iema
Instituto de Energia
e Meio Ambiente

Annual Report

Instituto de Energia e Meio Ambiente (IEMA)

2022

SUMMARY

Letter to readers

This Annual Report highlights the advances achieved in 2022 in the implementation process of IEMA's Strategic Plan 2020–2024. In addition to providing a concise overview of the organization's actions and impacts, detailed information about our financial situation and how our resources are being applied.

It is important to highlight that the results presented here were obtained with continuous and collaborative work by our team in close partnership with various actors, especially with networks of civil society organizations, researchers and public agencies.

Working in networks allowed us to take advantage of synergies and complementarities among diverse stakeholders, pooling together efforts, knowledge, and resources.

Enjoy the read!

André Luis Ferreira,
Executive Director of the Instituto de Energia e Meio Ambiente (IEMA).

PHOTO: Unsplash/Chuttersnap

IEMA

Instituto de Energia e Meio Ambiente (IEMA) is a Brazilian non-profit organization founded in 2006. It is located in São Paulo but operates throughout Brazil. Recognized for producing and disseminating technical-scientific knowledge on environmental issues, IEMA has contributed to improving environmental quality in a socially just and sustainable manner.

PURPOSE

Qualify decision-making processes so that transportation and energy systems in Brazil ensure the sustainable use of natural resources with social and economic development.

VALUES

Generosity: cooperation and knowledge sharing with society.

Excellence: appreciation for scientific rigor and independent thinking.

Transparency: genuine openness and listening.

Impact: focus on long-lasting, public interest-oriented transformations.

2022 TEAM

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NETWORKS

We are currently actively involved in various networks, carrying out numerous projects in partnership. Our work in most topics we are involved with is developed in collaboration with other organizations. Over the years, we have become an organization that closely partners with NGOs and public sector entities.

NETWORKS IEMA PARTICIPATES IN:

Advocacy Hub;
Climate and Clean Air Coalition;
Coalición Latinoamericana por el Aire Limpio;
Coalizão Energia Limpa;
Coalizão Respirar;
GT Infraestrutura e Justiça Socioambiental;
GT-Qualidade do Ar da 4ª Câmara de Coordenação e Revisão do Ministério Público Federal;
Observatório do Clima;
Rede Energia e Comunidades;
Rede Narrativas.

2022 ANNUAL REPORT MASTHEAD

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STRATEGIC PLANNING

IEMA's activities are implemented based on five Strategic Objectives, which are pursued through cross-cutting projects, including nine lines of action.

OBJECTIVE 1: CLEAN AIR
To adapt air quality in large Brazilian urban agglomerations, following the recommendations of the World Health Organization (WHO)

OBJECTIVE 2: LOW-EMISSION URBAN MOBILITY
To promote urban mobility that is inclusive and has low emissions of atmospheric pollutants and greenhouse gases

OBJECTIVE 3: SUSTAINABLE REGIONAL FREIGHT TRANSPORT
To reduce the negative social and environmental impacts of freight transport

OBJECTIVE 4: CLEAN AND INCLUSIVE ENERGY MIX
To universalize access to electricity and reduce the negative social and environmental impacts of the expansion of the electricity system

OBJECTIVE 5: INSTITUTIONAL DEVELOPMENT
To strengthen governance, management, and communication.
To promote the team's personal development

LINES OF ACTION

- Providing information about air quality to society.
- Supporting the strengthening and formulation of air quality policies.
- Preparing inventories of air pollutant and greenhouse gas (GHG) emissions.
- Assessing and proposing public policies for the energy transition in the transport sector.
- Improving decision-making processes for transport logistics infrastructure.
- Improving decision-making processes for the expansion of the electrical system.
- Supporting universal access to electricity.
- Consolidating communication and implementing tools for monitoring our impacts on society.
- Improving governance and management.

CLEAN AIR

To adapt air quality in large Brazilian urban agglomerations, following the recommendations of the World Health Organization (WHO)

PHOTO: Sergio Souza / Pexels

According to data released by the World Health Organization, approximately 99% of the world's population breathes air that exceeds the air pollution limits recommended by the organization. Currently, more than 6,000 cities in 117 countries monitor air quality, and the data available reveal that those living in low- and middle-income nations face higher pollution exposure levels.

In 2022, the WHO added to its comprehensive database, which is the most extensive in covered land area, measurements of average annual nitrogen dioxide (NO_2) concentrations, a common urban pollutant and a precursor of fine particulate matter and ozone. **The WHO database also includes measurements of particulate matter (PM_{10} and $PM_{2.5}$), which comes primarily from human activities.**

Brazilian data from the IEMA Air Quality Platform were also incorporated by WHO.

Living in an environment with polluted air causes harmful health effects. Nitrogen dioxide is associated with respiratory diseases, while particulate matter, especially $PM_{2.5}$, may penetrate deep into the lungs and enter the bloodstream, causing cardiovascular, cerebrovascular (such as strokes), and respiratory damage.

To promote cleaner air, IEMA has aimed to strengthen paths and public policies to improve air quality since its inception. **One of the main goals of the organization is to ensure that all metropolitan regions of Brazil, where the largest part of the population resides, monitor and disseminate data on local air quality.**

> "The relationship between air pollution and health is obvious. Before the pandemic, WHO had ranked air pollution as the leading cause of mortality and morbidity, the number one cause of death and morbidity on the planet. As a more detailed example, approximately 50,000 people died in Brazil in 2018 due to poor air quality";
>
> *David Tsai, project manager at IEMA.*

PHOTO: Pixabay / Pexels

Polluted air in the city of Rio de Janeiro.

MEETINGS

At the end of February 2022, IEMA held the first Minicourse on the Air Quality Platform, attended by more than 170 people. The course was an open event, but it was aimed at a more specialized public, such as government technicians, researchers, students, civil society organizations, and others interested in acquiring information about air quality. The main functionalities of the Air Quality Platform were demonstrated during the course to stimulate scientific applications and contribute to elaborating public policies.

It was emphasized during the online Minicourse that air quality monitoring in the country is still insufficient. It was also mentioned that some states do not have sufficient conditions to publish information on air quality. To collaborate with public institutions and facilitate access to air quality data, **IEMA offers the Air Quality Platform as a tool to provide society with information on this topic in an accessible manner.**

Also in the first semester, in June, IEMA held the "Virtual Meeting: Challenges and Pathways to Expand Air Quality Monitoring in Brazil," a closed event with representatives of state-level environmental agencies. **During this productive meeting, public officials responsible for monitoring air quality exchanged information on challenges and opportunities in each state.** The talks helped in creating the policy paper *"Recomendações para a expansão ea continuidade das redes de monitoramento da qualidade do ar no Brasil"* ("Recommendations for the expansion and continuity of air quality monitoring networks in Brazil").

IN THE MEDIA

Portal iG
Pollution: 99% of the world breathes inadequate air; what can we do?

Folha de S.Paulo
Air quality improves in São Paulo, but pollution is still higher than ideal levels

O Dia
It is hard to breathe in São Paulo and Rio de Janeiro

Rádio CBN
Pollution in SP remained above the levels recommended by WHO over the last 22 years

TV Globo/ SP1
Air pollution in the city of SP has remained above the levels recommended by the WHO for the last 22 years

TV Globo/ SP2
SP2 - Thursday, May 26th 2022 edition

Portal UOL
São Paulo has had pollution above the WHO limits for 22 years

Diário da Região
Rio Preto needs 23 million trees to neutralize pollution

Unibes Cultural
Cultural Talks – Air Pollution: Causes and Consequences

STUDIES

In May, IEMA published the technical note *"Qualidade do Ar no município de São Paulo"* ("Air Quality in the city of São Paulo"), an analysis of the last 22 years of air quality monitoring in the capital of the State of São Paulo. This study showed that, in 2021, none of the air quality monitoring stations in the capital met the WHO guidelines for particulate matter ($PM_{2.5}$ and PM_{10}), ozone (O_3), and nitrogen dioxide (NO_2). In some parts of the city, the concentrations of these air pollutants were up to four times higher than the recommended values. Moreover, even during the pandemic, in 2020 and 2021, air quality fell short of what WHO considers safe for public health.

In the second semester, IEMA launched the study *"Recomendações para a expansão e a continuidade das redes de monitoramento da qualidade do ar no Brasil"* ("Recommendations for the expansion and continuity of air quality monitoring networks in Brazil"), which offers a comprehensive analysis of the country's shortcomings in air quality monitoring. Considering IEMA's experience developing the Air Quality Platform and our conversations with environmental agencies collaborating with this tool, **this study provided recommendations for public policies to expand and maintain air quality monitoring networks.** Moreover, the study seeks to encourage reflection on the persistent challenges that must be faced to enable this essential step of air quality management.

The effort toward more comprehensive monitoring of air pollution in Brazil is

PHOTO: Divulgação/ IEMA

Detail of the air quality monitoring station.

It should be noted that greenhouse gases (GHGs) differ from air pollutants, although their emitting sources may be similar. Anthropogenic GHG emissions are responsible for global warming and climate imbalance, while air pollutants are toxic and directly impact human health and the environment, causing significant damage. Recognizing this difference is critical to effectively address air quality and climate change challenges. Therefore, IEMA published a note on the difference between GHGs and air pollutants, seeking to reduce this confusion even among those working on the environmental agenda.

PUBLICATIONS

Air quality in the city of São Paulo
Detailed analysis and discussion of air pollution in the city of São Paulo in the last 22 years

Recommendations for the expansion and continuity of air quality monitoring networks in Brazil
Reporting of the main difficulties and guidelines to expand the capacity of air quality monitoring in the country

PHOTO: Kaique Rocha / Pexels

Marginal Pinheiros, in the city of São Paulo.

an essential initiative. However, only ten states and the Federal District currently carry out this type of monitoring. In the country's Northern region, which is highly affected by fires, official government information on the amount of pollutants breathed by the population is unavailable. Human resources in environmental agencies, continuous sources of financing, strategic planning in air quality monitoring networks, and standardization and dissemination of data and information are all insufficient.

Both publications complement IEMA's other actions, clearly communicating the problem, providing scientific bases to the issues discussed, offering support for decision-making, and bringing new knowledge to the discussions. The publications also contribute to a change towards a more socially and environmentally adequate government agenda and forming public opinion on the topic.

PUBLIC HEARING IN SÃO PAULO

After the publication of the technical note "Air quality in the city of São Paulo," IEMA was invited to participate in a public hearing in the Legislative Assembly of the State of São Paulo to discuss Bill 568/2020, which sets a deadline to reach the air pollutant concentrations recommended by WHO in 2005. Especially in preparation for this occasion, the IEMA team expanded the scope of the studies on air quality in the city of São Paulo to cover the entire state.

According to the survey, no municipality in the state of São Paulo where air quality is monitored currently

complies with the limits recommended by the World Health Organization (WHO) for all evaluated pollutants. The cities of Cordeirópolis, Cubatão, and Santa Gertrudes had the worst air quality indicators.

COALICIÓN ALAIRE

Air pollution knows no territorial boundaries. Fires in native Brazilian forests commonly reach neighboring countries, and all of Latin America suffers from similar difficulties as Brazil in dealing with air quality, such as insufficient monitoring and a lack of resources to tackle the problem. Coalición Latinoamericana por el Aire Limpio – Coalición ALAIRE (which IEMA is a part of) was created in this context. The coalition's creation was announced during the first Forum Ciudadano Internacional por el Aire Limpio (International Citizen Forum for Clean Air), which took place in Bogotá, Colombia, in August last year.

This event was promoted by the Interamerican Association for Environmental Defense (Asociación Interamericana para la Defensa del Ambiente – AIDA), El Derecho a No Obedecer (The Right to Disobey – a project of Corporación Otraparte), Trébola Organización Ecológica (Trébola Ecological Organization), El Poder del Consumidor (The Power of the Consumer), Coalizão Respirar (Breathe Coalition) and the Heinrich Boll Foundation. **Discussions are still ongoing to promote joint actions to reduce problems related to air quality across Latin America.**

PHOTO: Sergio Souza / Pexels

Sunset highlights air pollution in the city of São Paulo.

PHOTO: Divulgação/ Coalición ALAIRE

EVENTS

IEMA was present in Colombia at the *"Encuentro Latinoamericano por el Aire Limpio"* ("Latin American Meeting for Clean Air"), the first civil society meeting in Latin America to discuss actions to counter air pollution in the region. Besides Coalición ALAIRE being created as a result of the event, David Tsai also presented in the meeting the lecture *"Panorama Internacional y avances en la Calidad del Aire, Crisis Climática y Salud Pública"* ("International Overview and Advances in Air Quality, the Climate Crisis and Public Health"), in which he showed the current state of air quality and its monitoring in Brazil.

RESULTS

AIR QUALITY PLATFORM AT THE WHO

The WHO has published its new air quality database, and IEMA's Air Quality Platform is the primary Brazilian reference included in it. The WHO database includes 478 Brazilian records provided by IEMA, indicating pollutant concentrations in 82 locations (cities or metropolitan regions) between 2010 and 2019. According to the organization, the new air quality database is the most extensive for exposure to air pollution in terms of land coverage. For the first time, the database contains information from Brazilian municipalities with terrestrial measurements of average annual concentrations of nitrogen dioxide (NO_2). This inclusion provides a more comprehensive and accurate view of air quality, allowing for a more complete analysis of pollution levels across the country.

AIR QUALITY IN PERNAMBUCO

For the first time, the government of Pernambuco has released on its official website its data on air quality, including historical information since 2017. Disclosure occurs through a redirection of visitors from the government website to IEMA's Air Quality Platform. As some states, unfortunately, lack direct tools for publishing information on air quality, the Air Quality Platform aims to assist public agencies in making air quality data accessible to society, promoting greater information transparency.

INTERNATIONAL ENGAGEMENT

IEMA is part of the Climate and Clean Air Coalition (CCAC), a global effort that unites governments, civil society, and the private sector in a commitment to improve air quality and protect the climate for decades to come by reducing short-lived climate pollutants. Last year, IEMA collaborated with information on methane emissions in Brazil and possible measures to reduce them in the "Climate & Clean Air Ministerial" meeting held during the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 27).

DIRECT ACTION FOR THE DECLARATION OF UNCONSTITUTIONALITY

Instituto Saúde e Sustentabilidade (Health and Sustainability Institute) and the Alana Institute filed a direct action for the declaration of unconstitutionality (ADI, from the acronym in Portuguese) requesting, among other things, the adjustment of air quality standards in Brazil, defined in CONAMA Resolution No. 491/2018, to the current guidelines established by the WHO. One of the points raised in the claim cited the technical note on air pollution in the Macaé (RJ) municipality published by IEMA in 2021.

The text of the ADI cites: "The study revealed that, despite air quality data showing systematic pollution by ozone, the state environmental agency issued environmental licenses to more than ten thermoelectric power plant projects, which are important emitters of ozone precursors, and announced investments by large oil companies in the region. These activities tend to aggravate the scenario described."

LOW-EMISSION URBAN MOBILITY

To promote urban mobility that is inclusive and has low emissions of atmospheric pollutants and greenhouse gases

PHOTO: Sergio Souza / Pexels

In 2021, Brazilian GHG emissions reached the highest level in the last 19 years, according to data from the Brazilian System for Estimating Greenhouse Gas Emissions and Removals (*Sistema de Estimativas de Emissões e Remoções de Gases de Efeito Estufa – SEEG*), an initiative of the Climate Observatory which IEMA participates in. The figures indicate that Brazil emitted 2.42 billion tonnes of CO2e, an increase of 262.6 million tonnes, or 12% more, compared to the result recorded in 2020. **The energy sector, which includes transport, was responsible for 12% of these additional emissions.**

> "What is desirable and ideal is for deforestation to decrease, and then the energy sector in large cities—a sector in which transportation is the main emitter in Brazil—will make up an even greater share [of Brazilian GHG emissions]. Deforestation is a huge problem, but that does not mean the other problems are not important either";
>
> *Felipe Barcellos e Silva, IEMA researcher.*

The predominant use of motor vehicles rather than public transport in large urban centers in Brazil directly impacts greenhouse gas emissions and the quality of the air the population breathes. This is because virtually all cars burn fuel to work. Even if individual vehicles adopt energy sources that emit less GHGs, promoting this mode of transport as a solution to urban mobility entails other problems, such as traffic accidents, traffic congestion, socioeconomic consequences, and reduced access to cities by low-income populations.

Brazil's Nationally Determined Contribution (NDC), elaborated per the Paris Agreement to fight the rise in global temperatures, sets reduction targets for national GHG emissions. The country proposed reducing emissions by 37% by 2025 and 50% by 2030, using 2005 levels as a baseline. To achieve these goals, specific policies must be implemented in various sectors, including energy, in which transport figures as the largest emitter.

Recognizing the importance of public policies that promote public transport and active transportation as ways to reduce atmospheric emissions and democratize urban opportunities, IEMA seeks to collaborate for a fair energy transition, **producing critical content that presents the potentials and challenges of building cities that encourage inclusive, low-emission urban mobility.**

PUBLICATIONS

Prospects for a Fair Energy Transition in Public Transport in Brazil
Energy transition in urban mobility from the perspective of public policy

PHOTO: Rovena Rosa/Agência Brasil

Traffic in the city of São Paulo.

STUDIES AND EVENTS

In August, IEMA published the study *"Perspectivas para uma Transição Energética Justa no Transporte Público Coletivo no Brasil"* ("Prospects for a Fair Energy Transition in Public Transport in Brazil"), launched in an online event organized and executed by IEMA in partnership with the Rosa Luxemburg Foundation. This research addresses energy transition in urban mobility from the perspective of public policies on the right to transportation and the introduction of new vehicle technologies, analyzing the conditions for their implementation in Brazil while taking into account the current crisis in public transport and the urgency of replacing energy sources with less polluting options.

The study identified 3,950 policy initiatives in the National Congress and 3,387 records related to the topic in the Brazilian House of Representatives Committee on Constitution and Justice and Citizenship since 2005. Among these initiatives and records, 98 were selected for further discussion. The study observed that the previous federal government did not adhere to strategic policies to promote more efficient urban mobility. The authors of the article *"Transição energética no transporte público deve considerar usuários"* ("Energy transition in public transport must take users into account"), published in the Nexo Políticas Públicas platform, **address the fact that energy transition is needed not only to reduce atmospheric emissions but also to reduce social inequalities.**

The study is a continuation of the work *"Transição da indústria automotiva brasileira: desafios e perspectivas para uma conversão alinhada à mobilidade inclusiva e de baixas emissões"* (Transition of the Brazilian auto industry: challenges and prospects for a conversion aligned with inclusive and low-emission mobility"), published in 2021, which was part of an

ARTICLES

Nexo Jornal
Energy transition in public transport must take users into account
Eliminating fossil fuels is crucial, but this should not deepen social inequalities

Revista NTU Urbano
The challenges of a fair energy transition in public transport

international book organized by the Rosa Luxemburg Foundation and **discussed the transition the Brazilian auto industry should undergo to contribute to inclusive, low-emission mobility. Brazilian industry must contribute to inclusive, low-emission mobility by preserving, creating, and improving jobs.**

PHOTO: Valter Campanato/Agência Brasil

Public transport at Brasília bus station.

To prevent Brazil from becoming technologically lagged, deindustrialized, and even more unequal, it is crucial to plan coordinated progress accompanied by technological evolution. In this context, the State is responsible for regulating markets and defending the public interest. **A political direction that seeks to restore and improve public transport could boost employment and income generation through the manufacturing of vehicles and vehicle parts, the construction of road infrastructure, and the operation of the transport system.**

Without adequate management of the path of Brazilian industry and appropriate digital transformation for the 21st century, including goals aimed at achieving inclusive urban mobility and reducing socioeconomic inequalities, we will likely face setbacks. Therefore, it is essential to act proactively and strategically to ensure a more promising future for the country.

URBAN MOBILITY

On World Car Free Day, more than 140 independent researchers and civil society institutions, including IEMA, released a manifesto advocating for the creation of the *Sistema Único de Mobilidade* (Unified Mobility System – SUM), which would have the purpose of integrating federal, state and municipal spheres for a more comprehensive approach to urban mobility. Besides arguing in favor of SUM, the manifesto seeks to qualify the debate on the legal framework set by the *Política Nacional de Mobilidade Urbana* (National Urban Mobility Policy – Bill 3278/2021). These proposals are intended to contribute to developing a more complete and updated legal framework that can guide public policies on urban mobility while considering the needs and realities of the country's different regions.

During the event *"Parque da Mobilidade Urbana"* ("Urban Mobility Park"), promoted by Connected Smart Cities and Mobilidade Estadão, IEMA project manager David Tsai participated in the discussion table on "Bus Electrification: Brazil in the Context of Latin America" and stressed that **it is essential for governments to look at air quality, electromobility, and public policies in an integrated manner.**

IN THE MEDIA

TV Sagres
Arena Repense: experts point out a triad of solutions and paradigms that must be broken to curb traffic pollution

Fala, Absolar
Pollution and energy transition in transport

Portal UOL
Public transport may collapse without changes in funding

Estadão
Technology as an ally in depolluting public transport

Megawhat
Green hydrogen: BNDES will grant credit of up to BRL 300 million to fuel plants – Afternoon Edition

EVENTS

IEMA was at the international conference "The Automotive Industry—Just Transition and The Development of Alternatives in Global Value Chains" held in the European city of Brussels, the capital of Belgium, by the Rosa Luxemburg Foundation. The conference discussed the transformation of the global automotive industry and the creation of alternative jobs in the European Union and other parts of the world. **The IEMA team participated in the panel that discussed the automotive industry in global value chains.**

International companies from the United States, Europe, Japan, Korea, and China control car production in Brazil. Brazilian bus manufacturing, which plays a vital role in the South American market, has significant challenges transitioning to electric buses. This transition is hampered by the government's lack of coordinated industrial policy measures.

PHOTO: Divulgação/ IEMA

Conference held by the Rosa Foundation Luxembourg in Belgium.

Another highlight in 2022 was the participation of IEMA researcher Felipe Barcellos e Silva in the launch of the study *"O Cenário de Cidades Compactas Eletrificadas"* ("The Scenario of Electrified Compact Cities"), carried out by the Brazilian office of the Institute for Transportation and Development Policy (ITDP Brasil). At the event, Felipe stressed **that most GHG emissions from the energy sector come from transportation.**

RESULTS

EMISSIONS FROM BUSES IN SÃO PAULO

For the first time, the City of São Paulo published reports on emissions from public buses in the city, thanks to a tool developed by IEMA. At a meeting of the Management Committee of the Program for Monitoring Fleet Replacement with Cleaner Alternatives (COMFROTA-SP), São Paulo Transportes (SPTrans) presented the emissions by public buses in the city in 2021. To reach the results based on its operation data, SPTrans, and the concessionaires used the ReFrota tool developed by IEMA to monitor emission reduction targets per bus for carbon dioxide (CO_2), particulate matter (PM), and nitrogen oxides (NO_x).

SUSTAINABLE REGIONAL FREIGHT TRANSPORT

To reduce the negative social and environmental impacts of freight transport

PHOTO: Sergio Souza / Pexels

Land transport infrastructure plays a decisive role in deforestation and several other social and environmental impacts in Brazil. In practice, however, these issues are still not adequately included in decision-making processes related to transportation in the country.

Transport and freight logistics projects that lack clear public policy guidelines are frequently disseminated and selected without preliminary studies of alternatives. As a result, resources are allocated to infrastructure without clearly demonstrating the most appropriate options to achieve objectives and goals that benefit the public interest, such as reducing the country's logistics costs, reducing travel times, creating jobs, and eliminating deforestation, among others.

Another critical point to highlight is the fragility of decision-making processes due to the limited participation of civil society organizations and the population living in affected areas.

This public participation only happens to some degree at later stages, such as the preparation of final technical projects, the execution of construction works, or the concession of infrastructure or services. As a result, **manifestations of civil society have had limited scope, restricted to some projects submitted to public consultation processes which often do not allow a qualified debate on the motivations and impacts of given decisions.** Given this scenario, there is a low probability of manifestations of civil society altering previously taken decisions.

Seeking greater transparency, better social and environmental care, and the inclusion of analysis of alternatives in infrastructure processes in the country, **IEMA has the improvement of decision-making processes as one of its main objectives.** This approach includes: formally incorporating Strategic Environmental Assessment (SEA) into the decision-making process for the development of logistics infrastructure in Brazil; developing alternative scenarios for sustainable logistics infrastructure in collaboration with a group of relevant stakeholders; and establishing a consolidated network of civil society organizations to cooperate strategically in proposing, implementing and monitoring public policies aimed at the development of a sustainable transport logistics infrastructure.

> "The planning of cargo logistics infrastructure in Brazil has scarcely addressed regional development dimensions and has not promoted studies and discussions about less socially and environmentally impactful alternatives";
>
> *André Luis Ferreira, Executive Director at IEMA*

NGOS NETWORK "GT INFRASTRUCTURE"

Organizations representing GT Infraestrutura e Justiça Socioambiental (GT Infra), including IEMA, organized meetings in 2022 to discuss social and environmental risks of large infrastructure projects in the Amazon. Two results are worth mentioning: (i) "Carta de Alter", a document making proposals for the Amazon that aimed to contribute to the debates involved in the electoral process, including the planning and implementation of public policies from 2023 onwards and (ii) Document sent to the transition team of President Luiz Inácio Lula da Silva, elected in October 2022, with ten proposals for strategic action on Infrastructure and Sustainability for the Amazon.

EXTERNAL CONTROL OF INFRASTRUCTURE PROJECTS IN BRAZIL

Within the scope of a Cooperation Agreement between Transparency International Brazil and the Brazilian Institute of Public Works Auditing (IBRAOP), **IEMA joined a Commission formed by members of civil society organizations and auditors of Courts of Auditors, whose objective is to prepare technical documents on external control of the management of socio-environmental impacts of major infrastructure projects in Brazil.** In 2022, the commission's first result was made public, with the publication of new guidelines for auditing risks and socio-environmental impacts of plans, projects and the execution of investments in infrastructure.

PHOTO: Tadeu Junior / Unsplash

Fish in Manaus, Amazonas.

It is worth remembering that infrastructure plays a crucial role in socio-economic development, but it can also have significant impacts on the environment and communities. Poorly planned, built, or operated infrastructure projects can result in ecosystem degradation, biodiversity loss, air and water pollution, forced displacement of local communities, and human rights violations.

IN THE MEDIA

Valor Econômico
2022 will be key to Brazil's goals, say environmentalists

Diálogo Chino
Brazil's railway expansion plans put pressure on the Amazon

Estadão
Sustainable logistics

Fala, Absolar
Pollution and energy transition in transport

Valor Econômico
Four aspects of infrastructure that should be applied to the Amazon

R7
Road to sustainability

CLEAN AND INCLUSIVE ENERGY MIX

To universalize access to electricity and reduce the negative social and environmental impacts of the expansion of the electricity system

PHOTO: Danilo Lessa Bernardineli/Unsplash

Diversifying the energy mix, emphasizing increasing renewable sources, and democratizing access to electricity is paramount. Brazil is a signatory to the 17 Sustainable Development Goals (SDGs) established by the United Nations (UN), with goals to be achieved by 2030. In SDG 7, these goals include the promotion of access to clean and affordable energy sources, which is crucial to ensure broad access to high-quality electricity, including for those who currently have no access to this basic and essential public service.

PHOTO: Ollie Harding/ Flickr

Solar panel in the Xingu Indigenous Park, in Mato Grosso.

To this end, IEMA is dedicated to understanding the technical, regulatory, economic, social, and environmental challenges related to public policies for implementing an energy mix with less social and environmental impacts and universalizing access to electricity, especially in the Legal Amazon. A significant portion of this population lives in areas with low population density and geographical and environmental constraints, which makes expanding conventional electric power distribution networks difficult—and not always desired. Therefore, the availability of public electricity services needs to be ensured by implementing decentralized, distributed, small power generation systems.

During 2022, the IEMA team focused its efforts on two main fronts: the improvement of public policies for universal access to electricity, and the analysis of the Brazilian electricity supply, with a focus on the increased use of natural gas, oil, and its derivatives.

Regarding universal access to electricity, IEMA carried out studies to understand the resources needed to provide electricity to approximately one million people who still lack access to it in the Legal Amazon while also considering resulting solid waste generation. **Based on these studies, measures were proposed to deal with the challenges involved in this process, seeking to improve the regulatory environment and public policies related to access to electricity and waste management in this chain.** The objective is to promote universal access to electricity more efficiently, inclusively, and sustainably throughout the life cycle of implemented systems.

At the same time, IEMA made efforts to evaluate the social and environmental impacts of the financing and expansion of thermoelectric plants in Brazil, with the aim of monitoring and influencing the performance of BNDES and other actors in the expansion of natural gas exploration, production and use and in thermoelectric generation. IEMA provided technical support and data through monitoring bulletins on the main auctions for power generation projects involving fossil energy sources to help the general community understand and deal with the social and environmental impacts involved in this process. The main activities included

> "We take a critical stance on using gas in the energy mix, as we consider Brazil has fully viable, cleaner, large-scale, much cheaper sources that will reduce impacts for consumers";
>
> *Ricardo Baitelo, project manager at IEMA.*

monitoring electricity planning and the planning for auctions related to the expansion of thermoelectric power, as well as the publication of the first and second annual inventories of emissions from thermoelectric plants—referring to 2020 and 2021—**offering information on the environmental impacts of emissions from plants already in operation.**

That notwithstanding, the scope of IEMA's work included studying the whole oil chain, its importance for the national economy, and ways to reduce the extraction and use of fossil fuels. This work is being discussed with organizations in the third sector and should soon be disclosed to all interested parties.

Overall, **IEMA seeks to strengthen civil society's capacity to actively participate in discussions on energy planning, taking concrete measures to mitigate the negative impacts of thermoelectric plants.** Moreover, IEMA aims to ensure access to high-quality electricity for traditional communities and ensure that their rights are fully respected by the State.

UNIVERSALIZATION OF ELECTRICITY

Rede Energia e Comunidades, a network IEMA participates in which brings together a group of organizations working on the cause of the full right to clean and sustainable energy, meets periodically to exchange information and act together to universalize access to electricity in the Legal Amazon. Besides organizing its second meeting, throughout the year, the network has supported the activities of *Programa Energia e Comunidades* (Energy and Communities Program), a radio program and podcast created in partnership with another network, Rede de Notícias da Amazônia (the Amazon News Network).

IEMA also contributed to the Public Consultation on Brazil's 10-Year Energy

PUBLICATIONS

Inventory of atmospheric emissions in thermoelectric power plants
Electricity generation, emissions, and list of companies that own the public service fossil fuel-fired thermoelectric power plants connected to the National Interconnected System (base year 2020)

2nd Inventory of atmospheric emissions in thermoelectric power plants
Electricity generation, emissions, and list of companies that own the public service fossil fuel-fired thermoelectric power plants connected to the National Interconnected System (base year 2021)

Electricity Auction Bulletin
Preliminary analysis of the Auction for Contracting of Electric Power and Associated Energy of September 30, 2022

Expansion Plan 2031 *(Plano Decenal de Expansão de Energia 2031 – PDE 2031).* Among the points raised during the Public Consultation, it was noted that the plan for energy expansion does not provide for actions to contain the increase in consumption and imports of diesel oil, a weak point for Brazil's energy security and decarbonization.

INVENTORIES OF THERMOELECTRIC PLANTS

In 2022, IEMA published the first and second inventories of thermoelectric plants, which included information such as the types of fuel used, technologies adopted, and potential atmospheric emissions associated with these plants. **This detailed data compilation allowed a better understanding of the environmental impacts of thermoelectric plants in the general context of electricity generation.**

The first "Inventory of atmospheric emissions in thermoelectric power plants" compiled a database of 72 power plants throughout Brazil. **According to the document, electricity generation from thermoelectric power plants significantly increased over 20 years, almost tripling from 30.6 TWh in 2000 to 84.8 TWh in 2020.** The study also revealed information on electricity generation and greenhouse gas (GHG) emissions attributed to each company that owns the power plants analyzed. Three of the ten largest emitters accounted for 59.1% of all emissions—Petrobras (24.9%), ENGIE (19.0%), and Eneva (15.2%). However, while Petrobras is the largest emitter in absolute terms (tonnes of CO_2 equivalent), its plants use more efficient technologies, which puts the company in 30th place in terms of emission rates.

The "2nd Inventory of atmospheric emissions in thermoelectric power plants" was published at the end of the second semester, covering fossil fuel power plants that provided energy to the National Interconnected System (Sistema Interligado Nacional – SIN) in 2020 and 2021. **Coal-fired power plants**

PHOTO: Rodrigo Kugnharski/Unsplash

Aerial view of the municipality of Tefé, Amazonas.

ARTICLES

Poder 360
Permanent offer of setbacks
Auction of areas for oil exploration and production is inconsistent with IPCC indications for climate control

Le Monde Diplomatique Brasil
Energy auction could put another coal-fired power plant in operation in Brazil
How are such highly polluting power generation alternatives still included in national projects?

PHOTO: Ryan Garcia/ Flickr

Dusk in Candiota, Rio Grande do Sul.

occupy the top places in emissions by electricity generated (tonnes of CO_2 equivalent per gigawatt-hour – tCO_2e/GWh). Candiota III (RS), Pampa Sul (RS), and Jorge Lacerda I and II (SC) are the three plants with the highest emission rates (in tCO_2e/GWh) in the Brazilian system. More than 60% of the GHG emissions recorded in the second inventory were attributed to only four companies: Petrobras (26.1%), Eneva (13.9%), Eletrobras (11.8%), and Fram Capital Energy (8.8%).

As a result of the management of the 2021 water crisis, there was a 75% increase in greenhouse gas (GHG) emissions compared to the total emitted by fossil fuel thermal power plants in the previous year. It should be noted that more thermoelectric power plants were activated to avoid energy rationing between 2020 and 2021. During this period, the contribution of electricity generation from fossil fuel sources to the Brazilian energy mix increased from 15% to 20%. In total, 95.8 TWh of electricity generated by fossil fuel-fired thermal power plants were sent to the National Interconnected System, 68.9 TWh of which, or 72% of the total, were produced using natural gas in 44 power plants. Two infographics visually summarize the information

IN THE MEDIA

Agência Estadão
Brazil shifts into reverse gear and encourages the use of fracking gas and coal

Jornal Nacional/ TV Globo
Bolsonaro extends the contracting of electricity produced by coal-fired thermal power plants in SC until 2040

EcoAméricas
Power costs, new law stoke Brazil's solar market

InfoAmazônia
Deforestation in the Amazon reduced rainfall and increased Brazilians' electricity bill

Valor Econômico
Six companies were responsible for 71.4% of Brazilian greenhouse gas emissions in 2021

Estadão
NGOs say new oil auction from Brazil's National Agency of Petroleum, Natural Gas and Biofuels (ANP) disregards conservation units

Diálogo Chino
Brazil's railway expansion plans put pressure on the Amazon

Jornal da Globo
Brazil increases clean energy production in the first four months of 2022

Globo/ Canal Futura
Renewable energies

above, one on the first inventory and one on the second.

The inventory served as a fundamental tool to monitor and evaluate atmospheric emissions from thermoelectric plants, contributing to a more efficient and conscious management of the energy sector. The list of companies that own thermoelectric plants also provided transparency and greater accountability regarding emissions of greenhouse gases and other air pollutants. This information was made available in rankings, including power generation, energy efficiency, emissions and emission rates by power plant, geographic distribution, and owner for the first time.

The work involved integrating and handling several national public databases, which allowed IEMA to also draw attention to the difficulty of accessing good quality data within the Brazilian electrical and environmental sectors. These studies aim to provide transparency to the electricity sector and monitor the evolution and environmental impact of thermoelectric plants in the country. **This contributes to a sustainable energy transition, avoiding additional environmental and local community burdens.** IEMA annually publishes updates to these data, creating a timeline for analysis and monitoring.

PHOTO: Geovana Mourão/Pexels

Alter do Chão, Pará.

ELECTRICITY AUCTION BULLETIN

Since the second half of 2021, IEMA has been monitoring the possible environmental impacts of electricity auctions in Brazil and disseminated them through the publication of bulletins, analyses, press releases, and interviews. Publications are always made before and after auctions. **The current bids point to higher GHG**

IN THE MEDIA

Canal Energia
Eletrosul and Engie dispute IEMA's methodology on Thermoelectric Power Plant emissions

Jornal do Comércio
Rio Grande do Sul's coal-fired power plants are less efficient

Megawhat
Eletrosul and Engie lead National Interconnected System's ranking of polluting gas emissions, says IEMA

Reconta Aí
Brazil counts its most polluting thermoelectric power plants for the first time

Valor Econômico
Coal-fired thermal power plants from three companies lead Brazilian CO2 emissions

Brasil de Fato
More polluting and expensive, thermoelectric power plants multiply and take Brazil farther away from the energy transition

Valor Econômico
Carbon emissions by thermoelectric power plants increased by 78% in Brazil in 2021

CNN Brasil
Energy production by thermoelectric plants grows 77% in 2021, says study

epbr
Less efficient, coal-fired power plants emitted the most CO_2 among Brazilian thermoelectric power plants, according to study

PHOTO: João Pedro Schmitz/ Unsplash

Aerial view of the municipality of Pato Branco, Paraná.

emissions by the Brazilian energy mix due to more inflexible thermoelectric power plants being contracted and operating consistently.

The fourth edition of the Electricity Auction Bulletin was published in September, referring to the first auction held to comply with an article of Law 14182/2021 which provides for the contracting of thermoelectric power plants that should start their operations between 2026 and 2030. IEMA analyzed the potential emissions from the contracting of these thermoelectric power plants, as well as other impacts such as deforestation and water stress, and assessed likely difficulties to be faced with implementing these new thermoelectric power plants in areas with little infrastructure to access fuels.

After the warnings of third sector organizations, three projects were contracted—out of 33 natural gas thermoelectric power plants offered—totaling "only" 753.8 MW of the 2 MW planned for this first auction. All three contracted projects are located in the state of Amazonas, as indicated in the analysis carried out after the auction, and all have problems with the data on their environmental impacts.

The auction held in October had coal-fired and biogas power plants competing together. The only participating coal-fired power plant, Ouro Negro, which would be built in Rio Grande do Sul if it won the bid, was not contracted. Considering all disputes, 22 projects were contracted, totaling 557.5 MW of power.

Finally, regarding the environmental impacts of pollutant and greenhouse gas emissions, IEMA participated in a public hearing in the City Council of Macaé, a city in the State of Rio de Janeiro, addressing the implications of new thermoelectric power plants in the city, since they will likely cause an increase in emissions and water stress.

LAUNCH OF COALIZÃO ENERGIA LIMPA

Coalizão Energia Limpa – transição justa e livre do gás (Clean Energy

IN THE MEDIA

Canal Solar
Fossil fuel-fired thermal electricity generation sees an increase of 177% in Brazil

Estadão
Trend of using fossil fuel-fired thermoelectric plants is permanent

Observatório da Mineração
City in Rio Grande do Sul with the most polluting thermoelectric power plants in the country rejects data and defends dependence on coal

Outras Palavras
Portrait of injustices in access to electricity

Valor Econômico
Organizations go to court to bar Eletrobras thermal power plant auctions

Gazeta do Povo
Government holds 1st auction to contract "covertly legalized thermoelectric power plants," which are to be installed in regions without natural gas supply

Repórter Brasil
Auction for gas-fired thermal power plants shows the advance of more expensive and polluting energy source

Folha de S.Paulo
Auction of "covertly legalized" thermoelectric power plants fails in the Northeast

O Globo
"Covertly legalized" power plants: government holds auction and buys electricity for three times the normal price

Coalition – a fair, gas-free transition), a coalition that aims to exclude natural gas from the mix of energy sources for electricity generation in Brazil by 2050, was launched during the meeting of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 27) in Egypt in November. This network is composed of a group of Brazilian organizations committed to the defense of a socially just and environmentally sustainable energy transition: ClimaInfo, Instituto Pólis, Instituto Internacional Arayara, Instituto de Estudos Socioeconomicos (Institute for Socioeconomic Studies – INESC), Instituto Brasileiro de Defesa do Consumidor (Brazilian Institute of Consumer Protection – IDEC) and IEMA.

For almost two years, IEMA has been serving as a secretary in periodic meetings with Brazilian and international organizations to discuss the expansion of the use of natural gas in the country. This coalition is a strategic union where the strengths and skills of each member are combined, knowledge is shared, and political strength is increased. The

PHOTO: Sara SRibeiro/Instituto Arayara

Launch of the Clean Energy Coalition at COP 27, Egypt.

first explicit public appearance of the coalition's members was when the group questioned the public session of the 3rd Cycle of the Permanent Concession Offer (Oferta Permanente de Concessão – OPC). The meeting was a bidding session for the concession of contracts for 379 blocks for exploration or rehabilitation and oil and natural gas production.

Partner organizations of Coalizão Energia Limpa also filed a civil action in the public interest requesting the cancellation of the Capacity Reserve Auction held in September, linked to the privatization of Eletrobras (Law 14182/2021), which provided for thermoelectric power plants staying in operation at least 70% of the time each year. According to data from the Instituto Brasileiro de Defesa do Consumidor (IDEC), BRL 111 billion would be added to the operation and maintenance cost of the Brazilian electricity system between 2022 and 2036 with the installation of the 8 GW provided for by this law.

IN THE MEDIA

epbr
antessala epbr | Elections, climate and energy

Repórter Brasil
The electric mix and the decision that will impact 200 million Brazilians

Canal Energia
Study shows that emissions from thermoelectric power plants increased by 75% in 2021

Repórter Brasil
Brazil promises clean energy at COP but expands coal-based production

Carta Capital
Renewable and competitive

Reconta Aí
Coalizão Energia Limpa is launched during COP 27

Um Só Planeta
Brazilian organizations launch Coalizão Energia Limpa during COP27: "Our goal is to fight against backward steps", says specialist

Projeto Colabora
Thermoelectric power plants: greenhouse gas emissions grew by 75% in 2021

Folha de S.Paulo
Brazilian emissions from fossil fuel-fired thermal power plants jumped 75% in 2021

EVENTS

In October, the researcher also attended the IEEFA Energy Finance Conference 2022 in New York, United States. He spoke about the energy transition in Brazil, the role of renewable energies, and the current investment in gas-fired thermoelectric power plants in a climate change scenario.

André Luiz Ferreira, IEMA's president, addressed the universalization of access to electricity in the Amazon at the "Energy Poverty" roundtable at the XIII Brazilian Congress on Energy Planning in August.

Water is also a sensitive topic from the point of view of clean and inclusive electricity generation. During the live stream *"Vampiros Hídricos – como a água sofre ameaças com o uso de combustíveis fósseis"* ("Water Vampires – how water is threatened by the use of fossil fuels"), promoted by the Arayara Institute on World Water Day, April 22, IEMA stressed that the use of precious water to cool down thermoelectric power plants can reduce water availability for direct uses by the population.

At the "Absolar Meeting Norte" event in Manaus in June, IEMA collaborated remotely, presenting information on using renewable energy in the Amazon. **It is essential to highlight the magnitude of the challenge in providing electricity to nearly one million people who reside in this region and remain without access to this crucial resource.**

RESULTS

MAPPING TO CONTRIBUTE TO NEW STUDIES

Researchers from the Climate Policy Initiative (CPI), an independent, not-for-profit international climate policy think tank based in California, requested the use of results from IEMA's mapping of people without access to electricity in the Legal Amazon to generate new analyses.

[2]

COAL MINE: COLLABORATION WITH THE FEDERAL PROSECUTION SERVICE (MNISTÉRIO PÚBLICO – MP)

The 9th Federal Court of Porto Alegre annulled the environmental licensing process for the Guaíba Mine in the city's metropolitan region. This was the largest coal mine in Brazil. The decision is a response to a claim issued in 2019 when the Poty Guarani Indigenous Association and the Arayara Association for Education and Culture filed a civil action in the public interest against the National Foundation of Indigenous Peoples (Fundação Nacional dos Povos Indígenas – FUNAI), the Henrique Luís Rossler State Environmental Protection Foundation (Fundação Estadual de Proteção Ambiental Henrique Luís Roessler – FEPAM), and the mining company Copelmi Mineração Ltda. Other organizations joined the civil action later. IEMA contributed to the work of the Federal Prosecution Office (MP), providing data on environmental issues.

SPECIAL PROJECTS

PHOTO: Diego Tirira/ Flickr

PHOTO: Divulgação/ Observatório do Clima

David Tsai and Tasso Azevedo during the SEEG coordination handover.

SEEG

The System for Estimating Greenhouse Gas Emissions and Removals (SEEG), coordinated by the Climate Observatory (OC) and developed jointly by IEMA, the Amazon Environmental Research Institute (*Instituto de Pesquisa Ambiental da Amazônia – IPAM*), the Institute of Agricultural and Forest Management and Certification (*Instituto de Manejo e Certificação Florestal e Agrícola* – IMAFLORA) and ICLEI – Local Governments for Sustainability, is a fundamental tool for the monitoring and evaluation of Brazilian GHG emissions and removals. **This tool contributes to decision-making, goal monitoring, international commitments, and raising awareness about climate change to promote effective actions to face this problem.** At the event celebrating ten years of SEEG's creation, at the end of 2022, IEMA's project manager David Tsai took over the tool's coordination after Tasso Azevedo—the project's creator, founder and executor throughout this decade—passed the baton.

The event took place in Brasilia and was attended by former ministers of the environment and representatives of the legislative and executive branches. At the end of 2022, data were also presented showing that Brazil's GHG emissions had seen the highest increase in almost two decades. **In the energy sector, this increase was the largest in 50 years.** The tenth edition of SEEG showed that, in 2021, the country emitted 2.42 billion tonnes of CO_2 equivalent, an increase of 12.2% compared to 2020. This increase occurred mainly due to three factors: the resumption of economic activity after the most severe phase of the COVID-19 pandemic; the 2021 water crisis, which led to an increase in the activation of thermoelectric power plants; and a drop in sugarcane crop yields in the Southeast due to the drought, which led to an increase in the price of ethanol, thus reducing the share of biofuel use in transportation.

Another highlight this year was the preparation and disclosure, in October, of the report *"Desafios e Oportunidades para a Redução das Emissões de Metano no Brasil"* ("Challenges and Opportunities for Reducing Methane Emissions in Brazil"), which made an unprecedented

calculation of the trajectory of methane emissions and a proposal for a Brazilian goal for reducing methane emissions, in line with the Global Methane Pledge signed in 2021 in Glasgow. Brazil can reduce methane emissions by 36% by 2030 compared to 2020 by simply expanding existing policies and measures in the agricultural, energy, and sanitation sectors and deforestation control. However, **the Brazilian potential for reducing emissions with more comprehensive policies and more significant investment is even greater — up to a 75% reduction in 2030 compared to 2020.**

In June, the SEEG team presented its second municipal data collection. This document makes it possible to consult all emissions in each of the 5,570 Brazilian municipalities. The city of São Paulo had the highest emissions from the energy sector, with 11.9 $MtCO_2e$, followed by Manaus (7.5 $MtCO_2e$) and Rio de Janeiro (5.7 $MtCO_2e$). Florianópolis was revealed as the "car capital," with the highest rate per inhabitant of emissions derived from individual road transport.

These data enhance the formulation and monitoring of public policies by local governments and civil society and also serve as a reference for various studies or news stories. The statistics available on the SEEG platform make it possible to analyze CO_2e emissions in any region of interest. This is what was done in the Climate Action Plan (Plano de Ação Climática – PAC) prepared for the State of São Paulo, which in 2021 joined the global Race to Zero initiative that sets the objective of achieving net zero carbon emissions by 2050. Led by the Department of Infrastructure and Environment of the State of São Paulo (SIMA/SP), the Climate Action Plan (PAC) was created with academic researchers and the SEEG team, responsible for quantifying the impact of proposed measures on GHG emissions.

PHOTO: Divulgação/ Observatório do Clima

Celebration of the ten years of SEEG, in Brasília.

The GHG information from states and municipalities measured by SEEG was also made available on the *Plataforma Subnacional para o Clima* (Subnational Climate Platform), resulting from a partnership between SEEG and the Climate Observatory (OC). For those with difficulties navigating SEEG, the IEMA team developed a tutorial indicating ways to access the data available on the platform.

PHOTO: Flickr: Dan / Flickr

Navigation in the amazon.

MAPBIOMAS

IEMA participated in the preparation and launch of MapBiomas Brasil's Collection 7, which brings together maps and annual data on the dynamics of 27 classes of land cover and land use in Brazil from 1985 to 2021, including modules with information on the annual evolution of deforestation, secondary vegetation, irrigation, mining, and pasture quality. IEMA collaborated by including 51 different layers related to infrastructure, such as georeferenced energy, mining, transport, telecommunications, and agribusiness data.

MapBiomas Brasil is a collaborative network composed of third-sector organizations, universities, and technology startups which aims to produce annual land cover and land use mappings and monthly monitor the water surface and fire scars using data that started in 1985. The project also validates and prepares reports for each deforestation event detected in Brazil since January 2019 through MapBiomas Alerta.

RURALOMETER

For the first time, IEMA collaborated with the Ruralometer, published by Repórter Brasil, a database and interactive tool that evaluates the performance of federal deputies on issues related to the environment, rural workers, indigenous peoples, and other traditional communities. **IEMA's participation mainly consisted of helping evaluate energy sector information.** According to this large study, 68% of the Brazilian House of Representatives, or two out of each three deputies, are accomplices to the social and environmental dismantling promoted by the presidential administration between 2019 and 2022.

IN THE MEDIA

epbr
Energy is the main source of emissions in Brazilian capitals

G1
Eight of the ten municipalities that emit the most greenhouse gases are in the Amazon

TV Globo/ Jornal da Globo
Federal Government announces program to reduce methane gas emissions

Valor Econômico
2022 will be key to Brazil's goals, say environmentalists

Reuters
Brazil extends coal use to 2040 under new 'just transition' law

SBT Brasil
Amazonian cities lead in the ranking of greenhouse gas emissions

PHOTO: Divulgação/ IEMA

Entry to COP27 in Egypt, in 2022.

COP 27

For the third consecutive year, IEMA representatives were present at the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 27), an event in which nations debate and seek to sign agreements to fight climate change. Last year, the meeting was held in November in Sharm El Sheikh, Egypt. Held in an African country, COP 27 highlighted the topic of climate justice, as expected—the Loss and Damage Fund for Vulnerable Countries was created during the event. The participation of Brazilian civil society was significant and well-integrated. However, the event also had a significant presence of companies and representatives of highly emitting sectors, such as oil and gas.

As a result, there was a setback in concrete actions on fossil fuels, and the term "phase down" regarding using these fuels was removed from the final text. This raises concerns about the inclusion of natural gas as a transition fuel. Although the need for investments in renewable energy was mentioned, there was not enough objectivity in guiding the pace and volume of these investments. Over the decades, COP has evolved to become a space where global environmentalism meets and also includes entrepreneurs from emitting sectors. However, due to economic pressure and difficulties in making changes, issues that are vital for transformation are often excluded from the resulting official documents.

While Brazil's previous federal administration neglected the possibility of taking a leadership role in global climate diplomacy, civil society organized itself to actively participate in the annual meetings. Over these four years, the participation of Brazilian civil society increased, bringing together environmentalists from around the world. As part of this movement, **IEMA sought to participate in more discussions and bring new developments and information to the debates, including the warning about the progressive increase in Brazilian emissions and the launch of Coalizão Energia Limpa – transição justa e livre do gás.**

This time, besides actively participating in debates at the Brazil Climate Action

IN THE MEDIA

TV Cultura/ Jornal da Tarde
Eight of the ten municipalities that emit the most greenhouse gases are in the Amazon

Uol/ Ecoa
Brazil has the potential to be the first zero-carbon economy; learn more

Um Só Planeta
What is blue hydrogen and what are its impacts?

Congresso em Foco
What the real Brazil will present at COP27

Outras Palavras
The real Brazil going to COP27

epbr
Marina Silva defends 'broad front' for climate governance

Hub, a space organized by the third sector at the meeting, **IEMA also presented at COP 27's Blue Zone, a place for discussion promoted by the UN.** IEMA was also at the Climate and Clean Air Coalition (CCAC) Ministerial meeting, where government ministers and CCAC leaders announced new collaborative actions and reaffirmed commitments to reduce air pollutants to protect health and avoid further global social and environmental impacts.

At the CCAC meeting, IEMA highlighted the contribution of Brazilian civil society in tackling climate change and air pollution, remarking that, after the commitment to reduce methane emissions signed at COP26, SEEG showed that Brazil can achieve a 36% reduction in its methane emissions by 2030 in comparison to a 2020 baseline. IEMA also highlighted Brazil's insufficient air quality monitoring, especially in Amazonian fire-affected states. Building a national monitoring system would be an essential achievement to be pursued by the new federal government.

PHOTO: Divulgação/ Ricardo Stuckert

Meeting of representatives of the current Brazilian federal government (2023) with civil society at COP 27, Egypt.

At the Brazil Climate Action Hub, representatives of SEEG, including IEMA, presented the current balance of Brazilian emissions. The country has seen a 20% increase in emissions over the past seven years, going from 1.5 billion tonnes in 2015 to 1.8 billion tonnes in 2021. This goes against Brazil's commitment to the Paris Agreement, which seeks a reduction of emissions. The goal is to reach a maximum of 1.6 billion tonnes by 2025 and further reduce this to 1.3 billion by 2030. The State of São Paulo's Climate Action Plan (PAC 2050), developed in collaboration with the SEEG team, was also presented at COP 27.

Coalizão Energia Limpa – transição justa e livre do gás, a coalition for a fair, gas-free energy transition, was also officially launched in Egypt. The event had the participation of several entities and parliament members. At the Brazil Climate Action Hub, IEMA and the Arayara International Institute promoted, through Coalizão Energia Limpa, the panel "Energy and Environmental Racism – Solutions based on a Just, Communal and

BRAZIL 2045

During 2022, the IEMA team was involved in preparing the Brazil 2045 document, organized by the Climate Observatory (OC) and launched in Brasilia. The document points out 74 measures that the new president, then still to be elected, could take in the first two years of the new government to undo the steps backward previously taken in social and environmental issues and develop public policies for greater social and environmental protection. Besides these priority actions, the report also suggested 62 emergency measures for the first 100 days of government. At the time, the document was delivered to the main pre-candidates for the 2022 presidential election.

PHOTO: Bruno Kelly/Amazônia Real

Indigenous Land of Vale do Javari, Amazonas.

Inclusive Energy Transition," which included representatives of indigenous and quilombola communities. **Energy and environmental racism are related to communities being excluded from access to clean energy and environmental services and the lack of representation of these communities in planning and** decision-making processes.

IEMA also participated in two debates promoted by the organization Uma Gota no Oceano (A Drop in the Ocean): "Loss and Damage, Gender and Territorial Impacts" held at the Brazil Climate Action Hub, and "Linking local energy projects to NDCs & transparency of national climate reporting," the first debate organized by a Brazilian organization presented in the official event area organized by the UNFCCC. **The former highlighted Brazil's worrying contribution to future emissions from the electricity sector due to the approval of laws that allow the contracting of gas-fired thermoelectric power plants and the extension of subsidies to coal-fired thermoelectric plants and their useful life.** The latter voiced criticism on implementing Nationally Determined Contributions (NDCs), the goals set by each nation to reduce greenhouse gas emissions. This criticism was directed at the lack of ambition, transparency, and popular participation in implementing these goals in various countries.

Watch the debates in which IEMA participated:

- Linking local energy projects to NDCs & transparency of national climate reporting
- Just Energy Transition in Brazil – Pathways for the oil and gas sector
- Loss and Damage, Gender and Territorial Impacts
- The lost decade of Brazilian emissions: what ten years of annual estimates by civil society reveal
- Energy and Environmental Racism – Solutions based on a just, communal and inclusive Energy Transition

EVENTS

Felipe Barcellos e Silva, a researcher at IEMA, was one of the participants in the 1st Cycle of Events on Climate Change held by the Climate Change Commission of Piracicaba *(Comissão de Mudanças Climáticas de Piracicaba – COMCLIMA)*, in partnership with Piracicaba's Municipal Council for the Environment (COMDEMA). The main objective of the meeting was to establish a connection between the climate agenda and the specific characteristics of the municipality, seeking a more local approach.

GENDER AND CLIMATE

For about two years now, Isis Nóbile Diniz, responsible for communication at IEMA, has been acting as part of the decision-making group of the Gender and Climate Working Group, coordinated by the Climate Observatory. In 2022, one of the results of this work was the publication of the book *"Quem precisa de justiça climática no Brasil?"* ("Who needs climate justice in Brazil?"), launched in Recife, Pernambuco.

PHOTO:: Divulgação/ IEMA

The reflections presented in the book seek to understand the climate crisis as another oppressive factor which, when analyzed in the light of intersectionality, reveals that the impacts of climate change are even more harmful to black, indigenous, and quilombola women and for women in rural, fishing and shell-fishing communities, in favelas, and in underprivileged communities in general. These women are the book's main focus, as environmental and climatic factors accentuate existing inequalities and create chasms of extreme marginalization for women in these intersections. **The publication contains an article by the IEMA team addressing the lack of electricity in isolated communities in the Legal Amazon.**

PHOTO:: Divulgação/ IEMA

RESULTS

PDE 2031 BIBLIOGRAPHY

SEEG was part of the bibliography of Brazil's Ten-Year Energy Expansion Plan (PDE) 2031, indicating the prospects for the energy sector's expansion for the next ten years (2022 to 2031). The expansion plan was prepared by the Brazilian Energy Research Company (*Empresa de Pesquisa Energética – EPE*) under the guidance and support of teams from the Ministry of Mines and Energy, coordinated by the Department of Planning and Energy Development (SPE/MME) and the Department of Oil, Natural Gas and Biofuels (SPG/MME). The analysis helps inform energy policy decisions and provides the market with information relevant to assessing the progress of the Brazilian electricity system and adequate supply conditions in various potential future scenarios.

INSTITUTIONAL DEVELOPMENT

To strengthen governance, management, and communication.
To promote the team's personal development.

PHOTO: Edila Döler / Pixabay

In 2022, IEMA continued to play the role of a think tank, domestically and internationally. **The organization's performance was marked by collecting data and explaining its contents, mobilizing different fronts, and coordinating important actors for decision-making related to public policies.** The baseline of IEMA's action was the fulfillment of the five objectives established in the 2020–2024 Strategic Planning.

The IEMA team produced several studies, articles, courses, and recommendations; held meetings with decision-makers and opinion-makers; made analyses; and participated in events. These initiatives were crucial in providing relevant tools to policymakers, assisting them in making informed decisions. **IEMA also played a crucial role in disseminating knowledge to society.**

To this end, IEMA has a technical production with accuracy and criticism as its pillars, establishing dialogues with different public administration sectors, private entities, and third-sector organizations. So that IEMA can realize its full potential, activities for institutional improvement and strengthening the organization's management were carried out throughout 2022 through strategic actions to strengthen governance, management, and communication.

Two interns, Ingrid Graces and Fabio Galdino, and a project analyst, Vinicius Silva, were hired in 2022. Vinicius is currently working on studies on universal access to electricity. **Continuous training of the whole team is also another fundamental aspect of IEMA.**

Besides acting as the organization's governance department, the administrative and financial team manages the institutional budget, all ongoing projects, and transparency in accountability (disclosed in the annual balance sheet). Mônica Takeda, IEMA's administrative and financial manager, is a member of the Audit Committees of Oceana Brasil and Greenpeace Brasil.

> "Our area plays a crucial role from the moment we start planning a new project, including drafting the budget to present to funders. We are responsible for managing institutional and project budgets, ensuring careful monitoring of all financial activities, from payments to the rendering of accounts. We also play a comprehensive role in the organization's financial management, including producing information to present to the Audit Committee";
>
> *Monica Takeda, IEMA's administrative and financial manager.*

COMMUNICATION

IEMA's communication is established in its flows, exchanges between internal areas, and achievements. IEMA's communication area, which completed four years of existence in 2022, is one of the newest sectors within the organization and is responsible for related fields such as marketing, events, and public relations. Based on review conversations in the first quarter of 2021, **new actions or innovations within existing ones were implemented to help IEMA consolidate its external recognition as a think tank and expand its general recognition—one of the objectives included in the Strategic Planning.**

Some of the actions carried out in the update to the communication plan that go hand in hand with IEMA's administrative and study directives included: the creation of a new "Analyses" *(Análises)* tab within the "Library" *(Biblioteca)* section on IEMA's website (in Portuguese); an updating of IEMA's online address and online practices following the Brazilian General Data Protection Law *(Lei Geral de Proteção de Dados – LGPD)*; an overhaul of the organization's online strategy; investment in direct communication with decision-makers and actors relevant to the institution's longevity; the organization and increase of IEMA team's activities within networks and partnerships, which generated consortia for fundraising together with other organizations.

IEMA worked even more in social networks in partnership with other third-sector organizations. IEMA's press office also worked more closely with specialized journalists, particularly those working in the energy sector. Additionally, **IEMA's publications started being disseminated to media vehicles specialized in the financial market, mainly aiming to reach investors in the energy sector. This initiative aims to raise awareness about IEMA's activities and thus make the country more socially and environmentally fair.**

Teamwork

IEMA produced
8 publications of its own
– the exceptions being the Annual Report and documents coordinated by other organizations, such as those related to the SEEG;

The IEMA team wrote
3 analyses released
on the organization's website, press releases, and social networks.

Four editions
of the institutional bulletin were written.

The IEMA team was present at
39 national and international
events. There were 14 events related to SEEG and six participations at COP 27.

977 posts
were published on IEMA's social media profiles

Thirty-five press releases
related to IEMA analyses and studies were sent to journalists.

IEMA had
704 insertions
in media vehicles, among interviews, news articles, and mentions.

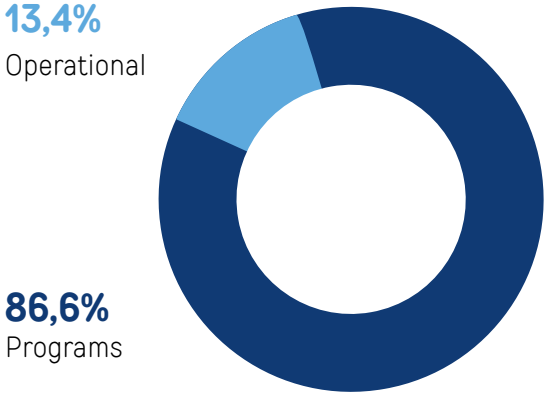
SUPPORTERS AND FINANCIAL INDICATORS

SUPPORTERS (2022)

Charles Stewart Mott Foundation
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Energy Transition Fund (ETF)
Fundação Rosa Luxemburgo (FRL)
GGON
Instituto Arapyaú de Educação e Desenvolvimento Sustentável
Instituto Clima e Sociedade (ICS)
Observatório do Clima (LabOC)
Oceana Brasil

USE OF RESOURCES 2022

Team	3.163.897
Third Parties	847.378
Travel / Conferences	92.684
Occupation / Infrastructure	132.069
General / Taxes	159.853
	4.395.881



BALANCE SHEET

December 31, 2022 and 2021 (In BRL)

ASSETS	2022	2021
CURRENT		
Cash and cash equivalents	5.197.042	3.855.854
Prepaid expenses	214.149	174.316
Other accounts receivable	57.933	124.444
	5.469.124	4.154.614
NOT CIRCULANT		
Immobilized	83.328	98.975
	83.328	98.975
TOTAL ASSETS	**5.552.452**	**4.253.589**

LIABILITIES AND NET ASSETS	2022	2021
CURRENT		
Suppliers	25.670	18.604
Tax obligations	148.085	117.979
Employment and social security obligations	322.695	254.009
Advance donations	2.549.794	1.341.641
	3.046.244	1.732.233
NET ASSETS		
Social Assets	2.475.731	2.300.205
Investment donations	45.625	45.625
Surpluses for the year	(15.148)	175.527
	2.506.208	2.521.356
TOTAL LIABILITIES AND NET ASSETS	**5.552.452**	**4.253.589**

STATEMENT OF INCOME

Years ended December 31, 2022 and 2021 (In BRL)

OPERATING REVENUE	2022	2021
WITH RESTRICTION		
Donation revenue	3.891.477	3.540.641
UNRESTRICTED		
Voluntary donations	120.006	-
Other revenues	8.254	750
Volunteer activities	6.480	6.591
	4.026.217	3.547.982

PROJECT COSTS	2022	2021
Contractors	(847.378)	(766.075)
Personnel expenses	(3.163.897)	(2.448.885)
General	(369.872)	(239.591)
Tax	(14.734)	(20.313)
	(4.395.881)	(3.474.863)
GROSS OPERATING SURPLUS	**(369.664)**	**73.119**

OPERATIONAL EXPENSES	2022	2021
Volunteer activities	(6.480)	(6.591)
General and administrative expenses	(19.890)	(28.264)
Depreciation	(17.338)	(19.093)
	(43.708)	**(53.948)**
RESULT BEFORE FINANCIAL INCOME AND EXPENSES	**(413.372)**	**19.170**
Financial expenses	(85.863)	(37.305)
Financial revenue	484.088	193.661
	398.225	156.356
SURPLUS FOR THE PERIOD	**(15.147)**	**175.527**

The year 2022 was audited by Audisa Auditoria e Consultoria and is available on the website (http://energiaeambiente.org.br/transparencia).

iema
Instituto de Energia
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