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**BENEFITS OF THE  
AIR QUALITY STUDY  
CONDUCTED BY THE  
STATE OF RIO DE  
JANEIRO**

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**Abstract:** The evaluation of public policies is an extremely important practice, as it allows monitoring the performance of government management and the achievement of the goals listed in the government plans. In addition, it promotes transparency, encourages the quality of public spending and strengthens Accountability. The objective of this article is to carry out a bibliographic research based on a recent study carried out by the State Institute of the Environment - INEA RJ on the public policy of Air Quality. The study makes it possible to know the resources invested in carrying out this public policy, making technical information available to all segments of society that provide greater clarity regarding the products that were revealed in the execution of environmental actions related to the quality of the State's Air, in the period of 2012 to 2015. In the analysis of the data, it was found that investments in environmental actions meet sustainable development and substantially affect the quality of life of the population of Rio de Janeiro. It was concluded that the environmental projects carried out in the last PPA (2012 - 2015) had a positive impact on society, since they considerably reduced the emission of polluting gases, improving air quality in the State.

**Keywords:** Environmental Management, Public Policies, Accountability, Air Quality.

## INTRODUCTION

Evaluating public policies is an extremely important practice in any sphere of government, as it adds transparency to Public Administration, improves the quality of public expenditure, in addition to serving as an instrument of social control, enabling the citizen, the taxpayer, to know the government spending.

The evaluation allows the public entity to trace the diagnosis of the programs that are being executed, verifying the achievement of

the goals established in the Pluriannual Plan - PPA and their respective results.

Due to the high budget constraint facing the different desires of the population, the evaluation is a necessary measure to identify how and where to apply the scarce resources.

A recent study carried out by Rio de Janeiro, through the Instituto Estadual do Ambiente - INEA, demonstrated the evolution of the State's environmental public policy, over the last 10 years, with regard to air quality. The work, called "Vehicle Emissions Inventory" is an important management tool for the control of air pollution that enables the elaboration of diagnoses that guide and reinforce preventive and corrective governmental actions, contributing to the development of specific control actions.

The inventory allows the public entity to assess the effectiveness of the policy developed, comparing the investments made with the gains generated. In this sense, the problem of the present research arises: **what benefits has the public policy on air quality brought to the state of Rio de Janeiro?**

The objective of the article is to carry out a critical study of the work performed by INEA in relation to the public policy on air quality, seeking to demonstrate the benefits generated in the execution of such a policy.

The research is bibliographical, developed based on the "Vehicular Emissions Inventory" produced by INEA, along with books, articles, legislation and websites related to the topic.

In view of the work carried out by INEA in relation to public policy on air quality between 2012-2015, this article aims to identify the practical (physical) benefits for the assisted population in the results presented.

As specific objectives, we sought to relate:

- Expected and executed values;
- Actions initiated compared to those completed;
- Actions not taken and their motivations.

For the construction of this study, the information was organized into sections, with the following approaches: The introduction is focused on the justification, research problem and objectives of the article; The theoretical framework will present some of the instruments that institute public Environmental policies in the State of Rio de Janeiro and other relevant information; In the presentation and analysis of the results section, the reports mentioned in the theoretical framework will be analyzed, in order to verify the execution of actions aimed at the quality of the State's Air, in the period from 2012 to 2015. In the final considerations, the understandings of the study and propositions will be highlighted of new studies for the theoretical-practical deepening of the referred theme.

## **THEORETICAL FRAMEWORK**

### **PUBLIC ENVIRONMENTAL POLICIES**

The term public policies has several definitions that privilege diverse aspects such as the actions and non-actions, decision-making, political actors, planning. Among these definitions, Vianna Junior apud Vallejo (2003) understands public policy as:

“a planned action by the government that aims, through various processes, to achieve some purpose. This definition, aggregating different governmental actions, introduces the idea of planning, of coordinated actions. (VIANNA JUNIOR, apud VALLEJO, 2003, p. 16).”

The concept of “public policies” also acquired a broader meaning and, according to Little (2003, p. 18), came to include “the set of interrelated decisions, defined by political actors, whose purpose is the ordering, regulation and control of the public good.

Therefore, the concept of “public” is no longer restricted to the State, incorporating and contextualizing civil society and the

private sector. However, the Brazilian State is traditionally centralized, little open to the negotiation of political spaces with society, which has been taking place for just over 10 years (ALCÂNTARA et al., 2006).

At the beginning of the 20th century, humanity began to face several problems typical of post-industrial society, mainly the difficulty in reconciling economic growth with environmental protection. It was then that the relationship between the environment and economic development became a matter of international concern.

This concern with environmental degradation caused by disorderly economic growth gave rise to the term “sustainable development”, which is the ability to meet the needs of the current generation, without compromising the ability of future generations. In other words, it is development that does not exhaust resources for the future. (Veiga, 2006).

According to Medeiros (2015), due to international pressures and non-governmental organizations for environmental preservation, Brazil began to adopt environmental public policies of preservation and conservation, helping to promote sustainable development and guaranteeing the right of present and future generations future generations to enjoy an ecologically balanced environment.

The article 23 of the Federal Constitution establishes as a common competence of the Union, States, Federal District and Municipalities: “[...] VI - protect the environment and combat pollution in any of its forms; VII - preserve forests, fauna and flora”.

The formulation of Public Policies related to the environment is the responsibility of the Executive, Legislative and Judiciary Powers. The Executive is responsible for the implementation, execution and supervision. The Legislature formulates the guidelines to

be followed and the Judiciary is responsible for safeguarding society, through legal actions, when omissions by the Government occur.

Although environmental protection is not an exclusive task of the State, the Public Power has the duty to act, through Public Policies, effectively in the preservation of natural resources and in the prevention of environmental damage, in order to protect and restore the processes essential ecological.

In addition, the State must act in defense of the environment through its environmental agencies, preventing its degradation. For this, it uses all the instruments at its disposal. An inefficient performance can have tragic consequences for the environment and society, influencing the quality of life of human beings.

### **MULTIANNUAL PLAN AND ITS APPLICATION IN THE PUBLIC ENVIRONMENTAL POLICY OF RIO DE JANEIRO**

The Federal Constitution of 1988 determined in its article 165 the elaboration of Pluriannual Plans (PPA) every four years. Its objectives must express the transformation of the socioeconomic reality that it wants to achieve. This way, the PPA consolidates all intended actions, guiding annual budgets through the Budget Guidelines Law (LDO).

In the view of Pares and Valle (2006), the PPA emerges with the objective of guiding public policies and major changes in society, based on planned and planned actions in 4 years.

According to the 2012-2015 Multiannual Plan Elaboration Manual, the State was going through a time of significant economic, political, social and environmental changes, especially the Major Events – World Cup, in 2014 and the Olympics and Paralympics, in 2016.

According to Garcia 2000, the PPA emerged due to a lack of governmental planning, and due to criticism from neoliberal ideologues:

The PPA emerged, therefore, in a context in which governmental planning (of a normative nature) was in disrepute and under strong criticism by ideologues and defenders of the neoliberal wave that was rising in power. In addition, many of the parliamentarians who were members of the commission<sup>3</sup> of the National Constituent Assembly responsible for preparing the proposals for what would become Title VI (On Taxation and Budget) of CF/88 had suffered from the difficulties of planning and executing budgets in a complex environment. growing and had leaned towards a more fiscal orientation.

### **GUIDING INSTRUMENTS: BUDGET GUIDELINES LAW AND ANNUAL BUDGET LAW**

The Public budget plays a very important role in public administration, as it configures the instrument of the Public Power to express its action programs, detailing the origin and amount of the resources to be obtained, as well as the nature and amount of the expenditures to be made (ANDRADE, 2006).

The actions undertaken by the State are not implemented automatically, and it is necessary to use some instruments that guide its performance. Provided for in the Federal Constitution, these instruments represent basic norms for the elaboration of the Public Budget, which, together, materialize the planning and execution of public policies. They are: Budget Guidelines Law - LDO and Annual Budget Law - LOA.

One of the main purposes of the LDO is to establish the parameters necessary for the allocation of resources in the annual budget, in order to guarantee, as far as possible, the achievement of the goals and objectives contemplated in the PPA. The LDO adjusts

the government actions, provided for in the PPA, to the real cash possibilities of the public coffers and selects among the programs included in the PPA those that will have priority in the execution of the following budget.

The LOA estimates income and fixes expenses for the subsequent financial year. On the one hand, it makes it possible to evaluate the sources of public resources in the universe of taxpayers and, on the other hand, it informs who the beneficiaries of these resources are.

Once interacting with the PPA and extracting its projects and actions, it is the LDO's constitutional duty to guide the elaboration of the LOA. In this sense, Andrade et al 2005 state that:

“The LDO must present the form of preparation of budget proposals, define the rules for forecasting revenues and setting expenses, identify the distribution of budget resources by sector of government action, define the deadlines for public administration bodies to submit their budget proposals partial budget consolidation”.

## **GOVERNANCE AND SUSTAINABILITY OF ENVIRONMENTAL MANAGEMENT**

The expression.: “*governance*” emerged from reflections conducted mainly by the World Bank, “with a view to deepening the knowledge of the conditions that guarantee an efficient State” (DINIZ, 1995, p. 400 apud GONÇALVES, 2005).

According to the United Nations Commission on Global Governance (CGG), the term *governance* is defined as follows: (Commission on Global Governance, 1995, p. 53).

“The sum total of the various ways in which individuals and institutions, public and private, manage their common affairs. It is an ongoing process through which conflicting or diverse interests can be accommodated

and cooperative action established. This process includes formal institutions and regimes empowered to enforce the rules, as well as informal arrangements that people and institutions have agreed to establish or perceive to be in their best interest.”

Environmental governance at national, regional and global levels is fundamental to achieving sustainable development, according to MOURA (2016):

“governance that promotes sustainable development must be seen as the ability to insert the idea of sustainability into the set of public policies and their interrelationships. The sectoral vision that has dominated environmentalism in Brazil has led to an apartment and, at times, a conflict between the implementation of environmental policy actions and instruments and other public policies.”

It is necessary, according to Born et al. (1996), that all people and society in general, through civil society organizations, can be sensitized, know and mobilize in favor of environmental conservation, the principles and guidelines of sustainable society, in which the dignity of quality of life for all beings, democracy, diversity, justice, among other values, are possible for everyone.

The challenge is to create and improve governance conditions, local to global, making use of multilateral regimes, command-control instruments (that is, associated with the regulated Public Power and manager of the interests of the whole society) and economic instruments. (through which the market and companies assume the environmental and social costs of their respective activities).

According to JACOBI (2005), the notion of *governance* is based on the social power that measures the relations between the State and Civil Society, as a space for structuring alliances and cooperation mechanisms, exchanged by conflicts arising from social differences

and their impacts on the environment and the forms of resistance, organization and participation of the various actors involved.

## **INTERNATIONAL TREATIES AND CONFERENCES ON AIR QUALITY**

According to legal terminology, international treaties are agreements signed between States in written form and governed by international law. In a broad sense, they represent all kinds of international agreements, such as: conventions, declarations, acts, protocols, among others.

The treaties establish a State-to-State relationship and apply to the entire territory of the contracting countries, entailing obligations for the Executive, Legislative and Judiciary powers of each signatory. On the other hand, its non-compliance entails the international responsibility of the State.

To enter into force and become binding, a treaty must go through the following stages: negotiation, signature, ratification, promulgation and publication. In Brazil, the power to enter into international treaties, conventions and acts belongs to the President of the Republic, and the National Congress is responsible for guiding him.

In 1972, the United Nations Conference on the Human Environment took place in Stockholm, motivated by serious environmental problems that affected the world. This Conference drew the attention of nations to the fact that human action was causing serious degradation of nature and creating severe risks for the well-being and survival of humanity.

The Conference, which was attended by representatives from 113 countries, 250 non-governmental organizations and UN bodies, produced the Declaration on the Human Environment, a declaration of principles of behavior and responsibility that must govern decisions concerning environmental

issues. Another formal result was an Action Plan, calling on all participants to cooperate in the search for solutions to a series of environmental problems.

In 1983, the UN created the World Commission on Environment and Development, after an evaluation of the 10 years of validity of the actions proposed at the Stockholm Conference. In the first three years, the organization promoted discussions between government leaders and members of civil society, which resulted in the Our Common Future Report.

Launched in 1987, the document presented for the first time the concept of sustainable development, suggesting the reconciliation of economic growth with environmental and social issues. Additionally, he emphasized the dangers of global warming and the destruction of the ozone layer.

In 1992, the United Nations Conference on Environment and Development (UNCTAD), known as the "Earth Summit", held in Rio de Janeiro the ECO-92, a convention on Climate Change, which evaluated how countries had promoted Environmental Protection since the Stockholm Conference of 1972.

172 countries participated in ECO-92 and together they produced five documents that alerted to the need for an urgent change in behavior, in order to preserve life on Earth. They were: Rio Declaration on Environment and Development, Agenda 21, Principles for Sustainable Forest Management, Convention on Biodiversity and Convention on Climate Change.

In 1997, the United Nations Conference on Climate Change took place in the city of Kyoto, in which the Kyoto Protocol was prepared, an important milestone in the preservation of the environment, for defining stricter commitments to reduce the emission of greenhouse gases, the main cause of global warming.

## **PUBLIC AIR QUALITY POLICIES**

The document proposed a timetable for the most industrializing countries to reduce the volume of greenhouse gases. The protocol came into force in February 2005, but not all greenhouse gas-emitting countries have joined.

In 2002, in Johannesburg, South Africa, the World Conference on Sustainable Development, also called Rio+10, took place. The objective was to assess progress and identify obstacles that prevented countries from making major advances in relation to the commitments made at Eco-92.

Two documents were written at the Conference: the Implementation Plan, which is based on the results achieved since Eco-92, seeking to accelerate the fulfillment of other objectives, and the Political Declaration, which reaffirms the countries' commitment to sustainable development.

In 2007, the Bali Conference took place in Indonesia, whose objective was to set targets even more ambitious than those established by the Kyoto Protocol regarding greenhouse gas emissions. The result of the conference was the Roadmap, the name suggested by the Brazilian delegation, agreed by 190 nations.

In 2012, twenty years after Eco-92, representatives from 188 countries met again in the city of Rio de Janeiro, at the United Nations Conference on Sustainable Development - Rio+20. The document entitled "The Future We Want" was born from the event, which defends the strengthening of the UN Environment Program and the creation of a political body to support and coordinate international actions for sustainable development.

In addition, the 188 nations present at Rio+20 have committed to investing US\$ 513 billion in projects, partnerships, programs and actions over the next ten years in the areas of transport, green economy, energy, environmental protection, desertification, climate change, among others.

Created in October 2007, the Instituto Estadual do Ambiente - INEA is the body responsible for implementing state public policies on the environment, water resources and forestry resources adopted by the Executive and Legislative Powers of the State of Rio de Janeiro. Linked to the Secretary of State for the Environment, the institution's function is to integrate the State's environmental policy in attention to society's demands on environmental issues.

Among the various activities developed by INEA, the monitoring of air quality stands out, a practice carried out in the State of Rio de Janeiro since 1967, with the installation, in the municipality of Rio, of manual air quality sampling stations. As of 2012, after the RIO+20 Conference, this action was intensified, with the approval by the State Fund for Environmental Conservation - FECAM, of 24 million reais to be used in monitoring the state's air, as stated by the president of the agency, in an interview with *Jornal O Globo* (By Selma Schmidt on 05/19/2012).

The financial incentive provided significant improvements in Rio de Janeiro's air quality, through the modernization of the monitoring network, continuous investment in sampling equipment for various pollutants and meteorological parameters, installed in various regions of the State of Rio de Janeiro.

With the modernization, the current monitoring network now has automatic and semi-automatic networks, composed of 21 stations and 63 samplers, capable of monitoring the concentrations of particulate matter in the air, continuously. In addition, the stations are located in strategic locations, close to the State's main industrial sources and enterprises with significant polluting potential, allowing management and control policies to be directed to specific problems.

The Metropolitan Region of Rio de Janeiro, Médio Paraíba and Norte Fluminense concentrate the largest number of air quality stations, as they concentrate the largest number of sources of atmospheric emissions, have dense urban occupation, and intense circulation of motor vehicles.

## METHODOLOGY

According to BEUREN (2010), “scientific methodology comprises the set of steps neatly arranged to be performed in the investigation of a phenomenon”. The present research is classified according to the objectives, procedures and approach to the problem.

The research is classified as descriptive. According to VERGARA (2011), “descriptive research exposes characteristics of a given population or a given phenomenon”. Thus, this study aims to analyze actions present in the environmental public policy of the State of Rio de Janeiro.

The means of investigation of the research is characterized as documentary because it uses technical, financial and budgetary reports, available on the transparency portal of the State of Rio de Janeiro. VERGARA (2011) states that “documentary research is carried out on documents kept within public and private bodies of any nature, or with people”.

The work also fits as bibliographic, as it was carried out “based on material already prepared, consisting mainly of books and scientific articles”, GIL (2010).

The research was based on the “Vehicle Emissions Inventory”<sup>1</sup> produced by INEA, along with books, articles, legislation and websites related to the topic.

The metropolitan region was chosen to be inventoried because it presents the problem

of vehicular emissions significantly more pronounced than the other regions, since it comprises 71% of the fleet of vehicles registered in the State of Rio de Janeiro (DETRAN, 2013).

## DATA ANALYSIS

Since 2011, INEA has received from the State Fund for Environmental Conservation - FECAM an investment of around R\$ 45 million, for the optimization of the air quality and meteorology monitoring system in the State, aiming to fulfill the commitment agreed between the government of the State and the International Olympic Committee (IOC). Part of this resource was applied to the expansion (with the acquisition of 11 new automatic stations), operation, maintenance and adaptation of the air quality and meteorology monitoring network in the State of Rio de Janeiro and hiring a company specialized in environmental solutions, making it by the end of 2013, the largest network of automatic stations in the country.

During 2013, resources were also invested in the modernization of the database system and information integration, enabling the Institute to integrate air quality, atmospheric emissions and meteorology information generated into the INEA Spatial Database.

Next, each program will be analyzed by the amounts budgeted, committed, settled and PAYED, in the years 2012, 2013, 2014 and 2015.

## ENVIRONMENTAL QUALITY MONITORING

Although the goal initially set was the acquisition of four new air quality monitoring stations in 2013, and this has been expanded to 11 stations acquired by 2015, the number of samples carried out, both by the network

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1. Inventory carried out by the Air Quality Management - GEAR, which identifies the origin of emissions of atmospheric pollutants by mobile road sources circulating in the Metropolitan Region of Rio de Janeiro in the year 2013.



WORK PROGRAM: ENVIRONMENTAL QUALITY MONITORING				
YEAR	INITIAL ALLOWANCE	COMMITTED EXPENDITURE	SETTLED EXPENSES	EXPENSES PAID
2012	R\$ 8.828.332,00	R\$ 5.305.111,46	R\$ 5.305.111,46	R\$ 4.302.849,41
2013	R\$ 11.466.383,00	R\$ 4.194.638,65	R\$ 4.194.638,65	R\$ 3.386.347,46
2014	R\$ 6.822.328,00	R\$ 2.347.195,40	R\$ 2.347.195,40	R\$ 2.061.221,68
2015	R\$ 4.000.000,00	R\$ 2.764.498,55	R\$ 2.764.498,55	R\$ 2.565.013,28

Adapted from the Statement of Budget Execution of Expenditure.

Table 1: Stages of Expenditure - Environmental Quality Monitoring.

Source: RJ-SIG State Management Information System.

WORK PROGRAM: ENVIRONMENTAL EDUCATION FOR VEHICLE DRIVERS				
YEAR	INITIAL ALLOWANCE	COMMITTED EXPENDITURE	SETTLED EXPENSES	EXPENSES PAID
2012	R\$ 400.000,00	R\$ 0,00	R\$ 0,00	R\$ 0,00
2013	R\$ 300.000,00	R\$ 0,00	R\$ 0,00	R\$ 0,00
2014	R\$ 150.000,00	R\$ 0,00	R\$ 0,00	R\$ 0,00
2015	R\$ 200.000,00	R\$ 0,00	R\$ 0,00	R\$ 0,00

Adapted from the Statement of Budget Execution of Expenditure.

Table 2: Stages of Expenditure - Environmental Education for Motor Vehicle Drivers.

Source: RJ-SIG State Management Information System.

of automatic air quality stations in the INEA, as for the semi-automatic stations, increased significantly, exceeding expectations in 2015.

In 2015, the budget execution represented 69.11% of the forecast, becoming the highest in the period. In 2014, it had the lowest execution rate, with only 34.40%.

Within the scope of the Environmental Planning and Management Instruments, resources were invested in the modernization of the database system and integration of environmental information related to air quality, meteorology and atmospheric emissions, enabling the agency to integrate the information generated into the Database INEA Spaces. This development also allowed the WEB visualization of the data in a geospatialized way and the issuance of management reports with alert systems for critical episodes of air pollution.

The initially planned target was the

acquisition of four new air quality monitoring stations in 2013, having reviewed the number of samples carried out by the network of automatic and semi-automatic stations. This fact is due to the implementation, during 2013, of 9 of the 11 stations acquired at the end of 2011, in addition to the hiring of a specialized company to perform the services of operation, maintenance and adaptation of the networks.

On January 10, 2014, services were carried out for the development and implementation of an Integrated Information System for Air Quality Control, which consists of a spatial database to promote the integrated control of environmental information on air quality.

## ENVIRONMENTAL EDUCATION FOR MOTOR VEHICLE DRIVERS

The Superintendence of Environmental Education is responsible for the elaboration

and implementation of public policies for Environmental Education in the State of Rio de Janeiro.

Within the scope of INEA, the Air Quality Management of the Information, Monitoring and Inspection Department, in compliance with Action 1529 of this Program, carried out campaigns aimed at environmental education for drivers and users of motor vehicles, with the objective of raising awareness of the population about the need to keep their vehicles regulated in order to contribute to reducing the emission of polluting gases into the atmosphere. The goal originally set was to carry out 1 (one) annual educational campaign, however, this number was increased to 3 (three), on themed days to raise awareness of problems related to air pollution, they were: Environment Week and Inter-American Air Quality Day.

Two campaigns were carried out on September 22 and 28, in commemoration of World Car Free Day, at the Pracinas Monument - Aterro do Flamengo and at São Francisco Beach, Niterói. The events were promoted by the Cycling Federation of the State of Rio de Janeiro and aimed to raise awareness of society for the adoption of urban mobility alternatives that contribute to the reduction of vehicular pollution.

Although the expected goal was one (1) annual campaign, this number was increased

to three (3) due to the demand and receptivity of society in relation to the topic.

All actions were carried out as planned, and no initiative was interrupted. However, they did not use State financial resources, since the campaigns were carried out by the Cycling Federation.

### **IMPLEMENTATION OF THE VEHICLE REFERENCE CENTER**

It was not possible to carry out this Program, due to the technical impossibility of implementation, new locational alternatives were prospected for the implementation of the Reference Center, since it depends on specific characteristics, difficult to reconcile in large urban centers such as Rio de Janeiro, such as: easy access for large vehicles, space for carrying out gas inspection tests in vehicles, rooms and laboratories for training, as well as a place for the administrative installation.

During this period, 2 areas were pre-selected, the first belonging to the Brazilian Army, and the second, the Companhia Docas. In both cases, the space assignment process was forwarded, however, when it was formalized, the parties lost interest in carrying out the Project.

From 2012 to 2015, budget amounts were foreseen in the LOA, but nothing was actually implemented. However, it is worth mentioning that Rio de Janeiro is the only state in the

<b>WORK PROGRAM: IMPLEMENTATION OF THE VEHICLE REFERENCE CENTER</b>				
<b>YEAR</b>	<b>INITIAL ALLOWANCE</b>	<b>COMMITTED EXPENDITURE</b>	<b>SETTLED EXPENSES</b>	<b>EXPENSES PAYED</b>
2012	R\$ 500.000,00	R\$ 0,00	R\$ 0,00	R\$ 0,00
2013	R\$ 200.000,00	R\$ 0,00	R\$ 0,00	R\$ 0,00
2014	R\$ 200.000,00	R\$ 0,00	R\$ 0,00	R\$ 0,00
2015	R\$ 200.000,00	R\$ 0,00	R\$ 0,00	R\$ 0,00

Adapted from the Statement of Budget Execution of Expenditure.

Table 3: Stages of Expense - Implementation of the Vehicle Reference Center.

Source: RJ-SIG State Management Information System.

country where there is a partnership between the Traffic Department – DETRAN-RJ and the environmental agency, in the vehicle inspection process. This measure makes the State the most advanced in terms of vehicle inspection in Brazil.

## GENERAL ANALYSIS

Several vehicle emission control measures were applied. Estimated emissions were reduced by approximately 90% for carbon monoxide (CO) and 75% for oxides of nitrogen (NO<sub>x</sub>). In relation to the sum of estimated emissions in 2004 and 2016, the reduction reached 90%, according to the 2nd Inventory of Vehicle Emissions of the Metropolitan Region of Rio de Janeiro.

To reach this percentage, the State Government intensified vehicle inspections; improved the Inspection and Maintenance Program for Vehicles in Use, carried out in partnership between INEA and DETRAN; improved the Procon Fumaça Preta Program, which intensified the control of heavy vehicles traveling in the State of Rio and encouraged the use of Natural Vehicular Gas (CNG).

At the national level, the measures adopted were: use of biofuels such as the ethanol and an increase in the percentage of biodiesel in diesel; improvement in the quality of commercialized fuels; and manufacturing vehicles with stringent emission control systems.

## FINAL CONSIDERATIONS

The evaluation of public policies is a very important practice for public administration, as it makes it possible to add transparency to management, makes government spending more efficient and improves social control.

The main objective of this study was to verify the benefits that the public policy on air quality has brought to the state of Rio de Janeiro, using the “Vehicle Emission

Inventory” carried out by INEA as a basis.

The inventory is an extremely useful tool in the control of atmospheric pollution, as it allows the survey of pollutant emissions emitted by the fleet of motor vehicles in a region, enabling the development of preventive and corrective governmental actions.

After analyzing the data, it was possible to verify that the implementation of the Public Policy aimed at air quality in the State of Rio de Janeiro, in the period from 2012 to 2015, generated significant benefits to society, especially the reduction in the emission of polluting gases that culminated in the improvement of air quality in the State, the increase in the population’s awareness, through environmental education campaigns, the improvement in the population’s quality of life and health, due to the probable decrease in the number of people with respiratory diseases, among others.

In relation to the percentage executed in the budget, around 50% of the initial allocation was invested and only one of the actions was carried out - Modernization of the State Environment System, belonging to the Environmental Quality Monitoring Program.

Thus, the State became a reference in the control of air quality at the national level and the expertise of its Environmental Management, in this period, served as a stimulus for other States, such as: São Paulo and Espírito Santo, interested in mapping the air quality of their metropolitan regions.

It was not possible to verify the impact of improving air quality in relation to health expenditures in the assisted population, due to the absence of a database. Therefore, as a suggestion for future work, it would be interesting to analyze health indicators, especially regarding respiratory diseases, in the period from 2012 to 2015, to correlate the results of public policy on air quality with health.

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