i), (ii), (v) and (vi). The enormous and urgent dearth of sanitation in cities requires massive investments. The most cost-effective option (individual, through consortia or other partnerships) for the proper disposal of urban solid wastes – sanitary landfills, anaerobic stations and other options for sewage treatment – increases the emission of biogas, which contains about 50% methane, a powerful greenhouse gas.

However, if this gas is burned, and especially if used to replace fossil fuels, it may generate a significant amount of additional mitigation and even increase the profitability of investments.

7. Urban mobility plans are the responsibility of local governments in municipalities with more than 20 thousand inhabitants, according to the National Urban Mobility Policy (Federal Law No. 12587/2012).

Going beyond these sectoral issues, it should be stressed that cities have a new and crucial role to develop, i.e., promotion of the circular economy, a system that seeks to eliminate waste and make continuous use of resources[8]. Transition from a linear economy to a circular economy results in a much healthier environment and provides the opportunity of financial return to economic agents because of the efficiency gains that can be obtained. This approach is ideal for cities, particularly for urban and industrial wastes, housing and other constructions, and public and private transport systems.

Since our cities reflect the socioeconomic disparities of the country, they have high levels of inequalities and are extremely segregated in land use, with countless numbers of slums and unhealthy areas. The development of the NDC mitigation actions and others must be incorporated into the planning of land development, which, together with plans for transportation, mobility, sanitation etc., could be effective instruments to reverse this situation.

> “The contribution of Brazilian cities recommended in Brazil’s NDC is a valuable strategy that should be promoted to achieve mitigation targets and even go beyond, increasing the country’s ambitions.“

8. Circular systems employ reuse, sharing, repair, renovation, remanufacturing and recycling to create a closed system, minimizing the use of resources and creation of wastes, pollution and emissions (Geissdoerfer, et al., 2017).

Conclusion

National mitigation efforts, coordinated by the Federal Government or, independently, by subnational entities, engender great opportunities for Brazilian cities to raise the standard of living of their citizens while at the same time contribute to global climate efforts. There are countless options for actions that bring both local and global benefits at the same time.

Needs and demands of cities for investments are in perfect harmony with Brazilian mitigation efforts reflected in the Brazil's NDC. It is even possible to go further and incorporate new perspectives with an effective potential for social gains.

Efforts will be maximized if there is a central governance that allows for vertical integration of the NDC, which takes into account the viewpoints of the economic/corporate sector, science, and society, leading to the development of tailor-made strategies: listening to local political leaders, identifying needs and possibilities of each entity and evaluating the costs and benefits in the search for the best solutions.

In spite of the existence of cities with advanced levels of climate planning, "it is still necessary to create a national multilevel governance approach" since several "local governments do not have the capacity to work with the climate agenda in a cross-cutting manner, there is not enough technical know-how and they lack awareness. Furthermore, access to resources to help cities in their low-carbon development is restricted due to the structural challenges faced by local governments" (URBAN LEDS, 2019).

Central coordination maximizes the potential to be achieved by cities and other subnational entities. In its absence, however, benefits that can be achieved through independent action or coordinated by other structures are large enough to warrant new political arrangements that enable climate action at subnational levels, especially in cities.

References

Blanco G., Gerlagh, R., Suh S., Barrett, J., Coninck, H.C. de, Diaz Morejon, C.F., Mathur, R., Nakicenovic, N., Ahenkora,A.O., Pan, J., Pathak, H., Rice, J., Richels, R., Smith, S.J., Stern, D.I., Toth, F.L., and Zhou, P. (2014). Drivers, Trends and Mitigation. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Farahani, E., Kadner,S., Seyboth, K., Adler, A., Baum, I.,, Brunner, S., Eickemeier, P., Kriemann, B., Savolainen, J., Schlömer, S., von Stechow, C., Zwickel, T. and Minx, J.C. (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

C40, 2016. Co-benefits of urban climate action: A framework for cities. A working paper by the Economics of Green Cities Programme, LSE Cities, London School of Economics and Political Science.

FBMC, 2019. Brazilian Climate Change Forum in an electronic message to its members in May 2019.

Frickmann C.E.,Young, C. A., , Possas, E. (2013). Sinal Fechado: Custo Econômico do Tempo de Deslocamento para o Trabalho na Região Metropolitana do Rio de Janeiro. http://www.ie.ufrj.br/images/gema/ Young_Aguiar_2013_EcoEco_Sinal_fechado_Custo_Deslocamento_RJ_1.pdf

Geissdoerfer, M.; Savaget, P.; Bocken, N. M. P.; Hultink, E. J. (2017). “The Circular Economy – A new sustainability paradigm?” Journal of Cleaner Production. 143: 757–768.

Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC). http://ghgprotocol.org/sites/default/files/stan- dards/GHGP_GPC_0.pdf

IPCC, 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories. https://www.ipcc--nggip.iges.or.jp/public/2006gl/

Hamilton K.,, Brahmbhatt, M.,and Liu, J. (2017) Multiple benefits from climate change mitigation: assessing the evidence. Policy Report. The Centre for Climate Change Economics and Policy (CCCEP) and The Grantham Research Institute on Climate Change and the Environment.

Oberling, D. (2018). Análise de Cobenefícios da Mitigação de Emissões de Gases de Efeito Estufa no Setor de Transportes até 2050, no Cenário 1,5°C. In Rovere, E. L.L.; Wills, W.; Dubeux, C. B. S; Pereira Jr, A. O.; D’Agosto, M. A; Walter, M. K. C; Grottera, C.; Castro, G.; Schmitz, D.; Hebeda, O.; Loureiro, S. M.; Oberling, D; Gesteira, C.; Goes, G.V.; Zicarelli, I.F.; e Oliveira, T.J.P (2018). Implicações Econômicas e Sociais dos Cenários de Mitigação de GEE no Brasil até 2050: Projeto IES-Brasil, Cenário1.5 ° C. COPPE / UFRJ, Rio de January, 2018. http://www.centroclima.coppe.ufrj.br/index.php/br/estudos-e-projetos/encerrados/35-2018

OECD, 2019. The Circular Economy in Cities and Region. Brochure.

UN-Habitat (2015). Guiding Principles for City Climate Action Planning- United Nations Human Settlements Programme.

World Bank, 2016.The Cost of Air Pollution - Strengthening the Economic Case for Action. The World Bank and Institute for Health Metrics and Evaluation University of Washington, Seattle.

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The Brazilian Center for International Relations (CEBRI) is an independent think tank that contributes to building an international agenda for Brazil. For over twenty years, the institution has engaged in promoting a pluralistic and proposal-oriented debate on the international landscape and Brazilian foreign policy.

In its activities, CEBRI prioritizes themes with the greatest potential to leverage the country's international insertion into the global economy, proposing pragmatic solutions for the formulation of public policies.

It is a non-profit institution, headquartered in Rio de Janeiro and internationally recognized. Today, its circa 100 associates represent diverse interests and economic sectors and mobilize a worldwide network of professionals and organizations. Moreover, CEBRI has an active Board of Trustees composed of prominent members of Brazilian society.

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NEW DISCUSSIONS IN BRAZIL AND IN THE WORLD

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